

# EMERGING DIGITAL TRENDS IN INFORMATION TECHNOLOGY AND SERVICES

Haris U.

**HARIS UMMATH**  
Assistant Professor  
Dept. of Computer Science  
KAHM Unity Women's College  
Manjeri - 676 122

Post Graduate Department of Computer Science  
Korambayil Ahamed Haji Memorial Unity Women's College, Manjeri  
P.O. Narukara, 676 122, Malappuram District, Kerala, India

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Edited by

**Haris U.**

Assistant Professor, Post Graduate Department of Computer Science,  
KAHM Unity Women's College, Manjeri, P.O. Narukara, Malappuram District,  
676122 - PIN, Kerala, India.

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**Haris U.**

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## Forward

We all know that the software projects are not easy to build when we need to do something new. And a corollary is there, “The only software that is worth is the software that does something new”. This book contains the new different software projects developed by the students of the Post Graduate Department of Computer Science at KAHM Unity Women’s College, Manjeri.

I would like to laud the editor of this book, Mr. Haris Ummath, for spending his valuable time to prepare this book and all the authors, who have given their contributions for forming the book in this frame, too. I hope, this book will serve as an unexampled reference for those who are aspirant in software developments.

Rahib B.

Assistant Professor & Head  
Post Graduate Department of Computer Science  
KAHM Unity Women’s College, Manjeri

# Preface

The principal focus of the book *Emerging Digital Trends in Information Technology and Services* is to publish the software developments using latest technologies that happens in the area of Information Technology.

The book chapters in this book are written by final year Undergraduate Students of B.Sc. Computer Science and their supervisors as co-authors. I sincerely thank our eminent authors for their contribution to this book and I expect that the book will be valuable addition to the existing body of knowledge and is especially intended for students and teachers.

Haris U.

## Acknowledgements

This book is a product of an extensive effort of the post graduate students and the faculties in the department of Computer Science. Therefore, I express my sincere appreciation to all authors of this book. I thank the head of the department Mr. Rahib B for his whole hearted support and constant encouragement in revising the book. I also acknowledge the principal Prof. (Dr.) Muhammed Basheer Ummathur and Manager Engr. O. Abdul Ali for this opportunity for our department to publish this book. I express my sincere thanks to my colleagues and my students for their cooperation during editing process.

Haris U.



# Contents

1. Emotion Recognition for Autistic Children ..... 01 - 18  
Shahana Sherin K.T.  
Jisna
  
2. Online Ambulance Booking ..... 19 - 25  
Fathima Rishla P.  
Tamim Fathima  
Mohammed Shefееq N.T.  
Anandhu K.  
Houlath K.
  
3. Shopping Autocart ..... 26 - 37  
Nahdha C.  
Nasla K.P.  
Shihabul Haq. M
  
4. Department Software ..... 38 - 52  
Nishana Sherin C.  
Shahana P.  
Shihabul Haq M.
  
5. Face Recognition Based Attendance ..... 53 - 58  
Mubashira K.M.  
Mohammed Safwan K.  
Rishad E.  
Muhammed Adnan M.  
Neethu M.

6. Secure Cloud Data Deduplication with Efficient Re-Encryption ..... 59 - 66  
Fathima Liba P.  
Jahana Thasnim C.K.  
Shihabul Haq M.
7. QR Covid - An Outbreak to Covid-19 ..... 67 - 72  
Nitha Mol  
Haneena T.P.  
Himna K.  
Fasna M.M.  
Jashira P.
8. IOT Based Home Automation and Security System ..... 73 - 79  
Farseena P.  
Shihabul Haq M.
9. Prediction of Dropout Students Using Datamining Techniques for  
Improving Their Intellectual Skills by Collaborative Learning..... 80 - 88  
Fathimath Shabana



# EMOTION RECOGNITION FOR AUTISTIC CHILDREN

\*Shahana Sherin K.T.<sup>1</sup>

Jisna<sup>2</sup>

<sup>1</sup>Department of Computer Science, Korambayil Ahamed Haji Memorial Unity Women's College Manjeri, Malappuram, Kerala, India

<sup>2</sup>Department of Computer Science, Noble Women's College Manjeri, Malappuram, Kerala, India

\*Corresponding author: shanishanz321@gmail.com

## Abstract

Assistive technology has proven to be one of the most significant inventions to aid people with Autism to improve the quality of their lives. In this study, a real-time emotion recognition system for autistic children has been developed. Emotion recognition is implemented by executing three stages: Face identification, Facial Feature extraction, and feature classification. The objective is to frame a system that includes all three stages of emotion recognition activity that executes expeditiously in real time. Thus, Affectiva SDK is implemented in the application.

The propound system detects at most 7 facial emotions: anger, disgust, fear, joy, sadness, contempt, and surprise. The purpose for performing this study is to teach

emotions to individuals suffering from autism, as they lack the ability to respond appropriately to others' emotions. The proposed application was tested with a group of typical children aged 6-14 years, and positive outcomes were achieved.

**Keywords:** Autism, Emotion recognition, assistive, facial

## Introduction

Autism spectrum disorder is a neurological disorder that affects communication and behavioural skills. It was initially discovered by Kanner in 1943, nevertheless current understanding of ASD has advanced immensely in terms of diagnosis and treatment. Autism can manifest at any age; however, it is known as a developmental syndrome, with the first indications manifesting in early years of a child's life. According to DSM-5 (Diagnostic and Statistical Manual of Mental Disorders), a person with autism lacks efficiency in behavioral, social and communication

Therefore, difficulty in effective communication, emotion recognition and social interaction are generally considered as a significant trait of individuals with ASD. All individuals with ASD experience difficulty in one of the above-mentioned social aspects, regardless of their intellectual abilities or the severity of disorder.

The ability to understand other people's emotions and reciprocate them is defined as empathy. While sympathy is the ability to share similar feelings as another person. People with ASD may not possess the capacity for either sympathy or empathy. They may show signs of joy when someone is hurt, or they respond with no emotions whatsoever. Thus, the inability to respond appropriately to others' emotions may create appearances that autistic people don't feel emotions.

However, numerous studies have examined whether autistic people can truly show emotions to others or not. Understanding and interpreting other people's impressions by noticing body language, voice, facial expressions carefully is a prerequisite to show empathy. While children learn to recognize facial expressions required to show empathy by observing and mimicking people around them, people with ASD don't have adequate social skills related to interpretation of body language and reciprocating



emotions. Most social skills required to interact with others are severely compromised in people with ASD. There is a distinct social and emotional paucity related to ASD that generally consists of impairments in social emotive understanding, social semiotics and cognition.

Generally, a person with autism is incapable of sympathizing with another person's emotions and mental state by observing facial expressions or voice intonation. Also, they may experience difficulty in anticipating other people's behavior by interpreting their mental state. Likewise, social semiotics that refers to an individual's ability to react appropriately in a peculiar social circumstance can be challenging for a person with ASD, which may in turn lead to difficulty in maintaining positive peer relationships.

The social and emotional paucity can impact the quality of life for person with ASD in diverse forms like social rejection and exclusion. It may also affect the scholastic and professional incompetence along with intellectual health issues. Emotion recognition research is extensively based on facial expressions. The ability required to detect emotions and differentiate among other facial expressions usually develops from birth. Children with ASD often exhibit no interest to facial expressions. Additionally, children with autism interpret facial expressions in an erratic manner, thus it can be deduced that they lack skills in recognizing emotions.

Interpreting emotions generally entail multiple sensorial processing. Emotion can be understanding from facial, body and speech metrics as well. The potential to detect emotions requires the propensity to split scrutiny and concentrate observance on pertinent facial information, such type of processing is mostly subliminal. People with ASD and High-functioning Autism (HFA), are identified by disability in social and behavioral skills and possess inadequate understanding of interpreting emotions of the other person.

## **Role of Assistive Technologies for People with ASD**

Assistive technology is any equipment or device that allows people with ASD to perform activities that would not have been possible otherwise. Such technological support tools help people with disabilities to perform daily life activities. Recently, there has been a surge in development of technology that aids people with autism. Such

technology varies from low-level to potent and evolving technologies. The main objective of assistive technology is to aid people with special needs.

The use of technology for such people would contribute to the potential adoption of assistive technologies in specially designed centers or schools aiding such individuals. Combined effort between such centers, schools and government might lead to creating technology-based therapeutic rooms. The majority of researchers agree that it is essential to systematically select the appropriate assistive technology for individuals with autism depending on the severity of the disorder. Thus, not all assistive technology is suitable for every individual. Each person with ASD has their own unique set of traits. Therefore, it is apparent that a common set of assistive technology does not exist. Only experts are capable of identifying the distinctions and satisfy the requirement for appropriate assistance.

Assistive technology varies from basic techniques to an advanced computing technology. It can be classified into three main categories: basic assistive technology, where pictorial cards are used for communication between the child and the instructor, medium assistive technology refers to graphical representation systems, while advanced technology encompasses human-computer interaction applications like robots and gadgets.

Since the purpose of assistive technology is to reduce the functional restrictions of an individual with autism, various technologies fall under the definition of assistive technology. One of them is adaptable toys that allow a child to experience and control their surroundings despite significant physical limitations. Another technological application that is used to improve communication of people with ASD is Augmented and Alternative Communication (AAC), which consists of a plan of actions that could help a non-verbal person to interact with others.

Also, use of computer-based adaptive learning can altogether enhance the methods to make such special people learn to improve their life. People with disability can familiarize themselves with computers via a distinct medium that allows for auxiliary input and output control. This medium can be hardware, software or an integration of both. Some of the advanced technological computing devices that have evolved fall within



the category of dynamic assistive technology that includes control apparatus, touch screens, augmented and virtual reality applications.

These technologies can be utilized both for analysis and for therapy. People with ASD have shown more interest in pictures and graphics. Pictorial cards have proved to be an effective way to make them learn how to perform daily tasks and they tend to be efficient visual learners. People with disabilities have problems with decision making, judgements, learning and a lack ability to remember. Nevertheless, assistive technology focuses on improving social and behavioral skills. It has been anticipated by several studies that autistic children are puzzled whenever a daily routine task sequence is required.

To overcome this problem, picture cards are used to make them learn about task schedules. Some studies have demonstrated that autistic children have a potential to understand graphical representation better than vocal representation. Several research works have demonstrated that interactive computer games have a positive impact on improving social and behavioral skills of autistic persons.

In study, authors presented a collaborating gaming application to develop communication skills of autistic children. In this gaming application, an autistic child was asked to say the name of objects in the images shown on the screen. Results were measured on the basis of whether or not the word was named correctly by the child.

However, one of the drawbacks of this study was that the child was not trained properly before using the proposed application. Another study also proposed an interactive compute application for individuals with Asperger's syndrome. Asperger's syndrome is an intellectual disorder and it is a type of Autism Spectrum Disorder (ASD). Individuals with Asperger's might be entirely speechless, some might have difficulties speaking, or lack the ability to formulate sentences.

The authors have illustrated a web-based application to improve social and communicative skills of such individuals. In another study, the authors proposed an application that incorporates games to enhance the learning ability of special needs children. Similarly, the authors in study, presented an exceptional concept that will educate and help autistic children to learn about the notion of money in our society, thus improving the social skills.



## Emotion Recognition techniques

A facial detection system that does not only identify faces in an image, but also calculates the type of emotions from facial features, has been long studied by researchers and technology experts. One of the first studies regarding automatic facial detection was documented in 1960 by Bledsoe for the US Department of Defense. Since then, software was built specially for the Department of Defense, however, little detail is available to the public about the product. In early 1960s, Bledsoe explained a number of issues encountered by modern facial recognition systems. His concepts and techniques were later on utilized by Bell laboratories.

The foremost fully functional automatic facial recognition system was accomplished by Kanade. This system was capable of measuring sixteen distinct facial features by distinguishing between the features extracted from a computer with those extracted by humans. However, the accuracy percentage for this algorithm ranged from 45 to 75% only.

A number of studies illustrated that computer assistive learning technology acts as an efficient therapeutical tool for autistic persons, being progressively used more. One of the studies, depicts how visual presentation can aid autistic children learn about emotions. They created a number of videos and games to teach the child about different kinds of emotions and analyses their progress. Another research paper proposed a web application that provides such special children with a platform to interact by using a simulated model.

Further, a project named "AURORA" incorporated the use of a robot and enabled interaction between the child and the robot, thus providing a human-computer interaction interface. Another study encourages human-computer interaction presenting a number of short videos of distinct kinds of emotions, to teach emotions to special needs children. The authors explore different prospects of using robots as therapeutic tools.

Despite the numerous studies related to teaching emotions to autistic children, various challenges persist. It is quite difficult for an autistic person to interpret emotions from facial expressions. A study demonstrated an application providing an emotional hearing aid to special needs individual. One of the techniques used for recognizing facial

expressions is the facial action coding system (FACS), proposed by Ekman and Friesian in. The facial action coding system illustrates different types of facial expressions depending upon the facial muscular activity.

This system permits the measurement and recording of facial expressions in a quantifiable manner. With the progress in developing real time machine learning algorithms, there has been substantial development of facial recognition systems. The paper provides comprehensive literature of present methods and applications of automatic facial recognition systems. The literature illustrates that the majority of the current systems recognize either the six basic facial expressions or different types of facial expressions.

The methods of recognizing emotions through both facial and verbal expressions is defined as emotion recognition. Emotional intelligence plays a vital role in identifying emotions. Understanding emotions involves biologic and physical processes, and refers to the potential of distinguishing the emotions of others [32]. An individual can accurately predict emotions by observing facial expressions and somatic changes by transforming these noted changes to their physiological presentation. According to Darwin's study, it is presumed that the process of identifying emotions involves multiple models of behavior, thus providing a detailed classification of 40 states of emotions.

However, the majority of studies related to stratification of facial attributes refers to the classification of six basic emotions presented by Ekman. The six basic emotions are: happiness, sadness, surprise, fear, disgust, and anger. Yet sometime later neutral expression was also appended with six other basic emotions. The significant benefit of implementing this model is that these sets of emotions are easy to identify.

Numerous computer-based methods have been designed to interpret human's sentiments and human feelings more accurately to enhance user experience. They predominantly rely on cameras or webcams to predict significant human facial expression. An individual can frequently infer the emotions of another individual facing the camera or webcam with moderate accuracy. Meanwhile, various research studies in machine learning and image processing show that human sentiments can be identified conspicuously by means of facial features and eye gaze behaviors.



The Facial Action Coding System (FACS) can be defined as a system to classify facial impression via the affectation on the face. It was first proposed by Ekman and Friesen in 1978, later it was updated by Hager in 2002. Variations in facial muscles, even from modest distinct changes in facial movement are computed with the help of FACS. The concept of FACS is significantly used to systematize an individual's emotions, and it has proved to be effective for therapists.

