COMPUTER NETWORKING

April 2020

LIST OF PROJECTS

DIPLOMA IN COMPUTER NETWORKING

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SMART VOICE ASSISTANT FOR EDUCATIONAL INSTITUTION

GUIDE

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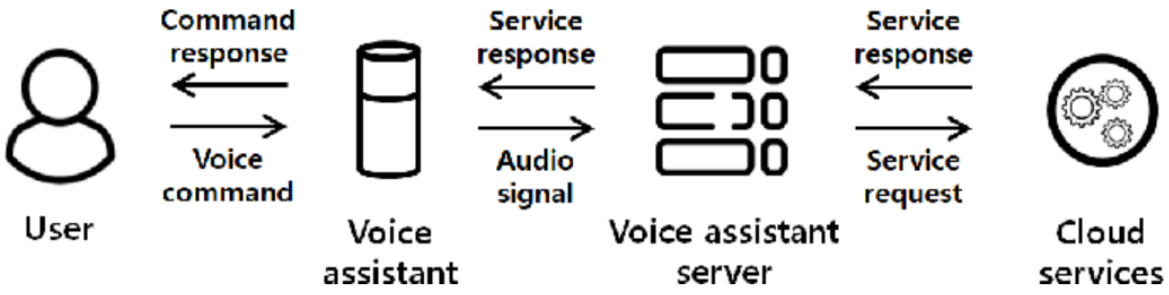
Voice assistants are built on artificial intelligence and voice recognition technology. As the end user interacts with the digital assistant, the AI programming uses sophisticated algorithms to learn from data input and better itself at predicting the user's need. To guide a user to travel throughout a website or a web application we need a **bot like voice assistant.** People have a lot of questions and learning needs and they need an immediate assistance for solving it. Assigning a dedicated human staff to addresses this may not be effective as human resources have certain limitations.

For this exemption online websites were developed. But interfacing a bot in the website and making it work dynamically can attract and have a good reach to all extremes. It will also be efficient and easy for accessing the information. This could be achieved through the implementation of Artificial Intelligence. The smart assistant uses speech to text, text to speech conversion algorithms. It is backed up by well-trained keyword filtering algorithm. Hardware includes a combination of microphone and speaker connected to raspberry pi.

There is a difference between viewing a website and analysing it through voice. Already there are voice assistants like **Google, siri, alexa, cortana** but they all resolve our queries primarily. To guide a user to travel throughout a website or a web application we need a **bot like voice assistant.** This was primarily developed in command-line basis. Therefore we propose to take a step ahead to make advancement of the existing system. We promote a basic bot to guide a user to explore a particular website (laudea for PSG institutions) which answers all the queries from all modules with a dynamic update.

The analysed system requirements for our project are listed below. Software requirements include NLTK, Python (latest version -3.7), Tensor Flow and the library files and packages like NumPy, CUDA,Tensor Layer. The hardware requirements include a server with a high speed RAM, NVidia GTX for graphics, Microphone with speakers and an Intel Core processor.



IMPROVING PASSWORD SYSTEM USING BLOCKCHAIN

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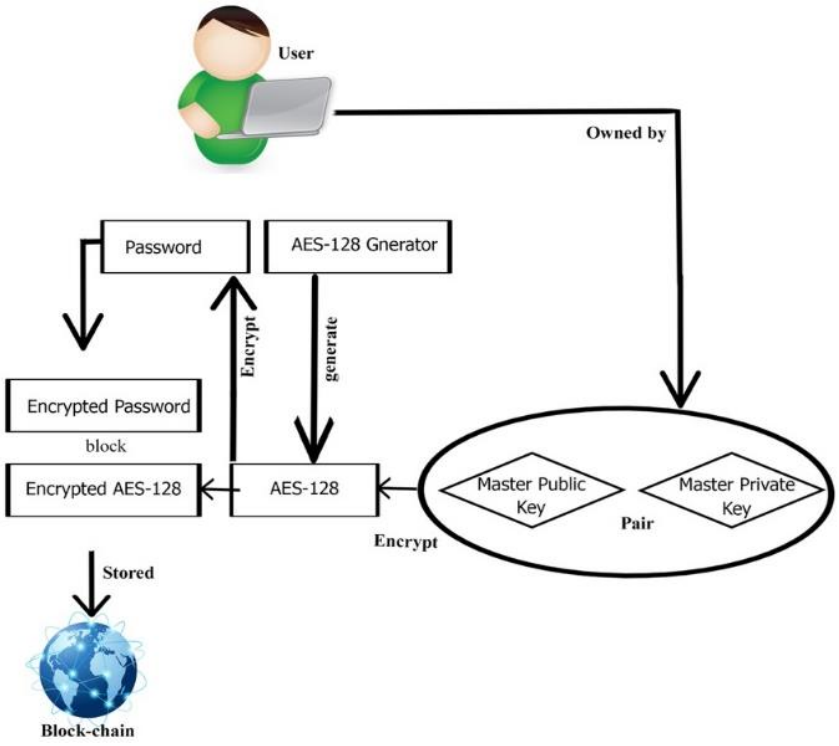
Most of the cyber information systems require users to provide identity information as a way of authentication and usually the identity information is a pair of username and password. With so many information systems to access, people need to memorize hundreds of usernames and passwords. we propose a solution storing people's usernames and passwords using block-chain in an encrypted format. When the username or password for a particular website is lost, they can be accessible through the block-chain. The password stored in the block-chain would not be compromised to any cyber-attacks because block-chain is immutable.

The block-chain technology consists of two key technology parts. One is the asymmetric encryption techniques, and the other is the decentralized distributed system. Asymmetric encryption enables each block of data to be linked together by cryptography. The distributed ledger technology (decentralized distributed system) changes the traditional operation order, thus providing a new organization form and new rules for the exchange and management of data of the information society. In the block-chain, all the nodes hold a common ledger of data, also known as a block-chain. If user stores a password, it is stored in encrypted form and the encrypted password is stored in the block-chain.



VOICE BASED EMAIL FOR VISUALLY CHALLENGED PEOPLE

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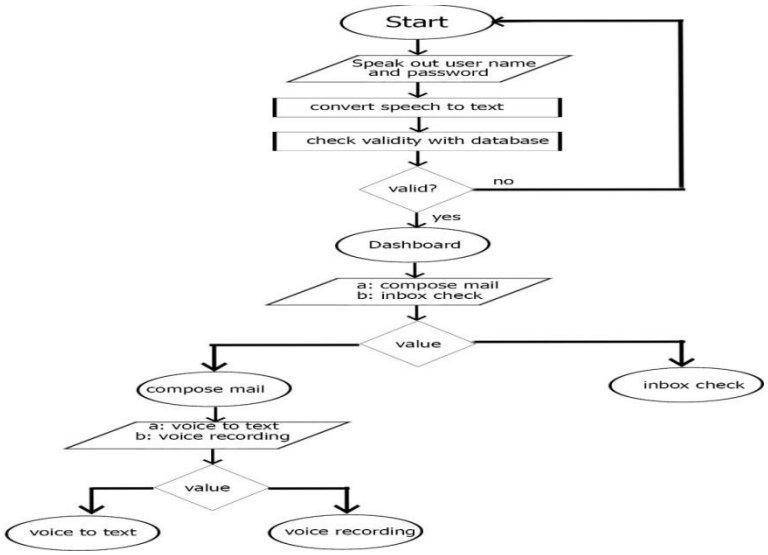
Internet has become one of the basic amenities for day-to-day living. Every human being is widely accessing the knowledge and information through Internet. People with disabilities meet barriers of all types. Disability does not mean people are unable, it just means they also require the right tools, and technology is one of the key enablers. Technology has always lent a helping hand for people with visual impairment, speech impairment and motor disabilities. Having a disability shouldn't exclude someone from the opportunity to be independent. Hence we propose a Voice based Email system for visually challenged people to access Emails easily and efficiently using voice commands and simple mouse clicks without the need of keyboard. The proposed system also allows a blind person to record her voice and instead of converting the speech to text, the system directly sends the recorded voice message to the recipient's mail address as an attachment. The system also provides option to access the mail inbox and read out received mails.