FACS has been shown to be an autonomous computing structure used to recognize faces in video streams, where the geometrical feature extraction of faces is performed followed by production of a time-based outline of facial activities called Action Units (AUs). In FACS, every noticeable change in facial expressions is outlined through Action Units (AUs), generally defined by coders. Coders demonstrate which Action Unit is used to generate changes in facial movements; this attribute makes the concept of FACS coding entirely empirical. Also, scoring it is essential to involve frame-by-frame inspection to detect the AUs that appear frequently in real-time video streaming.

In FACS, facial activities can be computed but sometimes it is not easy to categorize emotions into one of the basic six emotions, like distinguishing between genuine and fake smiles, and depression-like emotions. FACS includes code for 27 facial Action Units, 25 head and eye, and 28 auxiliary Action Units for heterogenous movements. The Action Units related to face are separated into lower and upper facial appearance.

Upper facial expression includes Action Unit 1 and 2 for inner and outer brow raiser, Action Unit 4 for brow lowering and Action Unit 5 and 6 for eyelid and cheek raiser. However, lower facial expressions are quite convoluted including erect, straight, skewed and orbital Action Units. The majority of facial movements consist of a combination of upper and lower Action Units.

### **Proposed Assistive Tool**

From a historical perspective, we can postulate that there exist several techniques for recognizing facial emotions. Corresponding systems for detecting and recognizing facial expressions autonomously include some difficulties like detecting face, facial feature extraction, and meticulous classification of emotions. There is a significant component of

each of these systems whose aim is to analyse the facial expressions: facial recognition; facial feature extraction; the classification of facial features.

The purpose of our application is to develop and execute real time emotion recognition by using camera, such that the application offers potential to measure the data cumulatively. Such a system would aid individuals with ASD in learning about emotions. In the near future, such applications could be incorporated in the learning environment, to address the difficulties faced by special needs children in recognizing other people's emotions. Our proposed solution can be implemented and used to deduce the degree of success in detecting emotions from face.

The question that needs to be answered is whether it is possible to recognize emotions, regardless of conditions such as distance from the face, lights affecting the background, frequent movement of face, or any other deviations. The hypothesis can be framed as: The potential of our proposed system to recognize emotions does not depend upon the distance from the face, lighting conditions and recurrent facial motions. The concept of analyzing emotion phases via facial expressions shares similarities with the concept used in face detection.

The complete evaluation states can basically be broken into three successive stages. These are: detecting face in a video frame with complex background, including its standardization; extracting relevant facial features to define emotion by implementing a preferred classifier. The selection of an appropriate classifier is inevitably determined based on the method used and on the basis of required results.

So, in this application we did not implement a conventional approach for recognition, extraction and classification stages while designing, rather we implemented the substantiate available open-source Libraries, APIs and SDKs, as well as Affectiva SDK. The major benefit of implementing such services is that there is no need to handle training datasets eventually at the last stage of the emotion recognition procedure.

The algorithm of the proposed AutisMitr is shown below:

Step 1: Capture Video from the camera,  $\vartheta T$

Step 2: Extract Frames from the video  $\vartheta T \in \{\varphi_1, \varphi_2, \varphi_3, \dots, \varphi_n\}$

Where  $\vartheta T$  = Video Sequence recorded at T th Second.  $\varphi_n$  = n th frame of video



sequence.  $n$  = frame rate.

Step 3: Extract facial features from frame  $\varphi_n$ , namely the Action Units like eyebrow raiser, lip opening, closing, eyes opening, closing, and cheek movement and so on.

Step 4: Compute action units AU1, AU2, ..., AU $n$ .

Step 5: Use Facial Action Coding System (FACS) to label AUs.

Step 6: Generate text notification like joy, anger, surprise, fear, disgust, and contempt for autistic children.

Step 7: Text to Speech conversion to assist autistic children

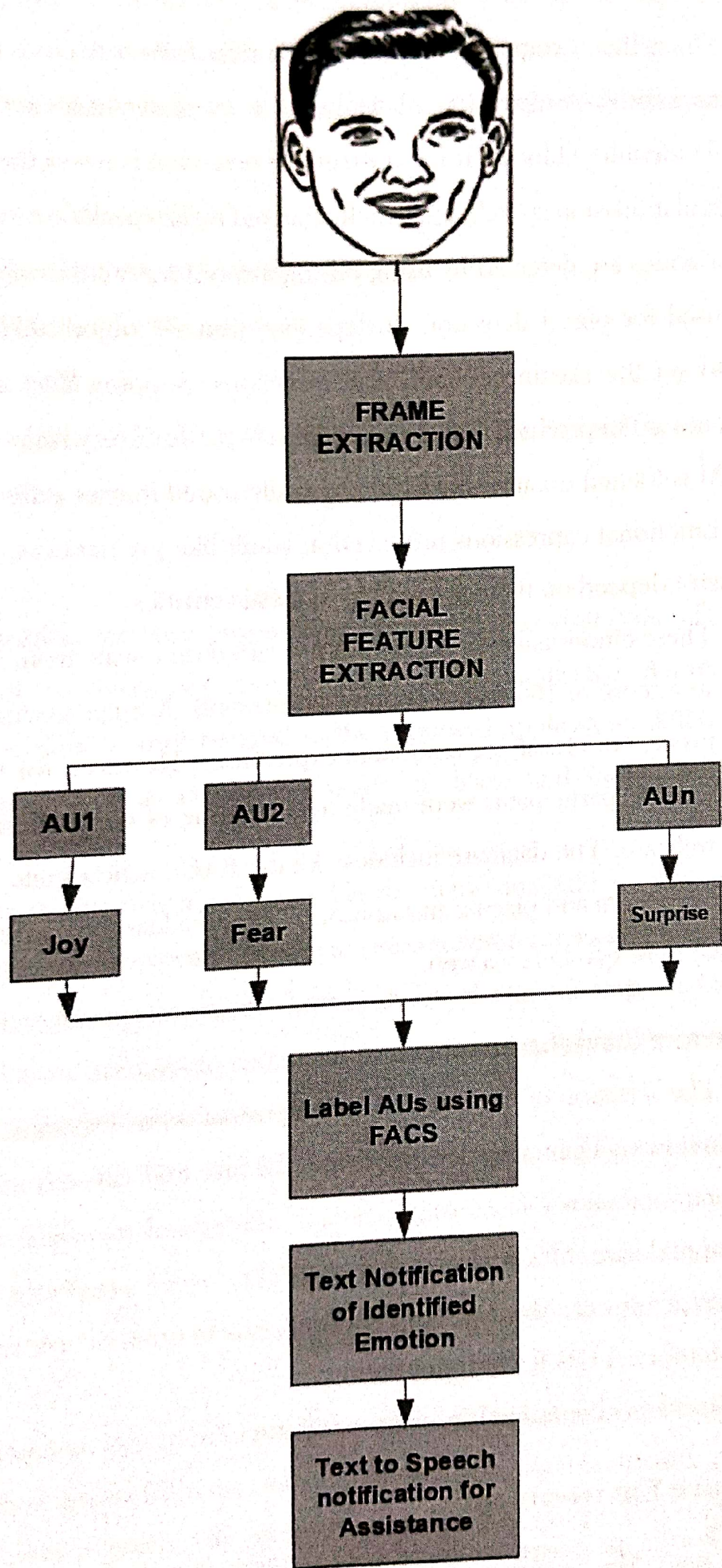
## Methodology

In this study, an emotion recognition system was developed that renders real-time facial expressions and automatically recognizes the facial expressions captured by camera. Figure 1 presents a proposed methodology of our emotion recognition system. The video stream is captured by camera. Once the video stream is input to the SDK, it is followed by the process of frame extraction. The Affectiva SDK supports various platforms such as Android (Java), iOS, C++, Linux, C#, JavaScript. This available SDK functions on the idea of expanded facial impression prototype at subsequent levels: detecting relevant facial features, feature extraction, feature classification, and implementing emotion facial action coding system.

Facial recognition and extraction of relevant attributes is processed by implementing the Viola-Jones recognition algorithm. The Viola-Jones algorithm provides a framework for detecting objects or faces in real time. This particular algorithm was introduced to resolve the problem of face detection in images. It is implemented in our application because of its significant features such as: it is quite resilient as it has a high rate of detection; it can be used for real time detection; and it is implemented only for facial recognition and detection.

The algorithm has four distinct phases, they are: Haar Feature selection, producing image representation named as integral image, adaboost training and cascading classifiers. One of the significant contributions of this study is introducing the ViolaJones algorithm to implement a group of features for image recognition. These features are a group of pixel values altogether inputted to the algorithm.







Once the recognition is performed, it is followed by a process of landmark detection. Landmark detection is employed to every rectangle surrounding the face by almost 34 identified blocks. If the measure of detection is lower than the threshold, then the particular division is excluded. All the derived facial specks are presented by this SDK. Facial activities are detected by using Histogram of Oriented Gradient (HOG), which is widely used for object detection. It depends upon the object attributes enclosed in an image to get the classification of edge directions. Support Vector Machine algorithm (SVM), is used to produce score ranging from 0-100 for every facial activity. In this SDK, the SVM is trained on almost 10,000 physically coded images gathered from around the world. Emotional expressions produced in result like joy, sadness, anger, fear, surprise, and disgust depend on the combination of facial activities.

These emotional expressions are measured on a scale from 0 (i.e., the emotion is absent) to a score of 100 (i.e., emotions are present). A huge amount of data is required for the process of classifying emotional expressions. However, for data accumulation in Affectiva SDK, participants were made to watch one of the three advertisements, while using a webcam. The database includes: All the FACS action units; head motions; facial feature extraction; and placing autonomously identified landmarks. All the information is accessible to researchers via web.

## **Hardware Environment**

The selection of hardware is very important in the existence and proper working of any software. Then selection hardware, the size and capacity requirements are also important.

- Input device: Mouse, Keyboard
- Output device: Monitor
- Memory: 4 GB RAM (minimum)
- Processor: Pentium IV processor & above

## **Software Environment**

For the proposed system to work properly, it is necessary that following software

are installed and running on the server / client. One of the most difficult tasks is selecting software for the system, once the system requirements is found out then we have to determine whether a particular software package fits for those system requirements. The application requirement:

- Operating System: Windows7/8 & above
- Front End: Android, Python Back End: MySQL
- IDE: Android Studio, Jet Brains, PyCharm
- Software Used: SQLyog
- Web Browser: Internet Explorer/Google Chrome/Firefox (for web application)
- Coding: Python, Android

## **App Features**

In this publication, we have proposed an emotion recognition system for autistic children. Features of the developed application are further explicated. As, mentioned previously, Affectiva SDK is implemented in the proposed application. Affectiva is an organization, whose goal is to enable computers to learn and understand human emotions.

This solution is primarily implemented in the marketing field, developed on the basis of observations made by exposing people to video advertisements and assessing their reactions to a similar advertisement in distinct statistical surroundings. Additionally, Affectiva developed a sensor that can recognize emotions depending on the reactions in the skin. Initially, Affectiva distributed its SDK in 2015.

The latest version of SDK is 4.0.0 for Windows operating system, released in October 2017. The SDK's main objective is to recognize facial expressions and classify the corresponding emotions. Our application interface is quite straightforward; it is adequate for recognizing emotions of an individual. The application's main characteristics are:

- The application can detect emotions in normal light radiance, from a distance of approximately 7 meters from the device to the smallest possible distance of 15 cm.
- All the directions to modify the state of the application are present on the front screen. However, it takes around 10 to 15 seconds to recognize and notify emotion.



- Additionally, “Start SDK” and “Stop SDK” toggle buttons are used to initiate and close SDK, respectively.
- Similarly, “Start Camera” and “Stop Camera” toggle buttons are used to initiate and turn off the camera, respectively.
- Further, “Front” and “Back” toggle buttons signify the use of front camera or back camera as per the requirements of a testing environment.
- Since our application detects the emotions in real time, there is no need to record the video *stream*.

In this study, the basic emotions we focused on were: Anger; Disgust; Fear; Joy; Sadness and Contempt. Affectiva SDK also provides indexing of facial expressions, however, the measuring score for expressions is disabled, i.e. the expressions are classified as “NaN”, meaning it is not considered for scoring.

## **Conclusion**

The application presented here will be beneficial for individuals suffering from ASD by allowing them to learn and recognize emotions of others, as they are unable to understand their emotions on their own. The key attribute that makes this application unique is that the emotions are recognized and then communicated by speech.

The purpose of performing this study was to teach children and individuals suffering from ASD about emotions, so that they can express their emotions to others and at the same time they can interpret the emotions of others. Since children with ASD lack social, communication and behavioural skills and they are not comfortable with unfamiliar environments and people, this application will be helpful to such children, as they are more inclined to use gadgets and digital devices.

This application detects and recognizes emotion even if the face is slightly tilted. If the face of an individual is rotated less than 15 degrees, the emotion is recognized, whereas if the head or face of an individual is rotated above 15 degrees, then detection is not successful. There are numerous emotion recognition systems available.

What makes our system unique is that it was developed to help autistic children to learn about empathy. While testing our application with a group of children, the focus was not only on the successful outcome, rather it was on whether the application can

recognize emotions in the image regardless of differing lighting conditions or the distance from the face. Simultaneously, it was also observed that the software is capable of not only recognizing emotions but also measuring the score of the recognized emotions.

Therefore, the potential of our application to recognize emotions and measure the score of recognized emotions is entirely independent of the distance, light conditions and facial image. Also, it was observed that the score of facial emotion recognition was strongly influenced by the rotation and movement of the subject's head and face. It was observed that the smallest distance for face detection is 20 cm and the largest is approximately 7.5 meters.

Thus, it was not necessary to statistically verify the outcomes of the test experiments, because the software either recognizes or doesn't recognize the emotions from a face. Moreover, the percentage of successful classifications of facial emotions is not evaluated, rather the comprehensive average percentage of successful detection and recognition of facial emotions is measured by implementing Affectiva SDK, which is 85.97%. Nonetheless, if the face does not rotate above a 15-degree angle, 100% value is attained.

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# ONLINE AMBULANCE BOOKING

\*Fathima Rishla P.

Tamim Fathima

Mohammed Shefeeq N.T.

Houlath K.

Department of Computer Science, EMEA College of Arts and Science, Malappuram,  
Kerala, India

\*Corresponding Author: rishlapookkayil@gmail.com

## Abstract

As in India every minute's one person dies. Because he is not able to reach the Hospital in time. So, we are developing an application which will reduce the time. The main function of this project will reduce the time between ambulance driver and the Patients and it will save someone's life. When the patient or user will open the user. Application on his smartphone and when he clicks on emergency button given on application it will directly send its location to the ambulance driver which are available nearby him. We will require two smartphones one for user and other for ambulance driver. Global Positioning System (GPS) hardware and uses Google Map Application Programming Interface (API) to plot details of the user and driver on Google Map of the Smartphone. Because of this application we save time as well as we save a life of a human.

## Introduction

This software developed for managing ambulance services. This is a much-needed app as we have seen many casualties caused due to the lack of services provided by the hospitals or the ambulance being not able to reach at time to the patient. The project deals with the problems on managing Ambulance services and avoids the problems which occur when carried manually.

The software will be a website that will be used for booking the Ambulance in an organized manner. Using this system, it is easy to book the ambulance. This platform provides the facility for upgrading and digitalizing the traditional channels that were used to seek help. All the details are managed online, very easily and can be accessed without any problem from anywhere anytime through internet.

It provides high security to the information stored in the database to access. Identification of the drawbacks of the existing system leads to the designing of computerized system that will be compatible to the existing system with the system which is more users friendly.

## Existing System

For the past few years, the need for ambulance services is increasing rapidly. Thereby there may be a tight requirement for the ambulances. And hence there is a lot of strain on the person who are managing these. This is a much-needed app as we have seen many casualties caused due to the lack of services provided by the hospitals or the ambulance being not able to reach at time to the patient.

The project deals with the problems on managing ambulance services and avoids the problems which occur when carried manually. Identification of the drawbacks of the existing system leads to the designing of computerized system that will be compatible to the existing system with the system which is more users friendly. we can improve the efficiency of the system, thus overcome the following drawbacks of the existing system.



- Human errors
- More strength and strain of manual labour needed
- Difficult to handle
- Huge waiting time
- Difficult to handle

## Proposed System

The drawback of the existing system is that it is difficult in the situations as we have seen many casualties caused due to the lack of services provided by the hospital or the ambulance being not able to reach at time to the patient. It is difficult sometimes to handle the system manually and it is less accurate. Moreover, it is very difficult to time consuming.

The proposed system is very easy to operate. Speed accuracy are the main advantage of the proposed system. There no redundancy of data. There is no delay. Ambulance in the shortest possible time at the lowest cost that they're able to negotiate and are comfortable. The data are stored in the computer secondary memories like hard disk, etc. It can be easily received and used at any system. The proposed system will easily handle all the data and the word done by the existing system.

## Need And Significance

- It reduces the manual effort to gather information.
- Time consuming.
- User can inform the need of ambulance to the drivers.
- Provide the current location of the ambulance.
- User can send request for booking the Ambulance.

## Objectives

- It computerizes the ambulance booking system.
- Drivers can register their ambulance in the site.
- It contains all ambulance details and drivers' details.
- User can send the request for ambulance in the website.

- Provide the current location of the user, hence it helps drivers to know whether any bus is available for them or not.
- User friendly.
- Easy to handle, update, keep record.
- Provide security.

## **Front End**

### **React:**

React is free and open-source front -end JavaScript library for building user interfaces based on UI components. It is maintained by Meta and a community of individual developers and companies. React is a JavaScript Library created by Facebook for creating dynamic and interactive applications and building better UI/UX design for web and mobile applications. React is an open-source and component-based front-end library. React is responsible for the UI design. React makes code easier to debug by dividing them into components.

## **Backend - Node.JS**

Node.js is an open source, cross-platform, back-end JavaScript runtime Environment that runs on the V8 engine and execute JavaScript code outside a web browser. Node.js is primarily used for non-blocking, event-driven servers, due to its single-threaded nature.

It's used for traditional websites and back-end API services, but was designed with real-time, push-base architecture in mind, Node.js really shines in building fast, scalable network applications, offers benefits in performance, faster development, and other perks.

## **Express JS**

Express is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications. With a myriad of HTTP utility methods and middleware at your disposal, creating a robust API is quick and easy.



Express.js, or simply Express, is a back-end web application framework for Node.js, released as free and open-source software under the MIT License.

It is designed for building web applications and APIs. It has been called the de facto standard server framework for Node.js. Express.js is a free and open-source web application framework for Node.js. It is used for designing and building web applications quickly and easily.

## **MongoDB**

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server-Side Public License. MongoDB is a document database with the scalability and flexibility that you want with the querying and indexing that you need.

## **Technical Requirement**

### **Hardware**

- Input Devices: Mouse, Keyboard
- Output Devices: Monitor, Smart Phone
- Memory: 4GB Ram (Minimum)
- Hard Disk: 500GB

### **Software**

The Software specification means the operating system and all other applications or tools used for the development of the proposed system. It includes the operating system, and the software which we are going to use.

- Operating System: Microsoft Windows 7 or above
- Front End: React
- Back End: NodeJS, MongoDB, ExpressJ, NodeJS, MongoDB, Express JS
- Browser: Internet Explorer or Google Chrome or Other Modern Browsers

## **System Implementation**

System implementation is the final stage of software development life cycle. For the successful implementation and cooperation of new systems users must be selected, educated and trained. Unless the users are not trained, the system will become complex and it will feel as a burden for them. A product software implementation method is a systematically structured approach to effectively integrate software-based service or component into the workflow of an organizational structure or an individual end-user.

A product software implementation method is a blueprint to get users and/or organizations running with a specific software product. The method is a set of rules and views to cope with the most common issues that occur when implementing a software product: business alignment from the organizational view and acceptance from human view. It is stated that the implementation of (product) software consumes up to 1/3 of the budget of a software purchase.

The complexity of implementing product software differs on several issues. Examples are: the number of end users that will use the product software, the effects that the implementation has on changes of tasks and responsibilities for the end user, the culture and the integrity of the organization where the software is going to be used and the budget available for acquiring product software.

The implementation stage of the system begins by preparing a plan for implementation of the system. According to this plan, activities are to be carried out, discussions are made regarding the equipment to be required and resources and additional facilities required implementing the system. The most critical stage in achieving a successful system is by giving users confidence that the system will work based on their requirements and be effective. This method also offers the greatest.

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## SHOPPING AUTOCART

\*Nahdha C.

Nasla K.P.

Shihabul Haq M.

Department of Computer Science, KAHM Unity Women's College,  
Manjeri, Malappuram, Kerala

\*Corresponding Author: [nahdhachemban@gmail.com](mailto:nahdhachemban@gmail.com)

### Abstract

It has been observed that supermarkets witness long queues during the peak of shopping period and it's a very time-consuming process for both customers and staffs. Studies have shown that immediate availability when shopping for products or services dramatically increases the number of purchases or appointments. The objective of this project is to develop an auto-cart with the sole objectives of minimizing shopping time in supermarkets and malls.



# Introduction

Recently shopping has become a day-to-day activity and people are visiting the supermarket for purchasing products for their daily needs. Whenever a person is buying products, they need to search for the product in such a big store and collect all the required products and need to wait in queue for billing and payment. Since it is time consuming, they will be annoyed.

Our main aim in developing this product is to reduce the time consumption in searching products and waiting in queue while billing and payment thereby reducing the issues of social distancing which is the need for the hour. In this product RFID card reader is used in each product to identify it and a special RFID tag for payment and also for recharge, android app to search and locate products in store and also a payment option in application.

At present, many supermarket chains are attempting to further reduce labour costs by shifting to self-service check-out machines, where a single employee can oversee a group of four or five machines at once, assisting multiple customers at a time. This application creates an automated central bill system for supermarkets and mall.

## Existing System

A supermarket is a place where customers come to purchase their daily using products and pay for that. So, there is a need to calculate how many products sold and generate the bill for the customer. When we go for shopping, we usually select the required products and add them into the shopping cart. But when it comes to the final bill payment there are no adequate counters in the mall that can handle all the customers.

Also scanning each and every product of all the customer becomes a huge task and leads to large queue formation. Also, after that, it is hectic to stand in line for billing all the goods. Whenever a person is buying products they need to search for the product in such a big store and collect all the required products and need to wait in queue for billing and payment this is a time consuming process and the people need to wait for long time to pay their bill and likewise if people can search for product in a big store to get their required product it also take too much time.

## **Proposed System**

Market is growing day by day; everyone wants to save their time and gain profit while shopping. The system will also give suggestion Ever since the debut of wireless technology, electronic commerce has developed to such an extent to provide convenience, comfort, and efficiency in day-to-day life.

The main purpose of this paper is to provide centralized and automated billing system using RFID and ZigBee communication. for products to buy based on user purchase history from a centralized system. In this system, every product in Mart will have RFID tag, and every cart will be having RFID Reader.

## **Methodology**

AGILE methodology is a practice that promotes continuous iteration of development and testing throughout the software development lifecycle of the project. Both development and testing activities are concurrent unlike the waterfall model. The agile software development emphasizes on four core values

- Individual interaction over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

## **System Specification**

Hardware and software requirements for the installation and smooth functioning of this product could be configured based on the requirements needed by the component of the operating environment that works as front-end system here we suggest minimum configuration for the both hardware and software components. Working off with this software is requirements concrete on system environments. It includes two phases: Hardware Requirements & Software Requirements.

## **Hardware Specification**

- Processor: i3 or above.
- System Bus: 32Bit or 64Bit



- RAM: 4 GB or Above
- HDD: 500 GB or Above
- Monitor: 14" LCD or Above
- Key Board: 108 Keys
- Mouse: Any Type of mouse

### **Software Specification**

- Operating System: Windows 10 Any 32 bit or 64-bit platform
- Front End: Python
- Back End: MySQL Sever
- IDE: Eclipse, Python 3.6 or above, PyCharm

### **Software Required - Frontend**

#### **Python**

Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales. Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language.

Guido van Rossum during 1985- 1990, created it. Like Perl, Python source code is also available under the GNU General Public License (GPL). Python is a popular programming language. Guido van Rossum created it in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- System scripting.

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- Python is Interpreted – Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
- Python is Interactive – You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- Python is Object-Oriented – Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- Python is a Beginner's Language – Python is a great language for the beginner-level programmers and supports the development of a wide range of application

Python's features include:

- Easy-to-learn – Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
- Easy-to-read – Python code is more clearly defined and visible to the eyes.
- Easy-to-maintain – Python's source code is fairly easy-to-maintain.
- A broad standard library – Python's bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.
- Interactive Mode – Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.
- Portable – Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
- Extendable – You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
- Databases – Python provides interfaces to all major commercial databases.
- GUI Programming – Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.
- Scalable – Python provides a better structure and support for large programs than shell scripting.



## PyCharm IDE

- PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python language. It is developed by the Czech company JetBrains. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCS), and supports web development with Django as well as data science with Anaconda.
- PyCharm is cross-platform, with Windows, macOS and Linux versions. The Community Edition
- is released under the Apache License, and there is also Professional Edition with extra *features - released under a proprietary license*

## Bootstrap

Bootstrap is a free and open-source front-end framework for designing websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. Unlike many earlier web frameworks, it concerns itself with end development only. Bootstrap, originally named Twitter Blueprint, was developed by Mark Otto and Jacob Thornton at Twitter as a framework to encourage consistency across internal tools.

Before Bootstrap, various libraries were used for interface development, which led to inconsistencies and a high maintenance burden. After a few months of development by a small group, many developers at Twitter began to contribute to the project as a part of Hack Week, a hackathon-style week for the Twitter development team. It was renamed from Twitter Blueprint to Bootstrap, and released as an open-source project on August 19, 2011.

## Structure and Function

Bootstrap is modular and consists of a series of Less (Sass version 4 and onward) stylesheets that implement the various components of the toolkit. These stylesheets are generally compiled into a bundle and included in web pages, but individual components can be included or removed.

Bootstrap provides a number of configuration variables that control things such as colour and padding of various components. Since Bootstrap 2, the Bootstrap documentation has included a customization wizard which generates a customized version of Bootstrap based on the requested components and various settings. As of Bootstrap 4, Sass is used instead of Less for the stylesheets. Each Bootstrap component consists of an HTML structure, CSS declarations, and in some cases accompanying JavaScript code.

Grid system and responsive design comes standard with an 1170-pixel-wide grid layout. Alternatively, the developer can use a variable-width layout. For both cases, the toolkit has four variations to make use of different resolutions and types of devices: mobile phones, portrait and landscape, tablets and PCs with low and high resolution. Each variation adjusts the width of the columns.

## **Software Required - Backend**

### **My SQL**

MySQL is an open-source relational database and it includes advanced data types. MySQL operates using client/server architecture in which the server runs on the machine containing the database and client connect to the server over the network. MySQL runs on all platforms supported by MySQL and provides the most direct means of interacting with the server, so it's the logical client to begin with.

- You need to have the MySQL software installed.
- You need a MySQL account so that you can connect to the server.
- You need a database to work with.

The required software includes the MySQL clients and a MySQL client and a MySQL server. The client program must be located on the machine where you will work. The server can be located on our machine although that is not required. As long as you have permission to connect to it the server can be located anywhere. In addition to the MySQL software, you will need a MySQL account so that the server will allow you to connect and create a sample database and its table.



Microsoft SQL Server 2008 is a full-featured relational database management system (RDBMS) that offers a variety of administrative tools to ease the burdens of database development, maintenance and administration. In this article, we'll cover six of the more frequently used tool: Enterprise Manager, Query analyzer, SQL Profiler, Service Manager, Data Transformation Services and Books Online. Let's take a brief look at each.

Enterprise Manager is the main administrative console for SQL Server installations. It provides you with a graphical "birds-eye" view of all of the SQL Server installation on your network. You can perform high-level administrative functions that affect one or more servers, schedule common maintenance tasks or create and modify the structure of individual databases.

Query Analyzer offers a quick method for performing queries against any of your SQL Server databases. It's a great way to quickly pull information out of a database in response to a user request, test queries before implementing them in other applications, create/modify stored procedures and execute administrative tasks.

SQL Profiler provides a window into the inner workings of your database. You can monitor many different event types and observe database performance in real time. SQL Profiler allows you to capture and replay system "traces" that log various activities. It's a great tool for optimizing databases with performance issues or troubleshooting particular problems.

Service Manager is used to control the MS SQL Server (the main SQL Server process), MSDTC (Microsoft Distributed Transaction Coordinator) and SQL Server Agent processes. An icon for this service Manager to start, stop or pause any one of these services.

Data Transformation Services (DTS) provide an extremely flexible method for importing and exporting data between a Microsoft SQL Server installation and a large variety of other formats. The most commonly used DTS application is the "Import and Export Data" wizard found in the SQL Server program group.



## System Design

System design is the process of developing specifications for a candidate system that meet the criteria established in the system analysis. Major step in system design is the preparation of the input forms and the output reports in a form applicable to the user.

The main objective of the system design is to use the package easily by any computer operator. System Design is the creative act of invention, developing new inputs, a database, offline files, method, procedures and output for processing business to meet an organization objective. System design builds information gathered during the system analysis.

The system design is the most creative and challenging phase. The first step is to determine how the output is produced and in what format. Samples of input and output are presented. Next the input data and the master data are to be designed to meet the requirements of the proposed output. The operational phases are handled through program construction testing, including a list of programs needed to meet the system objective and complete documentation.

## Input Design

Input design is the process of converting the user originated inputs to a computer format. The input design involves determining what the inputs are, how the data should be performed, how to validate data, how to minimize data entry and how to provide a multiuser facility.

The design for handling input specifies how data are accepted for computer processing. Input design is a part of overall system design that needs careful attention and if includes specifying the means by which actions are taken. A system user interacting through a system must be able to tell the system whether to accept input produce a report or end processing. The collection of input data is considered to be the most expensive part of the system design. Since the inputs have to be planned in such a manner so as to get the relevant information extreme care is taken to obtain the information. If the data going into the system is incorrect then processing and outputs will magnify this error.