User can login to system by providing username and password for accessing his/her account. This module is used for authentication. It will accept username and password in speech format and convert it to text. Then this text will be used by system to decide whether that user is valid or not. After a successful login, the user will be directed to the dashboard. The dashboard contains the mailing option. The mailing option has the following two modules: Compose Mail and Inbox Check. A user can choose any one option depending upon the task in hand.

In Compose Mail module, the user can compose mail in two ways. If they can speak in English, they can compose their mail using speech to text conversion and send the mail without any problem since the software is designed based on English language. If they don't know English, they can speak in any language and record their voice and send as an attachment. The GUI of the system has been designed in such a way that irrespective of the position of the mouse pointer, the mouse click operation will be registered and the system will work accordingly. Once the recording is over, the system will ask the user to select the recipients mailing address. Once the recipient mail id is entered, the system will prompt the user to send the mail or to cancel the operation. In order to send the mail the user can either press the "send mail" button or by using the appropriate shortcut option to send the mail. In the Inbox module, the Blind user can check the incoming voice mails. The system starts to read out the email ids of the senders based upon his choice. For each email id, the system asks whether the user wants to listen to that voice mail or not. Then it performs the corresponding action and advances to the next mail.



IoT BASED ASSET TRACKING SYSTEM

GUIDE

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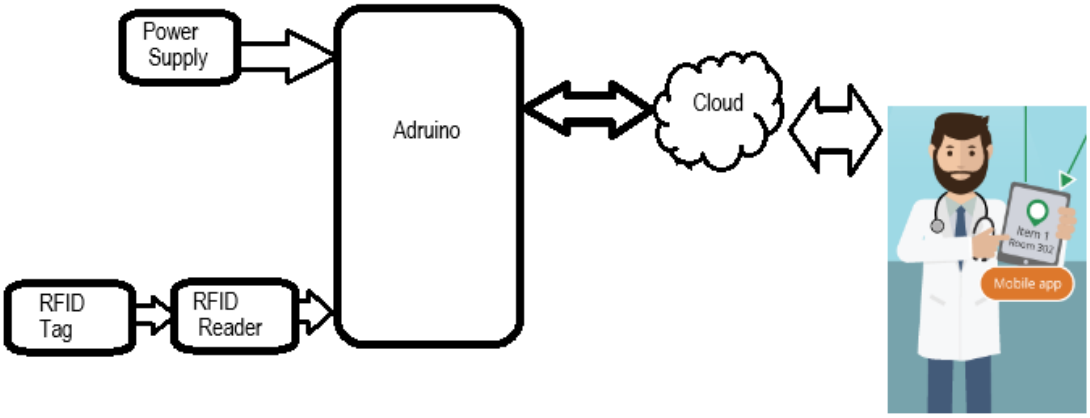
Today's healthcare facilities are facing increased patient volume as well as higher expectations for patient experience and satisfaction. To meet these increasing demands, they need to eliminate wasted steps and create a more streamlined workflow. One of the key components to an effective workflow is asset tracking and management. When staff members are under pressure, they don't have time to spare searching for medical equipment such as IV pumps and patient monitoring devices. Hence we propose an IoT based Asset Tracking system which has the ability to track hospital items remotely based on RFID tags and further gather and analyze the data to help the hospital personnel and administration in many ways.