All input data are validated in the order and if any data violates any conditions, the user is warned by a message. If the data satisfies all the conditions, then it is transferred to the appropriate tables in the database.

We have to keep in mind the following things to design the system

- What data to input?
  - What medium to use?
  - The dialogue to guide users in providing input.
  - Methods for performing input validation and steps to follow when errors occur
- Input requirement gathering was one of the major trivial processes in web or android application development. The project involves text inputs.
- The inputs can be entered through keyboard and mouse. The text input is gathered by forms with text boxes.

## Output Design

Effective output design will improve the clarity and performance of output. Output design phase of the system is concerned with the convergence of information's to the end user friendly manner. The output design should be Effective output design will improve the clarity and performance of output. Output design phase of the system is concerned with the convergence of information's to the end user friendly manner. The output design should be efficient, intelligible so that system relationship with the end user is improved and thereby enhancing the process of decision making.

They are also used to provide a permanent copy of these results of processing to the users. They are also used to provide a permanent copy of these results for late consultation. There are various types of output required by most systems, the main ones are:

- External outputs, whose destination is outside the organization and which require special attention because they project the image of the organization.
- Internal outputs, whose destination is within the organization and which require careful design because they are the user's main interface with the computer.
- Operational outputs, whose use is purely within the computer department.



- Turn around outputs, to which the data will be added before they are returned to the computer for further processing.

## **System Implementation**

The implementation includes all those activities that take place to convert from the old system to new. The old system consists of no filtering the contents searched by the user, which is operated in a push model manner from the proposed new system.

A proper implementation is essential to provide a reliable system to meet the requirements of the customers. An improper implementation may affect the success of the application. There are several methods for handling the implementation and the consequent conversion from the old applications to the new application developed in this project. The most secure methods for compare the old system and the new system is to run the old and new system in parallel. In this approach, a person may operate the old existing application and the new application.

This method offers high reliability and security. A working version of the system can is implemented in the website application. The website is managed by the admin, Doctor user and the user. The implementation plan includes host the website and the application put it into its operation. The implementation plan consists of the following steps:

- List all files required for implementation.
- Host the website and put it into its operation.

The implementation plan should anticipate possible problems and must be able to deal with them. The usual problems may be missing documents; mixed data formats between current files and errors in data translation, missing data etc.

## **Conclusion**

Now a days, shopping has become a daily activity in today's world. We can see large queues in many shopping malls waiting for billing. The objective of our project is to overcome the problem of standing in queue and wasting time. To overcome the above



problem, we are proposing a smart trolley billing system that will audit the purchased products and the payment is made online automatically using the RFID tag.

It will automatically identify and scan the product, and the final billing is made from the cart itself. So that customers are free from waiting in a long queue at checkout. It also provides the centralized and automated billing system using RFID. The primary goal is to provide a technology oriented, time saving and commercial oriented system for enhanced shopping experience.

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# DEPARTMENT SOFTWARE

\*Nishana Sherin C.

Shahana P.

Shihabul Haq M.

Department of Computer Science, KAHM Unity Women's College, Manjeri,  
Malappuram District, Kerala, State, India

\*Corresponding Author: [nishanasherincholakkal@gmail.com](mailto:nishanasherincholakkal@gmail.com)

## Abstract

This system aims at providing an application for the college departments. The system provides a document processing which aims at entering the university result details by scanning the file and read the contents by using the OCR and prepare an excel sheet automatically, based on that excel sheet the department can analyse the performance of the students based on the auto generated excel sheet and can generate an analysis report of each students, currently the office staff are manually entering the result details of the students into the excel sheets, so this system can reduce the work done by teachers using this document processing.

This system is also used to generate a consolidated report of the attendance of the students based on the daily attendance registration by the teachers. And also, the teachers will create an assignment folder in the system so that the students can submit their assignments, based on the submission date and time the teachers can analyse the punctuality of the students, they can get to know who all submitted the assignments on the correct date before due date.

By taking the performance analysis of the exam results, attendance and assignments, the system makes it easier for the teachers to calculate the internal marks of the students. This system also has the provision to enter the fee details of the students according to the community and quota. So that the students can come to know about their scholarships or any other advantages for them if any. And also, they can view the college bus fees details, the number of students using the college bus and any pending fee details etc. The library details of the students can also be visible in the system whether they have any fine or any book return or any dues can be managed here.

## **Methodology**

The office staffs have less effort and save time to add mark list because of using Department Software. They can add mark list into the system by using OCR method, which automatically scans the documents and displays the image formatted file into Excel sheet. Students do not need to visit office they are likely to know information quickly.

Teacher manually adds internal and assignment marks then the system automatically calculates the total mark of the student. When using this technique, we could find the highest mark students per year and also get subject wise top scorers.

## **Introduction**

The design and implementation of a College Department Software is to replace the current paper records. The system provides a document processing which aims at entering the university result details by scanning the image formatted file and reading the contents by using the OCR and preparing an Excel sheet automatically, based on that Excel sheet, the office staff can analyse the performance of the students based on the auto-generated Excel sheet and can generate an analysis report of each student.



Based on department, subjects, year, semester, mark, etc. analysis can be done. Office staff is able to access all details of the student. Currently teachers manually enter the result details of the students into the excel sheets, so this system can reduce the work done by teachers using this document processing.

The student registration, adding of fee details, university result, file uploading and its analysis are done by office staff registered by the admin. Admin can register department, office staff, teacher and librarian. This system is also used to generate a consolidated report of attendance of the students, based on the daily attendance registration by the teachers. And also, the teachers will create an assignment folder in the system so that the students can submit their assignments, based on the submission date and time.

The teachers can analyse the punctuality of the students, they can get to know the students who submitted the assignments on the correct date before the due date. By taking the performance of analysis of the exam result, attendance and assignments, the system makes it easier for the teachers to calculate the internal marks of the students.

This system also has the provision to enter the fee details of the students according to the admission process (community). The library details of the students are also visible in the system whether they have any fine or any book return or any dues can manage here. Librarian is adding the library details of each student. The details of each student can be viewed by the given teachers, librarian & also office staff in the software.

## **Existing System**

In existing system, the office staffs are manually entering the mark details into the system which indeed puts more effort, since they have to enter each student's mark details. Student's will have to visit the office and department to get to know their results. Teacher also needs to manually add internals and assignment marks into papers and they have to add students' attendance into records which takes time and effort.

Likewise, librarian also needs to enter the fine and book due details of the student's manually in records which also takes time and effort and which is difficult to sort out a particular student and their fine as well.

## **Limitation**

- Needs lots of time and effort.

## **Proposed System**

The office staffs have less effort and save time to add mark list because of using Department Software. They can add mark list into the system by using OCR method, which automatically scan the documents and display the image formatted file into Excel sheet. Students do not need to visit office they are likely to know information quickly. Teacher manually adds internals and assignment marks then the system automatically calculates the total mark of the student. When using this technique, we could find the highest mark students per year and also get subject wise top scorers.

## **System Specification**

Hardware and software requirements for the installation and smooth functioning of this product could be configured based on the requirements needed by the component of the operating environment that works as front-end system here we suggest minimum configuration for the both hardware and software components. Working off with this software is requirements concrete on system environments.

It includes two phases.

- Hardware Requirements
- Software Requirements

## **Hardware Specification**

- Processor: i3 or above.
- System Bus: 32Bit or 64Bit
- RAM: 4 GB or Above
- HDD: 500 GB or Above
- Monitor: 14" LCD or Above
- Key Board
- Mouse

# Software Specification

- Operating System: Windows 10 Any 32 bit or 64-bit platform
- Front End: Python
- Back End: MySQL Sever
- IDE: Eclipse
- Python 3.6 or above
- PyCharm

## Software Required:

### Frontend - Python

Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.

Python is a general purpose interpreted, interactive, object-oriented, and high level programming language. Guido van Rossum during 1985- 1990, created it. Like Perl Python source code is also available under the GNU General Public License (GPL). Python is a popular programming language. Guido van Rossum created it in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- System scripting.

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- Python is Interpreted – Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.



- Python is Interactive – You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- Python is Object-Oriented – Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- Python is a Beginner's Language – Python is a great language for the beginner-level programmers and supports the development of a wide range of application.

Python's features include:

- Easy-to-learn – Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
- Easy-to-read – Python code is more clearly defined and visible to the eyes.
- Easy-to-maintain – Python's source code is fairly easy-to-maintain.
- A broad standard library – Python's bulk of the library is very portable and cross platform compatible on UNIX, Windows, and Macintosh.
- Interactive Mode – Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.
- Portable – Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
- Extendable – You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
- Databases – Python provides interfaces to all major commercial databases.
- GUI Programming – Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.
- Scalable – Python provides a better structure and support for large programs than shell scripting.

## PyCharm IDE

PyCharm is an integrated development environment (IDE) used in computer

programming, specifically for the Python language. It is developed by the Czech company JetBrains. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCS), and supports web development with Django as well as data science with Anaconda.

PyCharm is cross-platform, with Windows, macOS and Linux versions. The Community Edition is released under the Apache License, and there is also Professional Edition with extra features - released under a proprietary license.

## **Bootstrap**

Bootstrap is a free and open-source front-end framework for designing websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. Unlike many earlier web frameworks, it concerns itself with end development only. Bootstrap, originally named Twitter Blueprint, was developed by Mark Otto and

Jacob Thornton at Twitter as a framework to encourage consistency across internal tools. Before Bootstrap, various libraries were used for interface development, which led to inconsistencies and a high maintenance burden. After a few months of development by a small group, many developers at Twitter began to contribute to the project as a part of Hack Week, a hackathon-style week for the Twitter development team. It was renamed from Twitter Blueprint to Bootstrap, and released as an open-source project on August 19, 2011.

## **Structure And Function**

Bootstrap is modular and consists of a series of Less (Sass version 4 and onward) stylesheets that implement the various components of the toolkit. These stylesheets are generally compiled into a bundle and included in web pages, but individual components can be included or removed. Bootstrap provides a number of configuration variables that control things such as color and padding of various components.

Since Bootstrap 2, the Bootstrap documentation has included a customization wizard which generates a customized version of Bootstrap based on the requested



components and various settings. As of Bootstrap 4, Sass is used instead of Less for the stylesheets. Each Bootstrap component consists of an HTML structure, CSS declarations, and in some cases accompanying JavaScript code. Grid system and responsive design comes standard with an 1170-pixel-wide grid layout.

Alternatively, the developer can use a variable-width layout. For both cases, the toolkit has four variations to make use of different resolutions and types of devices: mobile phones, portrait and landscape, tablets and PCs with low and high resolution. Each variation adjusts the width of the columns.

## **Backend - My SQL**

MySQL is an open-source relational database and it includes advanced data types. MySQL operates using client/server architecture in which the server runs on the machine containing the database and client connect to the server over the network. MySQL run on all platforms supported by MySQL and provides the most direct means of interacting with the server, so it's the logical client to begin with.

- You need to have the MySQL software installed.
- You need a MySQL account so that you can connect to the server.
- You need a database to work with.

The required software includes the MySQL clients and a MySQL client and a MySQL server. The client program must be located on the machine where you will work. The server can be located on our machine although that is not required. As long as you have permission to connect to it the server can be located anywhere.

In addition to the MySQL software, you will need a MySQL account so that the server will allow you to connect and create us sample database and its table. Microsoft SQL Server 2008 is a full-featured relational database management system (RDBMS) that offers a variety of administrative tools to ease the burdens of database development, maintenance and administration.

In this article, we'll cover six of the more frequently used tool: Enterprise Manager, Query analyzer, SQL Profiler, Service Manager, Data Transformation Services and Books Online. Let's take a brief look at each. Enterprise Manager is the main administrative console for SQL Server installations.



It provides you with a graphical “birds-eye” view of all of the SQL Server installation on your network. You can perform high-level administrative functions that affect one or more servers, schedule common maintenance tasks or create and modify the structure of individual databases. Query Analyzer offers a quick method for performing queries against any of your SQL Server databases. It’s a great way to quickly pull information out of a database in response to a user request, test queries before implementing them in other applications, create/modify stored procedures and execute administrative tasks.

SQL Profiler provides a window into the inner workings of your database. You can monitor many different event types and observe database performance in real time. SQL Profiler allows you to capture and replay system “traces” that log various activities. It’s a great tool for optimizing databases with performance issues or troubleshooting particular problems. Service Manager is used to control the MS SQL Server (the main SQL Server process), MSDTC (Microsoft Distributed Transaction Coordinator) and SQL Server Agent processes. An icon for this service Manager to start, stop or pause any one of these services.

Data Transformation Services (DTS) provide an extremely flexible method for importing and exporting data between a Microsoft SQL Server installation and a large variety of other formats. The most commonly used DTS application is the “Import and Export Data” wizard found in the SQL Server program group.

## **System Design**

System design is the process of developing specifications for a candidate system that meet the criteria established in the system analysis. Major step in system design is the preparation of the input forms and the output reports in a form applicable to the user.

The main objective of the system design is to use the package easily by any computer operator. System Design is the creative act of invention, developing new inputs, a database, offline files, method, procedures and output for processing business to meet an organization objective. System design builds information gathered during the system analysis.

The system design is the most creative and challenging phase. The first step is to

determine how the output is produced and in what format. Samples of input and output are presented. Next the input data and the master data are to be designed to meet the requirements of the proposed output. The operational phases are handled through program construction testing, including a list of programs needed to meet the system objective and complete documentation.

## Input Design

Input design is the process of converting the user originated inputs to a computer format. The input design involves determining what the inputs are, how the data should be performed, how to validate data, how to minimize data entry and how to provide a multiuser facility. The design for handling input specifies how data are accepted for computer processing. Input design is a part of overall system design that needs careful attention and if includes specifying the means by which actions are taken.

A system user interacting through a system must be able to tell the system whether to accept input produce a report or end processing. The collection of input data is considered to be the most expensive part of the system design. Since the inputs have to be planned in such a manner so as to get the relevant information extreme care is taken to obtain the information. If the data going into the system is incorrect then processing and outputs will magnify this error.

All input data are validated in the order and if any data violates any conditions, the user is warned by a message. If the data satisfies all the conditions, then it is transferred to the appropriate tables in the database. We have to keep in mind the following things to design the system.

- What data to input?
- What medium to use?
- The dialogue to guide users in providing input.
- Methods for performing input validation and steps to follow when errors occur.

Input requirement gathering was one of the major trivial processes in web or android application development. The project involves text inputs. The inputs can be entered through keyboard and mouse. The text input is gathered by forms with text boxes.



## Output Design

Effective output design will improve the clarity and performance of output. Output design phase of the system is concerned with the convergence of information's to the end user friendly manner. The output design should be efficient, intelligible so that system relationship with the end user is improved and thereby enhancing the process of decision making.