The hospital items are equipped with RFID tags. RFID tag is a chip with the information (unique identifier, electronic product code) and an antenna to send the info to a reader. RFID tags can be attached to the assets or embedded into them. A RFID Reader is a device receiving the radio waves from RFID tags located within its reading range. RFID Readers are located in the hospital rooms and corridors (e.g., on the walls, by the doors) send the information about the location of the assets. RFID readers and medical equipment are placed in such a way that they do not to influence each other. The RFID reader is interfaced with an Arduino module. On the other side, Arduino Board is connected with the cloud using Wi-Fi. The IoT module is responsible for storing, processing and analyzing the data gathered by RFID readers: the information about hospital items, how they are used and moved wisely during the emergency period. When a hospital item is needed, a doctor or a nurse makes a request using a mobile application. The IoT based asset tracking system finds the nearest available item (or items) and informs the user about its location. The Arduino board is programmed using the C++ language and complied with the Arduino compiler software. The cloud acts as a Data base for storing all the information, which can be accessed by the client through Internet from any accessible points. This system also helps hospital staffs to conduct asset management and find bottlenecks in internal hospital processes and optimize investments in inventory and equipment's.



HEURISTIC APPROACH TO INTRUSION DETECTION SYSTEM

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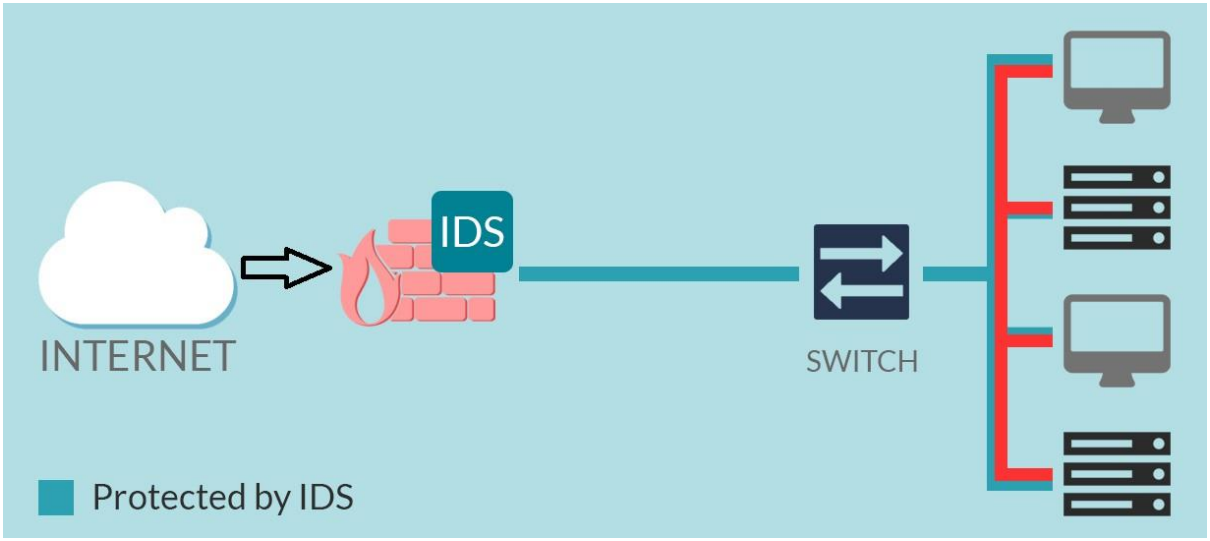
Intrusion Detection is the process of monitoring and identifying attempted unauthorized system access or manipulation by gathering and analysing information from diverse areas within a computer or a network to identify possible security breaches which include both intrusions and misuse. Intrusion Detection System (IDS) inspects all the inbound and outbound network activity to identify any suspicious pattern that may indicate an imminent attack. Most IDS works with either statistical anomaly based or signature-based models with each having their own strengths and weaknesses. In this project a hybrid detection system that combines the advantage of anomaly and signature detection is proposed. This approach improves accuracy and detection rate while reducing false alarm since publicly available blacklists along with Common Vulnerabilities and Exposure (CVE) reports compiled from various sources is used. Heuristic mechanism looks for behavior that is out of the ordinary by taking a baseline of the normal traffic and activity taking place on the network and comparing it to current baseline to detect even unknown threats and learn from them.