They are also used to provide a permanent copy of these results of processing to the users. They are also used to provide a permanent copy of these results for late consultation. There are various types of output required by most systems, the main ones are:

- External outputs, whose destination is outside the organization and which require special attention because they project the image of the organization.
- Internal outputs, whose destination is within the organization and which require careful design because they are the user's main interface with the computer. □
- Operational outputs, whose use is purely within the computer department.
- Turn around outputs, to which the data will be added before they are returned to the computer for further processing.

## System Implementation & Maintenance

The implementation includes all those activities that take place to convert from the old system to new. The old system consists of no filtering the contents searched by the user, which is operated in a push model manner from the proposed new system. A proper implementation is essential to provide a reliable system to meet the requirements of the customers. An improper implementation may affect the success of the application.

There are several methods for handling the implementation and the consequent conversion from the old applications to the new application developed in this project. The most secure methods for compare the old system and the new system is to run the old and new system in parallel. In this approach, a person may operate the old existing application and the new application. This method offers high reliability and security.

A working version of the system can is implemented in the website application.



The website is managed by the admin, Doctor user and the user. The implementation plan includes host the website and the application put it into its operation. The implementation plan consists of the following steps:

- List all files required for implementation.
- Host the website and put it into its operation.

The implementation plan should anticipate possible problems and must be able to deal with them. The usual problems may be missing documents; mixed data formats between current files and errors in data translation, missing data etc. User Training. The implementation of the proposed system includes the training of system operators.

Training the system operators includes not only instructions in how to use the equipment, but also in how to diagnose malfunctions and in what steps to take when they occur. So proper training should be provided to the system operators. No training is complete without familiarizing users with simple system maintenance activities. Since the proposed system is developed in a GUI, training will be comparatively easy than systems developed in a non-GUI.

There are different types of training. We can select off-site to give depth knowledge to the system operators. Success of the system depends on the way in which it is operated and used. Therefore, the quality of training given to the operating person affects the successful implementation of the system. The training must ensure that the person can handle all the possible operations. Training must also include data entry personnel.

They must also be given training for the installation of new hardware, terminals, how to power the system, how to power it down, how to detect the malfunctions, how to solve the problems etc. The operators must also be provided with the knowledge of trouble shooting which involves the determination of the cause of the problem. The proposed system requires trained personnel for operating the system. This will reduce the data entry errors considerably. It is preferable to provide the person with some kind of operating manuals that will explain all the details of the system.

For the purpose of training, we have improved our user interface for a guiding style of use and we are providing and intuitive interface for users. Along with all the

simplicity we are providing a help section for users of the application with a detailed description of how each module are working and feature wise specialties and benefits.

## **System Maintenance**

Maintenance of the software is one of major step in the development of the computer system. Software, which is developed by the engineer, should undergo maintenance process in a regular interval of time as time on new problem arises and it must be corrected accordingly Maintenance and enhancement are a long- term process.

In this project, the maintenance is carried over by the staff. Since they are the key persons to develop this project, they know clearly about the project and coding structured. So, they will change the coding whenever required. Regarding the project maintenance, the changes will occur then and there according to the conditions.

Various types of maintenance that can be made are:

- Corrective maintenance: reactive modification (or repairs) of a software product performed after delivery to correct discovered problems. Included in this category is emergency maintenance, which is an unscheduled modification, performed to temporarily keep a software product operational pending corrective maintenance.
- Adaptive maintenance: modification of a software product performed after delivery to keep a software product usable in a changed or changing environment. For example, the operating system might be upgraded and some changes to the software may be necessary.
- Perfective maintenance: modification of a software product after delivery to provide enhancements for users, improvement of program documentation, and recoding to improve software performance, maintainability, or other software attributes.
- Preventive Maintenance: modification of a software product after delivery to detect and correct latent faults in the software product before them become operational faults.

The staff in the concern takes part in each and every level of the project. So, they don't need any training of the software. During the development process they sat and entered each and every entry to test the project. They themselves used this is an opportunity to take training is not needed for the users.



## Conclusion

The project named Department Software is developed as a web application for scanning and displaying the image formatted University mark list into the Excel sheet and its analysis is done at office. This software provides information of a particular student as well. Admin will register office, teacher and librarian to give information to the particular student to view his/her academic performance. Students views the assignment, internal and attendance provided by the teacher.

And also, the students can know the library fine and book due details provided by the librarian. Thereby each students come to know their information. The project is developed using Python, Django and SQLite as back end. This language selection is based on the requirement specification of the user and analysis of the existing system, with flexibility for future enhancement. Since the system is developed in modules, future enhancement is very easy.

## Future Enhancement

This Department software is a web application has been designed and developed according to the current techniques and scopes of designing and development tools. This system is very flexible so that the maintenance and further amendments based on the changing environment and requirements can be made easily with adding further information. Further enhancement is possible to updating evaluating tools. This can be restructured as required. We can do future enhancements mainly on following fields of the product.

- Chat: Real time chat between admin and users.
- In further enhancement we aim at introducing text formatted files along with image formatted files. Thus, it supports text formatted files to be scanned by OCR method provided. Files can be analyzed in many ways based on new features of analysis.
- Office, we will implement updating regarding information given to students on scholarship details and bus fee details rather than fee details.
- The librarian can give information to students about the availability of books, whether the requested book is currently available or not.

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# FACE RECOGNITION BASED ATTENDANCE

\*Mubashira K.M.

Mohammed Safwan K.

Rishad E.

Muhammed Adnan M.

Neethu M.

Department of Computer science, MIC Arts and Science College, Athanikkal,  
Malappuram, Kerala, India

\*Corresponding Author: [mubashirakmtr@gmail.com](mailto:mubashirakmtr@gmail.com)

## Abstract

In present academic system, regular class attendance of students' plays a significant role in performance assessment and quality monitoring. The conventional methods practiced in most of the institutions are by calling names or signing on papers, which is highly time-consuming and insecure. This article presents the automatic attendance management system for convenience or data reliability. The system is developed by the integration of ubiquitous components to make a portable device for managing the students' attendance using Face Recognition technology.

## Introduction

Automatic face recognition (AFR) technologies have made many improvements in the changing world. Smart Attendance using Real-Time Face Recognition is a real-world solution which comes with day-to-day activities of handling student attendance system. Face recognition-based attendance system is a process of recognizing the students face for taking attendance by using face biometrics based on high - definition monitor video and other information technology.

The concept of face recognition is to give a computer system the ability of finding and recognizing human faces fast and precisely in images or videos. Numerous algorithms and techniques have been developed for improving the performance of face recognition. Human brain can automatically and instantly detect and recognize multiple faces. But when it comes to computer, it is very difficult to do all the challenging tasks on the level of human brain. The face recognition is an integral part of biometrics.

In biometrics, basic traits of human are matched to the existing data. Facial features are extracted and implemented through algorithms, which are efficient and some modifications are done to improve the existing algorithm models. Computers that detect and recognize faces could be applied to a wide variety of practical applications including criminal identification, security systems, identity verification etc.

The face recognition system generally involves two stages:

- Face Detection - where the input image is searched to find any face, then image processing cleans up the facial image for easier recognition.
- Face Recognition - where the detected and processed face is compared to the database of known faces to decide who that person is.

## Aims of the Project

- Direct Face scanning.
- Make easy for Teachers to record the Students Attendance.
- Faster processing and accurate results.
- Time consumption is very less in marking Attendance.
- Make Teacher Student communication easier.

## **Existing System**

Existing systems are based on finger print, magnetic cards. They are not efficient to handle complex systems. Most of them are costly.

### **Drawbacks of Existing System**

- Time Consuming
- Less accurate
- Devices are very expensive

## **Proposed System**

Proposed system is an android and python-based application. The system mainly includes a security concept based on Face Recognition. All the students of the class must be registered by entering the required details and then their images will be captured and stored in the dataset.

During each session, faces will be detected from the entry. The faces detected will be compared with images present in the dataset. If match found, attendance will be marked for the respective student. At the start of each session, list of absentees will be reported to the respective parents and teachers.

### **Advantage of Proposed System**

- More accurate.
- Speed.
- Time and cost efficient.
- Increased Security
- It is very comfortable for using and carry.

### **Functions of Proposed System**

- Staff Management
- Student management
- Attendance Management
- Mark management
- Notification management



- Face recognition

## **Problem Definition**

At present the Attendance are marked by individually by concerned teachers or by using Fingerprints. The present system is more time consuming. Face Recognition Based Attendance system uses the face to record the Attendance and it is faster and more accurate. Face Recognition Attendance overcome all the present crisis and helps the educational institute for marking their student's attendance.

## **Hardware Specification**

The minimum hardware requirement is

- Processor: Intel Core i3 or above.
- Primary Memory: 4GB RAM and above
- Storage: 500 GB hard disk and above
- Display: VGA Color Monitor
- Standard Camera

## **Software Specification**

The minimum software requirement is

- Operating system: Windows 7 or above & android
- Front End: Python, Android
- Back End: MySQL Server
- IDE: Android Studio, PyCharm
- Other Softwares: Adobe Dreamweaver, SqlYog

## **Methodology**

There are various project management methodologies. We choose the traditional and sequential methodology " Water fall " for doing our project. With this methodology, the tasks are sequenced that lead to a final deliverable product. With this, one task must be completed before the next one begins, in a connected sequence of items that add up to the overall deliverable. The reason behind the selection of this method was that every

step is pre-planned and laid out in the proper sequence.

The waterfall model is a relatively linear sequential design approach for certain areas of engineering design. In software development, it tends to be among the less iterative and flexible approaches, as progress flows in largely one direction through the phases of that are part of waterfall model includes many, they are initiation, analysis, design, construction, testing, deployment and maintenance.

## **System Implementation**

The implementation phase of a project covers the period from the acceptance of the tested design to its satisfactory operations, supported by the appropriated user and the operation manual. It is major operation across the whole organization structure and requires the great deal of planning. Planning of implementation must begin from initial conception of the project.

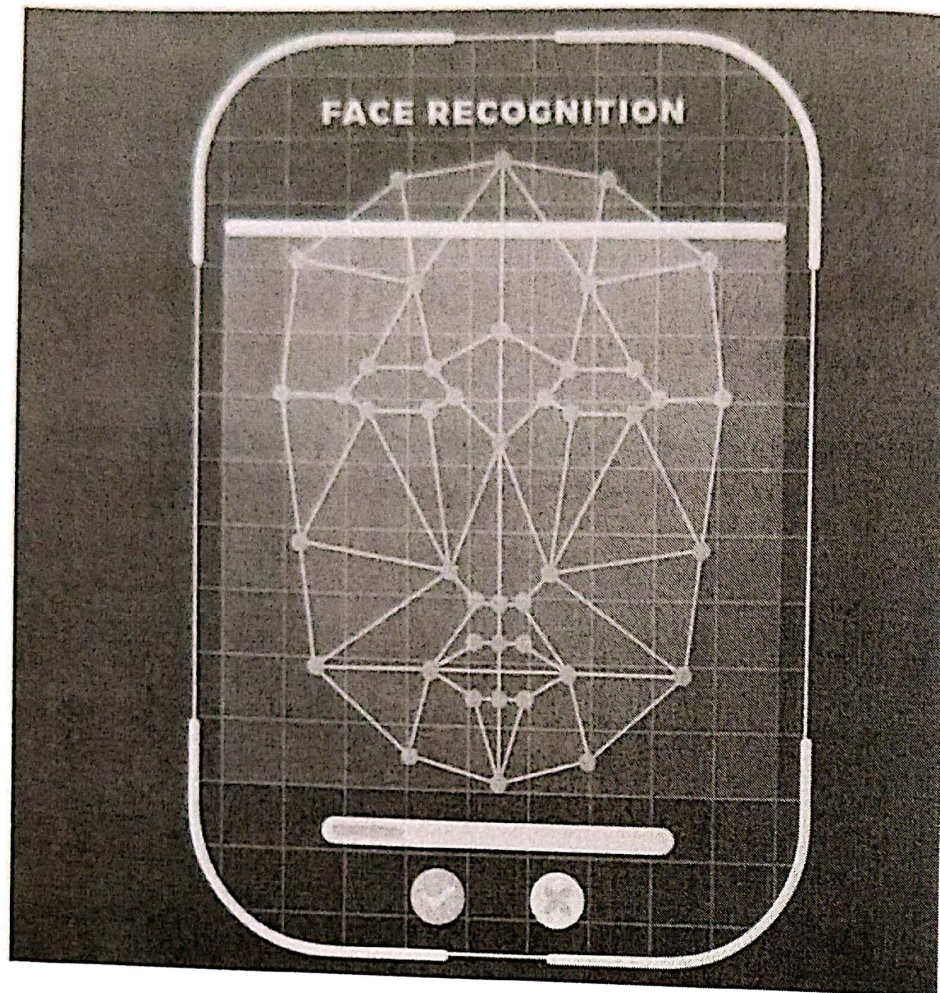
It requires a thorough knowledge of the new system, its personal need, hardware and software requirements, file and procedure conversion activities and of the current system where interface with the new, the change to it, the job that will be superseded, etc. Only the analyst responsible for creation the new system will possess this knowledge. The new system analyst can plan, schedule and coordinate, but has no executive power. Planning must cover the following aspects.

- Organization of implementation.
- Control of resources.
- Motivation of the users.
- Training and production manuals.
- Change over.

## **Conclusion**

This package has been developed to handling student attendance system. This system is designed using a generalized application and is also a highly user-friendly one. The system is more effective. Less time and paper work is required. No chance of error. User can generate the report as per requirement or in middle of the session. Student can improve their attendance. Work can be done speedily and in time.





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# SECURE CLOUD DATA DEDUPLICATION WITH EFFICIENT RE-ENCRYPTION

\*Fathima Liba P.

Jahana Thasnim C.K.

Shihabul Haq M.

Department of Computer Science, KAHM Unity Women's College, Manjeri,  
Malappuram District, Kerala, State, India

\*Corresponding Author: [liba3690@gmail.com](mailto:liba3690@gmail.com)

## Abstract

Data deduplication technique has been widely adopted by commercial cloud storage providers, which is both important and necessary in coping with the explosive growth of data. To further protect the security of users' sensitive data in the outsourced storage mode, many secure data deduplication schemes have been designed and applied in various schemes. Among these schemes, secure and efficient re-encryption for encrypted data deduplication is the best technique.

## **Introduction**

After the emergence of the cloud architecture, many companies migrate their data from conventional storage i.e., on bare metal to the cloud storage. Since then, huge amount of data was stored on cloud servers, which later resulted in redundancy of huge amount of data. Hence in this cloud world, many data de-duplication techniques have been widely used. Not only the redundancy but also made data more secure and privacy of the existing data were also increased. Some techniques got limitations and some have their own advantages based on the requirements. Some of the attributes like data privacy, tag regularity and interruption to brute force attacks.