A statistical anomaly-based IDS model establishes a performance baseline. It will then sample current network traffic to this baseline in order to detect whether or not it is within baseline parameters. If the sampled traffic is outside baseline parameters, an alarm will be triggered. In a signature-based IDS model the network traffic is examined for preconfigured and predetermined attack patterns known as signatures. Many attacks today have distinct signatures. In good security practice, a collection of these signatures must be constantly updated to mitigate emerging threats. In our project a python client component works with ElasticSearch and Logstarch to provide event notification. Some open-source Linux packages are used to log and monitor the network interface.



FACIAL EXPRESSION RECOGNIZER USING ARTIFICIAL INTELLIGENCE

GUIDE

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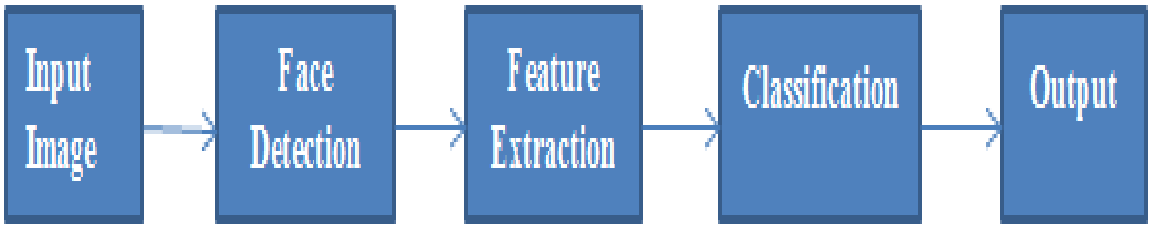
Facial Expression Recognition plays a great significance in the field of Artificial Intelligence. Facial Expression Recognition means finding out the inner emotion of a human by the computer. There are many applications for facial expression recognition like human-computer interaction, lie detection and real time detection of face and interpreting different facial expressions like happy, anger, sad, fear, surprise etc. Appearance based approach means considering the whole image and extracting the feature directly from the image. For detection and classification of different classes of facial expressions, machine learning algorithms are used by training of different set of images. Emotion recognition algorithm that performs detection, extraction, and evaluation of these facial expressions will allow for automatic recognition of human emotion in images and videos. The proposed algorithm uses open source computer vision (OpenCV) and Machine learning with python

To be able to recognize emotions on images we will use OpenCV. OpenCV has a few 'facerecognizer' classes that we can also use for emotion recognition. Fisherface is one of the popular algorithms used in face recognition. The dataset has been taken offline. The facial database must be big and have diverse examples. Using the facial expression recognizer the encoding takes place and result in the following : {0=neutral, 1=anger, 2=contempt, 3=disgust, 4=fear, 5=happy, 6=sadness, 7=surprise}. The dataset is divided into two categories namely ("source emotions" and "source images"). The emotion classified according to our algorithm are inserted in the "sorted_set" to house our sorted emotion images. Within this category create types for the emotion labels.We need to find the face on each image, convert to grayscale, crop it and save the image to the dataset. We can use a HAAR filter from OpenCV to automate face finding. HAAR is face detection algorithm used to find the face reaction and recognize the emotion like happy, sad, angry, and disgust.