To make data reduplication technique more efficient based on the requirements. This paper will discuss schemes that brace user-defined access control, by allowing the service provider to get information of the information owners. Thus, our scheme eliminates redundancy of the data without breaching the privacy and security of clients that depends on service providers. Our latest deduplication scheme after performing various algorithms resulted in conclusion and producing more efficient data confidentiality and tag consistency. This paper has discussion on various techniques and their drawbacks for the effectiveness of the reduplication.

## **Methodology**

AGILE methodology is a practice that promoted continuous iteration of development and testing throughout the software development lifecycle of the project. Both development and testing activities are concurrent unlike the Waterfall model. Agile software development emphasizes in four values.

## **System Analysis**

System analysis is a general term that refers to an orderly, structured process for identify and solving a problem. The system analysis process is calling the life cycle methodology, since it relates to four significant phases in the life cycle of all business information system: study, design, development and operation.

The definition of system analysis includes not only the process but also the process of putting together to form a new system. A system analyst is an individual who performs

system analysis, design, or any of the life cycle phases of a business information system. The system analyst not analyses business information system problems, but also synthesizes new to solve those problem or to meet other information needs.

The various techniques used in the study of the present system are:

- Observation
- Interviews
- Site visits
- Discussion

## Existing System

A number of deduplication systems have been proposed based on various reduplication strategies such as client-side or server-side reduplications, file-level or block-level reduplications. Bellaire et al formalized this primitive as message-locked encryption, and explored its application in space efficient secure outsourced storage. There are also several implementations of convergent implementations of different convergent encryption variants for secure deduplication. Li addressed the key- management issue in block-level deduplication by distributing these keys across multiple servers after encrypting the files. Showed how to protect data confidentiality by transforming the predictable message into an unpredictable message.

Data reliability is actually a very critical issue in a deduplication storage system because there is only one copy for each file stored in the server shared by all the owners. Most of the previous deduplication systems have only been considered in a single-server setting. The traditional deduplication methods cannot be directly extended and applied in distributed and multi-server systems.

## Proposed System

Our proposed constructions support both file-level and block-level deduplications. Security analysis demonstrates that the proposed deduplication systems are secure in terms of the definitions specified in the proposed security model. In more details, confidentiality, reliability and integrity can be achieved in our proposed system.

Two kinds of collusion attacks are considered in our solutions. These are the



collusion attack on the data and the collusion attack against servers. In particular, the data remains secure even if the adversary controls a limited number of storage servers.

## **System Requirement Specification**

Requirement analysis is a software engineering task that bridges the gap between system level software designs. We have done the requirement analysis in order to understand the problem faced in our objectives. The emphasis in requirement analysis is on identifying from the system, not how the system will achieve this goal.

## **System Specification**

### **Hardware Specification**

The selection of hardware is very important in the existence and proper working of any of the software. When selecting hardware, the size and capacity requirements are also important. The hardware must suit all application developments.

- Processor: i3 or above.
- System Bus: 32Bit or 64Bit
- RAM: 4 GB or Above
- HDD: 500 GB or Above
- Monitor: 14" LCD or Above
- Key Board: 108
- Keys Mouse: Any Type of mouse

### **Software specification**

One of the most difficult tasks is selecting software, once the system requirement is found out then we have to determine whether a particular software package fits for those system requirements. This system summarizes the application requirement.

- Operating System: Windows 10 Any 32 bit or 64-bit platform
- Front End: Python
- Back End: My SQL Sever
- IDE: Python 3.6 or Above, PyCharm

System design is the second phase of the system lifecycle. The detailed design of the system selected in the study phase is accomplished in the design phase. The principal activity performed during this phase includes allocation of function between computer programs equipment and manual tasks and data base design and test requirement definition. In the course of design phase, the performance specification is expanded into the design specification.

The user-oriented baseline prepared in study phase becomes a base line document, oriented to the needs of the programmers and other professional who will actually develop the system. A design phase report is prepared after the completion of design phase activities and the review is held with the user organization in order to determine whether or not the computer-based business information system project is ready to the development phase.

### **Input Design**

Input design is a part of the overall system design, which requires very careful attention. Often the collection of input data is the most expensive part of the system, in terms of both the equipment used and people involved. If the data going into the system is incorrect, then the processing and output will magnify the errors. Thus, the clear objectives of input design are:

- To produce a cost-effective method of input.
- To achieve the highest possible level of accuracy.
- To ensure that the input is acceptable to and understood by the user.

### **Output Design**

The output design is done so that the result of processing could be committed to the user and to provide a hard copy of these results and evaluations for later consultations. Effective output design will improve the clarity and performance of outputs. Output design phase of the system is concerned with the convergence of information's to the end user friendly manner. The output design should be efficient, intelligible so that system relationship with the end user is improved and thereby enhancing the process of decision



making. Outputs from the computer systems are required primarily to communicate the results of the processing to the users. They are also used to provide a permanent copy of these results of processing to the users. They are also used to provide a permanent copy of these results for late consultation. There are various types of output required by most systems, the main ones are:

**External outputs:** whose destinations outside the organization and which require special attention because they project the image of the organization.

**Internal outputs:** whose destination is within the organization and which require careful design because they are the user's main interface with the computer.

**Operational outputs:** whose use is purely within the computer department. Turn around outputs, to which the data will be added before they are returned to the computer for further processing.

### **Front End:**

- Python
- HTML
- PyCharm

### **Back End**

- My SQL

### **System Implementation**

System implementation is the final stage of software development life cycle. For the successful implementation and cooperation of new systems users must be selected, educated and trained. Unless the users are not trained, the system will become complex it will become feel as a burden for them. A software implementation method is a systematically structured approach to effectively integrate software-based service or component into the workflow of an organizational structure or an individual end-user.

A software implementation method is a blueprint to get users and/or organizations running with a specific software product. The method is a set of rules and views to cope up with the most common issues that occur when implementing a software product: business alignment from the organizational view and acceptance from human view. It is



stated that the implementation of software consumes up to 1/3 of the budget of a Software purchase. The complexity of implementing product differs on several issues. Examples are: the number of end users that will use the product, the effects that the implementation has on changes of tasks and responsibilities for the end user, the culture and the integrity of the organization where the software is going to be used and the budget get available for acquiring the software.

The implementation stage of the system being by preparing a plan for implementation of the system. According to this plan, activities are to be carried out, discussions are to be made regarding the equipment to be required, resources and additional facilities required implementing the system. The most critical stage in achieving a successful system is by giving users confidence that the system will work based on their requirements and be effective.

This method also offers the greatest securities since the old system can take over if the errors are found or inability to handle certain transactions while using the new system. The implementation involves the following formalities:

- Careful planning
- Investigation of the system and constraints
- Design the methods to achieve the changes
- Training the staffs in the changed phase
- Evaluation of the changeover method

## **Implementation**

Implementation of the system refers to the final installing of the package in its real environment, to the satisfaction of the indeed users and the operation of the system. It is the process of converting a new or revised system design to operation. It is the key stage in achieving successful new system.

The process of putting the developed system in actual use is called system implementation. This includes all those activities that take place to convert from the old system to new system. It must therefore be carefully planned and controlled. Proper guidance should be imparted to the users so that he is comfortable in using the application.

## Conclusion

We proposed the distributed de duplication systems to improve the reliability of data while achieving the confidentiality of the users' outsourced data without an encryption mechanism. Four constructions were proposed to support file level de duplication. The security of tag consistency and integrity were achieved.

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# QR COVID - AN OUTBREAK TO COVID-19

\*Nitha Mol<sup>1</sup>

Haneena T.P.<sup>1</sup>

Himna K.<sup>1</sup>

Fasna M.M.<sup>1</sup>

Jashira P.<sup>2</sup>

<sup>1</sup>Department of Computer Science, Amal College of Advanced Studies,  
Nilambur, Kerala, India

<sup>2</sup>Department of Computer Science, KAHM Unity Women's College, Manjeri,  
Malappuram District, Kerala, State, India

\*Corresponding Author: [nithanima25@gmail.com](mailto:nithanima25@gmail.com)

## Abstract

The recent outbreak of COVID-19 astonished the entire world, forcing lockdowns and straining public health care systems. Since COVID-19 is a highly infectious virus, and infected individuals are not initially showing symptoms, a significant fraction of the population can, at any given time, be a hidden source of transmissions. In response, many governments have shown great interest in smartphone contact tracing applications that help automate the difficult task of tracing all recent contacts of newly identified infected individuals. we discuss a pandemic management framework using symptom-based quick response (QR) codes to contain the spread of COVID-19.

In this approach, symptom - based QR health codes are issued by public health authorities. The codes retrieve the individual's information i.e., name, age, phone number, email ID, visited date, enter, and exit time will be stored in the Public Service Institution's database table and also in the individual's database simultaneously.

**Keywords:** Covid, QR code, Public Institutions,

## **Introduction**

The World Health Organization (WHO) on March 11, 2020, declared COVID-19 a pandemic, whose effects will probably determine the evolution of our society for many years to come. The direction of this evolution will greatly depend on the capacity of our society to swiftly and jointly converge toward the best mitigation solutions. Until a vaccine will be available or unless the pandemic will spontaneously disappear, the best weapons in the hands of countries will be the prevention and fast diagnosis of infected people.

The traditional manual contact tracing is being greatly improved by leveraging modern techniques like GPS tracking, peer-to-peer wireless beaconing, etc. The major challenges and concerns in this area are privacy, design flexibility, and rapid notification and integration. In addition to these, data protection, data quality, and operability are other key concerns for the effectiveness of such applications. We are introducing an application that helps to keep the visiting details of customers in a public institution using a quick response code. From these records, the responsible authorities can find the cluster of a covid infected person and can send an alert message to their mail.

## **Implementation**

Implementation is the process of bringing a developed system into operational use and turning it over to the user. Implementation includes all those activities that take place to convert from an old system to a new one. The implementation phase of software development involves translating design specifications into source code, and debugging, documenting and unit testing the source code.

At this stage, the theoretical design is turned into a working system. The crucial



stage in achieving a successful new system and giving confidence to the system the users that will work efficiently and effectively. The objective is to put the system into operation while holding costs, risks, and personnel irritation to a minimum. It involves:

- Creating computer compatible files.
- Training the operating staff.
- Installing terminals and hardware.

QR-COVID is an Android-based application system, so it requires some space on a server. To implement the new system, it has to be deployed in the localhost. It is also possible to run the system in the local network. First upbuild the website, then publish the website. After publishing QRCOVID, the files will be integrated into a package. These files and databases will be published on the online server. Then it is possible to access the functionalities just by using the URL.

Only a web browser is required to operate. QRCOVID is developed in a framework, but the client system doesn't require any framework to be installed. This method also offers the greatest security. For the implementation of the system, we want to introduce QRCOVID in society. The admin should log in to the web home page after entering the username and password. Then he/she can manage all details.

## Methodology

The methodology implemented here is the Waterfall model. This model was the first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. The waterfall Model illustrates the software development process in a linear sequential flow. This means that any phase in the development process begins only if the previous phase is complete. In this waterfall model:

- The phases do not overlap
- Requirements are very well documented, clear and fixed
- Product definition is stable
- Technology is understood and is not dynamic
- There are no ambiguous requirements
- Ample resources with the required expertise are available to support the product.

## Proposed System

QRCOVID will be based on the Android platform. Mobile users mainly will be of two kinds, the common public, and public services i.e., shops, restaurants, public transport, hospitals, government offices, etc. The sole admin will be mainly the health department or the concerned authorities working on tracing covid19 infected individuals. Mobile users can download the application and create an account based on their needs i.e., either as a common individual or as a public service institution. After registering, the application will provide the common individual with a unique ID, and automatically the database table will be created for the individual account.

The Public Service Institution can download their QR code and stick it in front of their respective institutions so that the common individuals on arrival at the respective Public Service Institution can scan the QR code with the mobile application before entering and while exiting so that the scanned individual's information will be stored to the Public Service Institution's database table and also to the individual's database simultaneously. This will help the individual to recognize the visited places with date and time if there is a case of a positive result even after some days by simply checking their database.

## Hardware Environment

The selection of hardware is very important in the existence and proper working of any software. Then selection of hardware, the size and capacity requirements are also important.

- Processor: Core 2 Duo at 2.0GHz
- RAM: 1GB DDR2 RAM [Minimum]
- Monitor: Any Color
- Keyboard: Standard Keyboard (120 keys)
- Mouse: Any
- Hard disk: 500GB [Minimum]
- Storage: 20 MB
- Network speed: 1 MBPS
- Android device



- Software Environment
- IDE: Visual Studio Code, Android Studio, Xampp
- Front End: Android, xml
- Framework: Bootstrap
- Back End: PHP, MySQL
- Coding Language: HTML, CSS, JavaScript, Java
- Operating System: Windows 10
- Web Server: Localhost

## App Features

This project is aimed at improving the process of contact tracing during Pandemic situations like COVID -19. Nowadays, contact tracing is done mainly by manual procedures, for instance, testing and sending to self-quarantine, wherein infected people are interviewed to trace their contacts. Subsequently, the health authority would reach out to each contact traced, check if they show any symptoms and would also give necessary advice if any.

This approach is time-consuming, resource-demanding and prone to errors, since people might not remember all their contacts. Even if they do remember, they might not know them in person or how to contact them. But, with this developed application, cluster of individuals who met the Covid-19 positive patient can be found quickly and marked as quarantined. We are introducing an android based application for contact tracing. In this application, users can register in two ways as an institution or as common people, and databases are created. QRCOVID provides unique ids for users and generates QR-codes for institution wise users. When a common user visits a public institution by scanning QR-code, the required data is entered into a database.

When a registered person is infected, the sole admin i.e., the health department can take the infected person's unique ID and find all the Public Service Institutions visited by an infected individual by fetching the databases from the past any number of days easily and by checking the date and time visited by the positive individual, all other customers visited in the same Public Service Institution can be informed via email notifications faster using the application itself.

## Conclusion

The framework of the study is presented in a way that it can be used to substantially control the spread of Covid - 19 in a particular area thereby saving the risks in the surroundings too. The traditional way of tracing the cluster by recording them in books, finding out each person one by one and informing them is rather time consuming. And it turns out to be a hectic task in the critical circumstances of rapid increase in TPR. On the other hand, the process is made much easier using an app. The information obtained can also increase the scientific understanding of the dynamics of Covid - 19 and deliver positive insight for other infected communities, thus proving that the proposed system is a lot better than the existing system.

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# IOT BASED HOME AUTOMATION AND SECURITY SYSTEM

\*Farseena P.

Shihabul Haq M.

Department of Computer Science, KAHM Unity Women's College, Manjeri,  
Malappuram District, Kerala, State, India,

\*Corresponding Author: farseenap001@gmail.com

## Abstract

Home Automation industry is growing rapidly, this is fulfilled by the need to provide supporting systems for the elderly and the disabled, especially those who live alone. Coupled with this, the world population is confirmed to be getting older. Home automation systems must comply with the household standards and convenience of usage. Home automation is one of the major growing industries that can change the way people live. Some of these home automation systems target those seeking luxury and sophisticated home automation platforms; others target those with special needs like the elderly and the disabled. Typical wireless home automation system allows one to control household appliances from a centralized control unit which is wireless.

These appliances usually have to be specially designed to be compatible with each other and with the control unit for most commercially available home automation systems. The developed system can be integrated as a single portable unit and allows one to wirelessly control lights, fans, air conditioners, television sets, security cameras, electronic doors, computer systems, audio/visual equipment's etc. and turn ON or OFF any appliance that is plugged into a wall outlet, get the status of different sensors and take decision accordingly. The system is portable and constructed in a way that is easy to install, configure, run, and maintain.

The perfect user interface still does not exist at present and to build a good interface requires knowledge of both sociology and technology fields. The problem lies with the situation of the elderly or disabled people, who cannot usually help themselves to move around, and might require external assistance. People who live alone might also need a helping hand at home. Therefore, an android app-controlled home automation system is designed, so that the users can perform certain tasks by just the use of their phones. Having a phone as a remote will make the system more user-friendly and portable.

**Keywords:** Home Automation, Smart Home, Wireless Home Automation.

## **Introduction**

This project presents the overall design of Home Automation System with low cost and wireless system. It specifically focuses on the development of an IOT based home automation system that is able to control various components via internet or be automatically programmed to operate from ambient conditions. A smart-house developed on the basis of the Internet of Things (IoT) can save more energy, where IoT is a network system consisting of electronic devices, software, sensors and networks that connect all concerned network entities together to make the system more valuable and able to provide many more services to users.



Managing all of your home devices from one place, the convenience factor here is enormous. Being able to keep all of the technology in your home connected through one interface is a massive step forward for technology and home management. Also, when you incorporate security and surveillance features in your smart home network, your home is protected and safe.

This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and turn on the lights automatically after a specific time. Besides, the same can also be utilized for home automation by making use of the same set of sensors. The leverage obtained by preferring this system over the similar kinds of existing systems is that the alerts and the status sent by the Wi-Fi connected microcontroller managed system can be received by the user on his phone from any distance irrespective of whether his mobile phone is connected to the internet.

## **Methodology**

In this proposed system we are including security and device control together which is not common in-home automation system in today's market. Also, we introduce wireless control of home appliances and monitoring status of those appliances. A list of familiar persons is added along with their contact and other details which notifies us on android phone when they are detected in the camera. The equipment is switched on automatically at specific time(night) if an unknown person is detected. The appliances in the above-mentioned environment can be controlled in intra-network, so range issues are solved.

The system can be implemented in homes, small offices and malls as well. With a strong existing possibility of adding and integrating more features and appliances to the system, the designed system is highly extensible in nature. AGILE methodology is a practise that promotes continuous iteration of development and testing throughout the software development lifecycle of the project. Both development and testing activities are concurrent unlike the waterfall model. The agile software development emphasizes on four core values.

## Existing System

The existing infra-red (IR) or Blue-tooth remote controls present in the market are in general appliance specific and the same cannot be used interchangeably. Electrical appliances connected through Bluetooth making use of Blue-tooth enabled smart phones cannot be managed from a distant location. Thus, functions such as being able to turn on an air-conditioner while returning home cannot be done with such systems.

## Proposed System

In the proposed system we are including security and device control together which is not common in-home automation system in today's market. Also, we introduce wireless control of home appliances and monitoring status of those appliances. A list of familiar persons is added along with their contact and other details which notifies us on android phone when they are detected in the camera.

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## System Requirement Specification

The following requirements are only the minimal requirements to run this utility more successfully and efficiently, there should sufficient memory and software tools for efficient processing.

### Hardware Requirements

- Processor: 64 bits
- RAM: Min 3 GB
- Hard Disk: 320 GB
- Embedded device: Integrated with Microcontroller Arduino Uno
- Web cam

- Software Requirements
- Operating system: Windows 7 or above, Android
- Technology Used: Python, Embedded, Android (application)
- Languages Used: Python, C program, java
- IDE: PyCharm / Android Studio
- Framework: Flask
- Database: MySQL

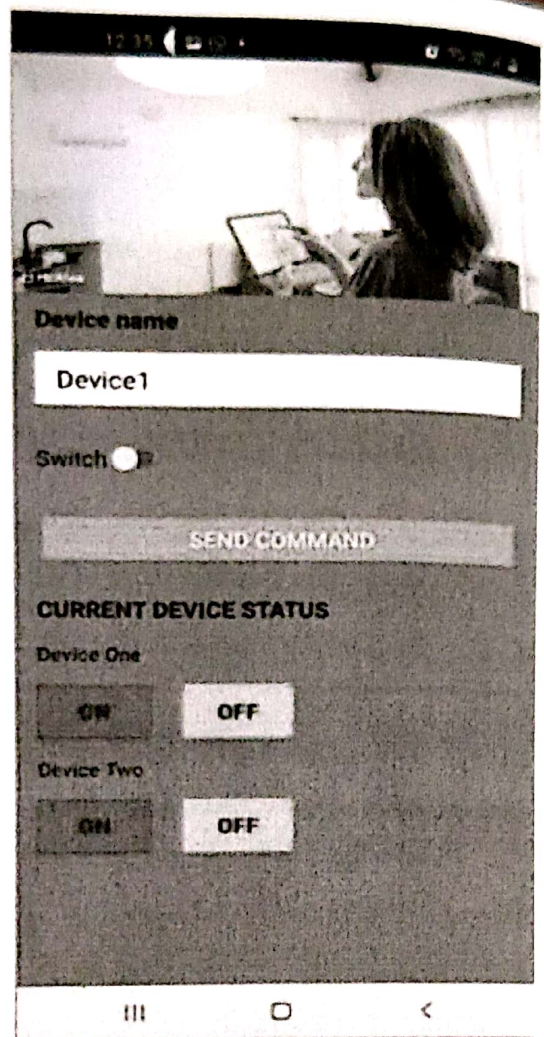
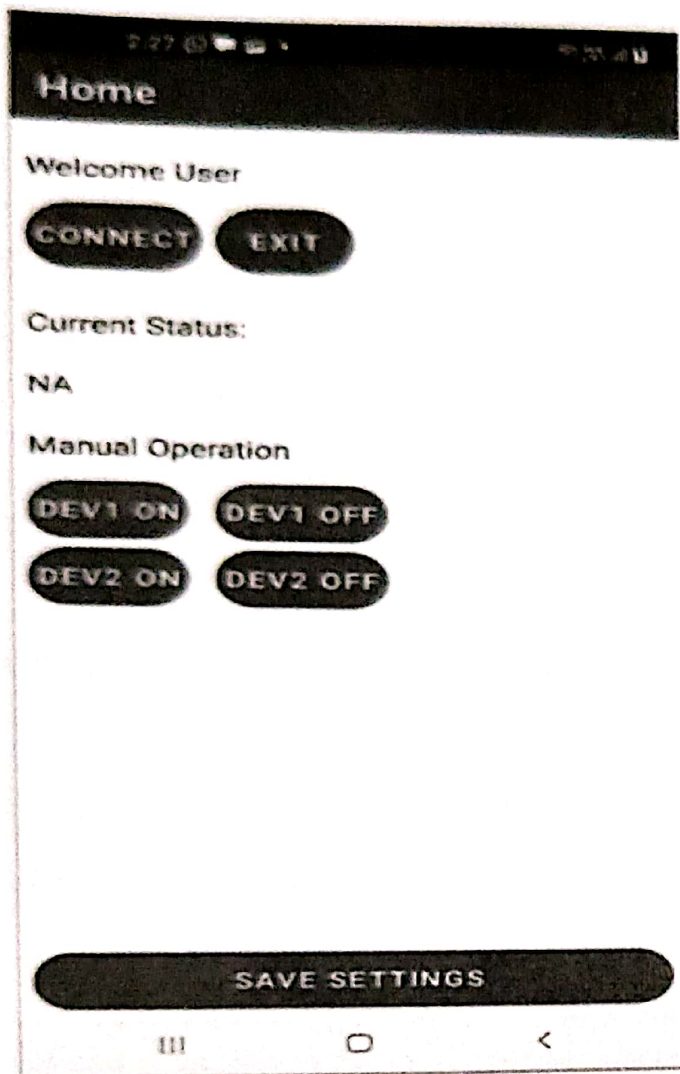
## System Implementation

The implementation phase of a project covers the period from the acceptance of the tested design to its satisfactory operations, supported by the appropriated user and the operation manual. It is major operation across the whole organization structure and requires the great deal of planning. Planning of implementation must begin from initial conception of the project.

It requires a thorough knowledge of the new system, its personal need, hardware and software requirements, file and procedure conversion activities and of the current system where interface with the new, the change to it, the job that will be superseded, etc. Only the analyst responsible for creation the new system will possess this knowledge. The new system analyst can plan, schedule and coordinate, but has no executive power. Planning must cover the following aspects:

- Organization of implementation.
- Control of resources.
- Motivation of the users.
- Training and production manuals.
- Change over.





## Conclusion

It is evident from this project work that an individual control home automation system can be cheaply made from low-cost locally available components and can be used to control multifarious home appliances ranging from the security lamps, the television to the air conditioning system and even the entire house lighting system. And better still, the components required are so small and few that they can be packaged into a small inconspicuous container. Looking at the current situation we can build cross platform system that can be deployed on various platforms like iOS, Windows.

Limitation to control only several devices can be removed by extending automation of all other home appliances. This project is beneficial for elderly people who struggle to get up themselves and those who moves far from home for various reasons. This system provides security surveillance along with device control. Scope of this project can be expanded to many areas by not restricting to only home, but to small offices and other institutions

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# PREDICTION OF DROPOUT STUDENTS USING DATAMINING TECHNIQUES FOR IMPROVING THEIR INTELLECTUAL SKILLS BY COLLABORATIVE LEARNING

\*Fathimath Shabana

Department of Computer Science, KAHM Unity Women's College, Manjeri,  
Malappuram District, Kerala, State, India,

\*Corresponding Author: [fathimathshabanamk@gmail.com](mailto:fathimathshabanamk@gmail.com)

### **Abstract**

In each year millions of students drop out without completing their educational course. In such a case, both the individual student and institution will have an effect of dropping out. The proposed research pays significant attention towards analysing the higher education and college students to identify their behaviour, which leads them to discontinue in the early stage and stop the dropout by taking necessary action towards the dropout reason. This in turn results in the lack of skilled workspace and weaken the productive system of the country and also student dropouts are more likely to become as the recipients of unemployment subsidies.

This research is more focused on the dimension reduction techniques, which involves both the feature selection and feature extraction methods. It also aims to



implications. When PCR measures, the key elements do not look at the reaction but rather at the predictors (by looking for a linear combination of the predictors that has the highest variance). It assumes that, the answer is correlated with the linear combination of the predictors with greatest variance.

It is presumed that, the regression plane differs when selecting the main variable in the other orthogonal direction, along the line and it does not differ. The second path is disregarded by selecting one component and not the other. Principal Component Analysis (PCA) is a method used for extracting features that use orthogonal linear projections to capture the database. This is illustrated in two phases. First phase is the development of dimension reduction using PCA to identify an accurate prediction variance of dropout students by using various ML algorithms and the second phase involves the developing of collaborative learning with engagement through social media and improves their intellectual skills by performing SVM hypothesis test.

**Keywords:** SVM, Collaborative learning, dropouts, Hypothesis

## **Introduction**

Dropping out students has significant implications for learners and their environment. University dropout is an issue such as, reduced enrolment, decreased college income and The State that finances the inquiries and sets up undergraduate student's financial problems as a social problem. Dropping out is influenced by both the students and institutions. In engineering education, late dropout is becoming more of an issue. Despite the fact that, global participation in higher education has increased, investigating the students' behaviour, mental health, academic performance and their family background helps to predict the students' dropout.

Student self-esteem and psychological wellbeing are impaired by dropping out of institutes that are faced with the fact that they lack skills and expertise to fulfil their wishes. Dropouts can be linked to problems with student success. In certain cases, students are unable to finance these deficits on their own. Over the last fifty years, dropout rates and low graduation rates have become an increasing source of concern for higher education

institutions and education authorities, as low graduation rates expand social and economic inequalities and stymie country growth. As a result, students tend to ignore or even negate their issues as long as possible because of a certain helplessness, fearing the pain of exposing themselves to themselves.

In this research, first to identifies an exact factor for the student dropout it can be done through dimension reduction. A dropout early warning system may assist universities or colleges in recognising students who are on the verge of dropping out and encouraging them to act. However, the predicting of children dropout can be analysed by data mining which may assist in identifying the early dropout prediction from institution but need to improve their intellectual skills have become complex and challenging task to the institutions by providing collaborative learning tool for retaining the student in their academic performance. Therefore, the research is focused on those aspects of improving academic performance of those respective students to avoid student's dropout rate.

Development of dimension reduction using PCA to identify an accurate prediction of dropout students by various ML algorithms. The early prediction satisfying their requirements. Principal Component Analysis, or PCA, is a technique of dimensionality-reduction that is often used by transforming a large set of variables into a smaller one that still preserves most of the information in the large set to minimise the dimensionality of large data sets.