SMART AND SECURE HEALTHCARE SYSTEM

GUIDE

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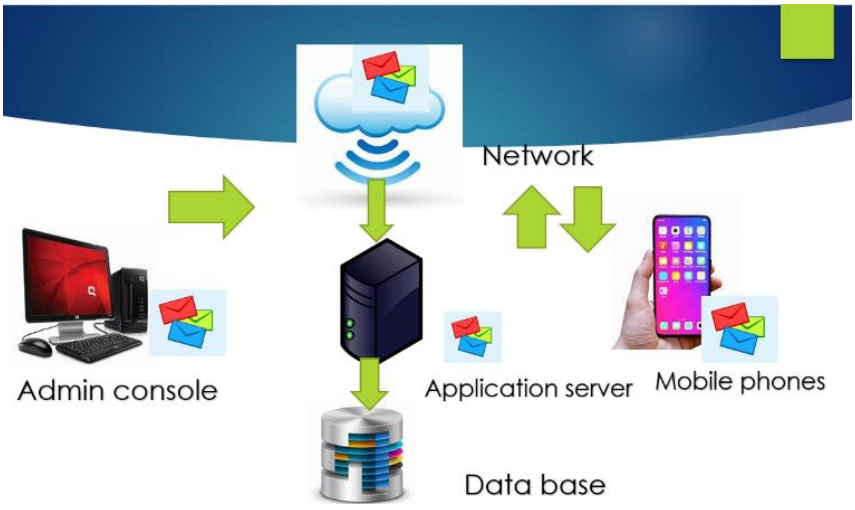
Prolonged life expectancy along with the increasing complexity of medicine and health services raises health costs worldwide dramatically. The smart health concept has much potential to support the concept of preventive, participatory, predictive, and personalized medical support.High-capabilitymulti-function monitors are typically used in hospitals and clinics to ensure a high-level of quality patient care. As a view, this proposed system can be used in healthcare camps which provide efficient manhandling, weakly-structured data sets and digitalized health care camp.

This allows them to use in remote areas, which enables monitoring and transmitting data to health care camp providers in other locations also. Register screens will also be available for different age-group of patients according to taking treatments from the camps. If there is no network the details of the patient will be updated dynamically in the server database when they are connected to online. The patient data are entered based on which the doctors have suggested the patient for their further treatments.

As a new try, modules are implemented in software. There will be five modules. The first module will be about family details "Family Enumeration" where the patient's family details are captured and stored. The second module will be about the community "Enumeration of patient" where the field agents will capture the community, caste, region and other data. The third module is "Community Health Screening of Patient" in which data collectors go to schools and camps to check up the students and other patients and recommend them for treatment. The fourth module is to create "Statistics" about the patient's health and this shows the patient's health condition by which the doctor can suggest treatment. The fifth module will be creating an "Out-Patient Face Sheet" which helps the patient’s entries in easy and fast manner.

A server is to be connected with hand held devices used in camps and schools as it involves both online and offline data to obtain much more information about the personally identifiable information (PII). As more and more information is stored on computers or communicated via computers, the need is to ensure that this information is invulnerable to snooping and tampering. With the fast progression of digital data exchange in electronic way, Information Security is becoming much more important for storing and transmission of data. In this system encryption is implemented as means of securing information.