## Methodology

This research focused on dimension reduction which involves both feature selection and feature extraction techniques while the approach of characteristic choice is a step-by-step procedure that is used to choose the right attribute from a given attribute units. The scholars at danger are possibly without carefully thought about the awful implications of their decisions, or without getting the ability to speak to experts, they drop out. The early intervention told by the early warning system of dropouts will redirect However, the predicting of students dropout can be analysed by data mining which may assist in identifying the early dropout prediction from institution but need to improve their intellectual skills have become complex and challenging task to the institutions by providing collaborative learning tool for retaining the student in their academic performance. Therefore,



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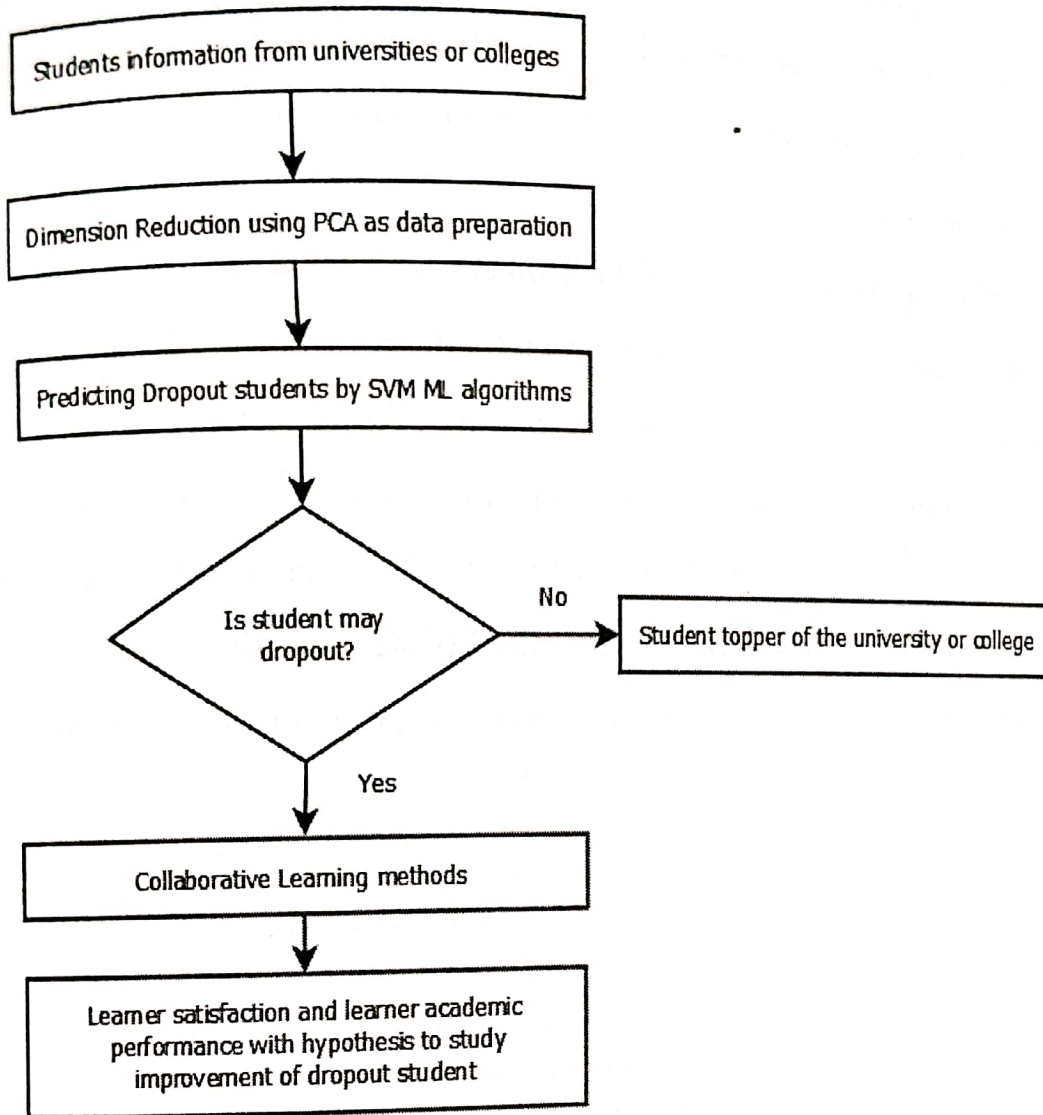


Figure 1 - Overall Proposed Framework For Improving Dropout Students

In the technique of the extraction process of the functions involved in the conversion of higher dimensional data with regard to lower dimension. In the Context of Science, the implementation of collaborative learning with engagement to the dropout students may assist in sharing of their knowledge and interaction with other students. It has insisted the dropout students to gain knowledge and communicate each other and even present their activity will make them to improve the confidence level of the student who may plan for dropout.

This research initially identifies the dropout student from the data provided by universities or colleges. It helpful to recognize the standard and expectation of the students with several features and it may be progressed by PCA technique to dimension reduction. The overall flow of the research is shown in figure 1 that illustrate both better prediction



in identifying dropout students and implementing collaborative learning with engagement.

This is illustrated in two phases.

- Phase 1 - Identification of Dropout student by ML
- Phase 2 - Improving dropout student skills by Collaborative Learning and Engagement

The input section takes data from universities or colleges with several variables which may assist to cover all kind of aspect to identify more precisely about dropout planning of future in early stage. Among these variables as features can be selected and extracted by dimensional reduction concept of principle compound analysis (PCA).

Once the data get pre - processed, the dimensional reduction is executed and progressed to Support Vector Machine (SVM) ML algorithms for accomplishing better accuracy in predicting the exact dropout students present in this university. The workflow of phase 1 is shown in the figure 2.

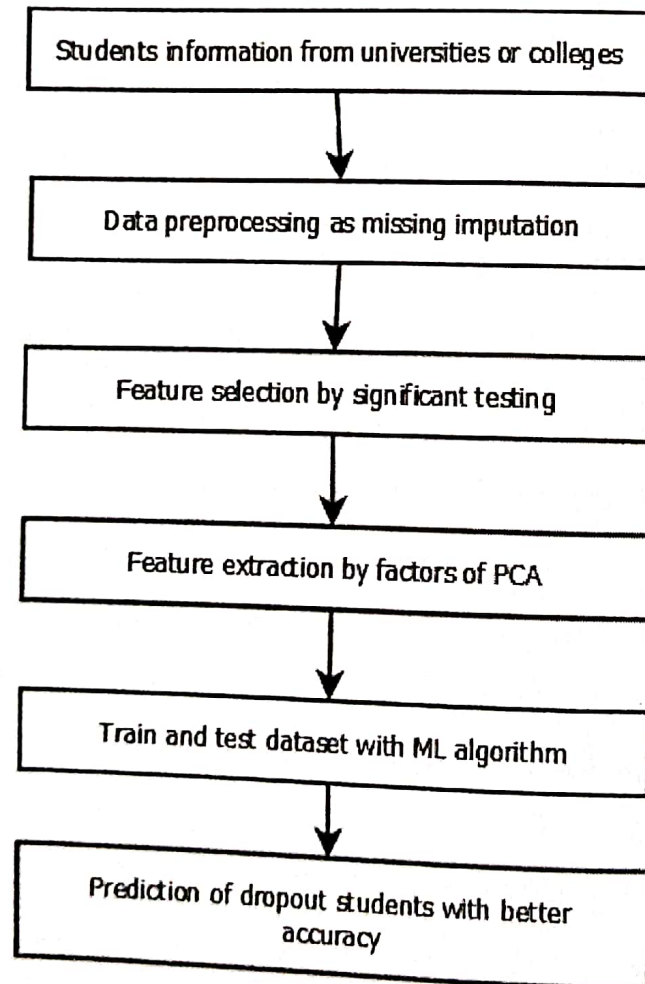


Figure 2 - Improving Dropout Student Skills By Collaborative Learning

This research proposed Collaborative Learning which mainly focused for predicted dropout student along with university topper. This analysis is used to identify the student who can able to improve their intellectual skills by collaborating and communicating with engagement activities.

The staffs and mentors are used as Supervisors to monitor for engaging the extra class using concept of Collaborative Learning (CL) to improve Learner Academic Performance (LAP) in which Learner's Satisfaction is essential.

## Hardware Environment

The selection of hardware is very important in the existence and proper working of any software. Then selection hardware, the size and capacity requirements are also important.

- Processor: Pentium Dual Core i5 or above
- Primary Memory: 4GB RAM or above
- Storage: 120 GB hard disk or above
- Display: VGA Colour Monitor
- Key Board: Windows compatible
- Mouse: Windows compatible

## Software Environment

For the proposed research to work properly, it is necessary that following software are installed and running on the server / client. One of the most difficult tasks is selecting software for the research, once the research requirements is found out then we have to determine whether a particular software package fits for those research requirements.

The application requirement:

- Operating System: Windows 7 or above, Android version 5 or above
- Front end: Python, Android
- Back end: MySQL
- Server: Apache (Wamp)
- IDE: PyCharm (website), Android studio (android app)
- Framework: Flask

## App Features

In this publication, we have proposed a dropout warning system, through which we can recognize the students who are on the verge of dropping out in early stage. Hence, we can provide collaborative learning tools for improve their intellectual skills.

The application's main characteristics are:

- It is a web and android combo application.
- The application automates the activities of educational institutions.
- The application detects the students who are going through the dropout situation at earliest.
- It also supports collaborative learning tools.

## Conclusion

The framework is based on the constructive concept for adopting CL and engagement type of learning to the dropout students. Principal Component Analysis is the Un-supervised Learning Algorithm. PCA implements the Dimensionality Reduction technique. The goal of PCA is the removal of irrelevant features while developing a model. PCA extracts the most dependent features contributing to the output. This research majorly focused on the student who gets stressed and planned for dropping. However, the proposed method may assist in improving the mental ability, interactive and communicating with each other without hesitation in sharing their thought. One of the interactive modes is collaboration for the students to share their knowledge and constructing their problem-solving ability by interactive with instructor and the group members.

Thus, the overall outcome of dropout predicted student can be evaluated through hypothesis support of LAP, whereas that exact identification of predicting dropout student can be easily identified by PCA with ML. Hence, through the application, can improve the intellectual skills of such students and by through we can reduce the dropout rate.

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- accuracy, 6, 7, 21, 63, 84
- AGILE, 28, 60, 75
- algorithm, 6, 9, 10, 12, 54
- ambulance booking system, 21
- Ambulance Service, 20
- Android, 10, 13, 56, 58, 69, 70, 71, 77, 85
- Android studio, 85
- Apache, 31, 44, 85
- API, 19, 22, 25
- ASD, 2
- assistive, facial, 2
- AURORA, 6
- Autism, 2
- Autism Spectrum Disorder, 5
- Automatic face recognition (AFR), 54
- automation, 73, 74, 75, 76, 78
- Backend**, 22, 32, 45
- biometrics, 54
- Blueprint, 31, 44
- Bluetooth, 76
- Bootstrap, 31, 32, 44, 71, 72
- collaboration, 28, 86
- Collaborative Learning, 84, 85
- comprehensive, 7, 15, 28
- computer-based methods, 7
- configuration, 28, 32, 41, 44
- COVID, 67, 68, 69, 71
- CSS, 31, 32, 44, 45, 71, 72
- Darwin's study, 7
- Data Transformation Services and Books
  - Online., 33, 45
- decision making, 5, 35, 48, 64
- departments, 38
- development, 3, 7, 22, 23, 24, 28, 29, 30, 31, 33, 35, 42, 43, 44, 45, 47, 50, 51, 57, 58, 60, 63, 64, 68, 69, 74, 75, 81
- Dimensionality Reduction technique, 86
- DSM-5, 2
- Emotion recognition, 3
- errors, 35, 36, 47, 49, 63, 65, 71
- Facial Action Coding System, 8, 10
- facial detection, 6
- FACS, 7, 8, 10, 12
- Factors, 87
- Feature extraction, 1
- framework, 10, 22, 23, 31, 44, 67, 69, 72, 85, 86
- General Public License, 29, 42
- Global Positioning System, 19
- GNU, 29, 42
- GPL, 29, 42
- GPS, 19, 20, 25, 68
- Grid system, 32, 45
- Hardware, 12, 23, 28, 41, 56, 62, 70, 76, 85
- Hardware Requirements, 28, 41, 76
- HDD, 29, 41, 62
- high-level, 29, 33, 42, 46
- Home Automation, 73, 74, 79
- Hospital, 19, 20
- HTML, 31, 32, 44, 45, 64, 71
- Human errors, 21
- human's sentiments, 7
- IDE, 13, 29, 31, 42, 43, 56, 62, 71, 77, 85
- implementation, 24, 36, 39, 48, 49, 57, 64, 65, 68, 69, 77, 83
- Input design, 34, 47, 63
- Input Devices, 23
- Internet Explorer, 13, 23
- intra-network, 75, 76
- IoT, 74, 75
- IOT, 73, 74, 79
- JSON, 23
- Key Board, 29, 41, 62, 85
- Keyboard, 12, 23, 70
- knowledge, 49, 57, 74, 77, 83, 86
- LAP, 85, 86



Learning, 17, 72, 87, 88  
 leverage, 75  
 literature, 7, 17  
 machine learning, 7, 87  
 mathematics, 29, 42  
 Memory, 12, 23, 56, 85  
 ML, 81, 82, 84, 86  
 MongoDB, 23  
 Monitor, 12, 23, 29, 41, 56, 62, 70, 85  
 Mouse, 12, 23, 29, 41, 62, 70, 85  
 MySQL, 13, 29, 32, 42, 45, 56, 71, 72, 77, 85  
 network, 15, 22, 32, 33, 45, 46, 69, 74, 75  
 NoSQL, 23  
 Object-Oriented, 30, 43  
 OCR, 41  
 Organization, 57, 68, 77  
 Output design, 35, 48, 63  
 PCA, 81, 82, 83, 84, 86  
 Pentium, 12, 85  
 PERL, 30, 42  
 PHP, 30, 42, 71, 72  
 plan, 4, 24, 28, 36, 49, 57, 65, 77, 83  
 Principal Component Analysis, 81, 82, 86  
 Processor, 12, 28, 41, 56, 62, 70, 76, 85  
 product, 6, 24, 27, 28, 37, 41, 50, 51, 56, 64, 69  
 programming language, 29, 42  
 project, 6, 19, 20, 26, 28, 31, 35, 36, 44, 47, 48, 50, 51, 56, 57, 60, 63, 64, 71, 74, 75, 77, 78  
 PyCharm, 13, 29, 31, 42, 43, 44, 56, 62, 64, 77, 85  
 Python, 13, 29, 30, 31, 42, 43, 44, 51, 56, 58, 62, 64, 77, 85  
 QRCOVID, 69, 70, 71  
 Query Analyzer, 33, 46  
 RAM, 12, 29, 41, 56, 62, 70, 76, 85  
 RDBMS, 33, 45  
 recognition systems, 6, 7, 14  
 reliability, 36, 48, 53, 61, 66  
 responsive, 32, 45  
 RFID, 27, 28, 37  
 runtime, 22, 30, 42  
 Sass, 31, 32, 44, 45  
 SDK, 1, 9, 10, 12, 13, 14, 15, 16  
 Server, 23, 33, 45, 46, 56, 66, 71, 85  
 service, 24, 27, 33, 46, 60, 64, 70  
 Service Manager, 33, 45, 46  
 shopping, 26, 27, 28, 36, 37  
 Smart Home, 74, 79  
 Smartphones, 20  
 software, 4, 6, 12, 15, 20, 23, 24, 28, 29, 32, 40, 41, 42, 45, 50, 51, 56, 57, 60, 62, 64, 68, 69, 70, 74, 75, 76, 77, 85  
 Software Requirements, 28  
**Specification**, 28, 29, 41, 42, 56, 62, 76  
 Speed, 21, 55  
 SQL, 32, 33, 45, 46, 62, 64  
 Storage, 56, 70, 85  
 supermarket, 27  
 Support Vector Machine, 12, 84  
 SVM, 12, 81, 84  
 System, 13, 20, 21, 23, 24, 25, 27, 28, 29, 34, 36, 40, 41, 42, 46, 48, 50, 55, 57, 60, 61, 62, 63, 64, 70, 71, 74, 76, 77, 85, 87  
 Time consuming, 21  
 Training, 49, 57, 65, 69, 77  
 Twitter, 31, 44  
 Unsupervised Learning, 86  
 Wamp, 85  
 waterfall model, 28, 57, 69, 75  
 WHO, 68  
 Wi-Fi, 75  
 Windows, 13, 23, 29, 30, 31, 42, 43, 44, 56, 62, 71, 77, 78, 85  
 Windows7, 13  
 wireless, 28, 68, 73, 74, 75, 76  
 Wireless Home Automation, 74