WEB APPILICATION FOR SPORTS MODULE

GUIDE

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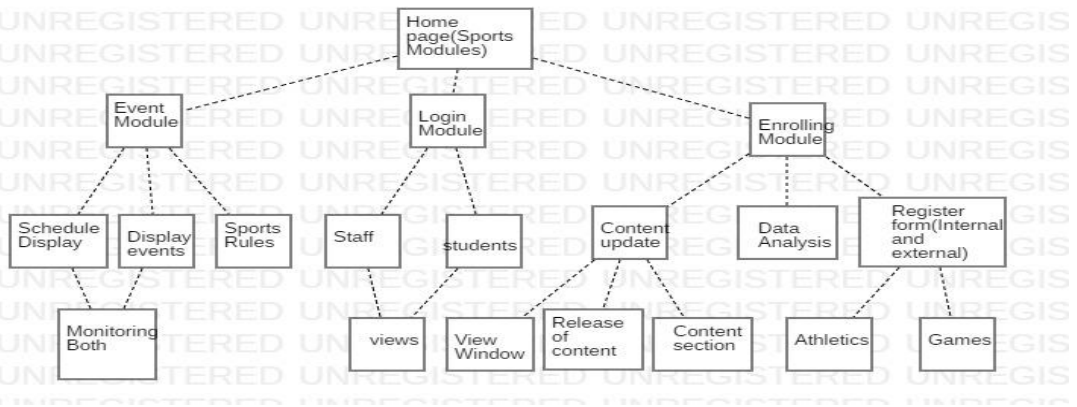
Sports is a broad and highly competitive field that incorporates aspects of many different areas, such as business, marketing and accounting. Public interest in health, fitness and spectator sports has also increased over the years. The main aim of this proposed system is to develop a separate module for sports community. In this project Student communication platform web application for sports module is proposed. The goal is to build a web application that creates an interactive environment among students regarding various updates on different events or sports meet. The current scenario from students about sports are; there are many events and sports meet activities that take place in colleges and also in external colleges. The updates regarding these events might not be effectively communicated among the students within the college. With the help of this web application the students can find the details and dynamic update of sports events. Conventional communication of these events requires physical effort to reach out to Students and convey the information regarding such events. By creating this web application, the communication of these events reaches out to the students easily and effectively.

The web application to be developed has an enhanced view for the Department of Sports. Its primary aim is to encourage the participation of students in Sports. The system to be developed has two major parts:

- **User Interface**
- **Back End Processing**

At the user interface we have included many modules such as Home- which contains the profile of department of sports its vision and motto, also a notification of upcoming events, recent activities held and achievements of the students; the second module, login- contains the login page for the students and staffs; the third module, games- contains the list of sports supported along with their rules and all the achievements in that particular sport; this is followed by the module, gallery which contains the picture section; the fourth module is event which gives a dynamic update of the forthcoming events. The updation of events and achievements is only done by authorized people.

At the back-end processing, the storing of user data is done. This is done with the support of MEAN stack technologies. This technology uses Mongo DB for database storage, Express.js and Angular.js for designing single-page, multi-page, hybrid web applications and dynamic web apps, Node.js is used for backend API services. The storage of Data is non-structured and is done with No SQL which is immune to conventional SQL injection attacks, but is vulnerable to a similar attack called Query Selector Injection.



E-COMMERCE WEBSITE WITH ENHANCED SECURITY

GUIDE

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E-commerce websites enable the distribution, selling, buying, marketing and servicing of products or services over the internet. It helps to reduce costs while reaching a wider market. The primary goal of an e-commerce site is to sell goods and services in online. People can buy goods or products in online just by visiting website and ordering the items in online by making payments on online.

In existing systems, there is always a threat to digital wallet due to hackers. E- commerce digital marketing with enhanced security is provided to prevent the website from hackers.

Modules are implemented in web application. There will be three modules. The first module will be based on sign in operation. This module request for the customer details like Gmail, contact number, username, password. The second module will be the home page of the web application. This module contains the list of products. It also contains the feature such as filtering and search option. The third module is the product detail module. This module contains the product details like price specification, features, picture of the product and it also contains review of the product.

In the proposed system, security at the registration level as well as during transaction time is provided. In this project, we introduce a method to send both OTP and e-mail messages to verify the user to secure the user account. But, in existing system they either send OTP or e-mail messages to verify the user account. In this way we make e-commerce system more secure and prevent the website from unauthentic operations. Further, the product reachability by advertising and digital marketing strategies are provided. Search Engine Optimization (SEO) techniques are also added to make the website easily reachable by the people. Language(s) or software tools to be used:

MySQL (My Structured Query Language)

Java script and

PHP (Hypertext pre-processor)

The above are the required software tools to build a website. Product details will be entered to the database using MySQL software. Further security features include OTP, email verification, captcha memory and biometrics.