

Digital Pharmacy by Implementing Stack Data Structure through Secured HMAC Algorithm in Real Time Automation and Control over Internet

Submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering Degree in Electronics and Communication Engineering

by

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY (DEEMED TO BE UNIVERSITY)

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APRIL – 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of GUDE SAI MAHESH (38130075) and YARAMASA VENU GOPAL (38130243) who carried out the project entitled “**DIGITAL PHARMACY BY IMPLEMENTING STACK DATA STRUCTURE THROUGH SECURED HMAC ALGORITHM IN REAL TIME AUTOMATION AND CONTROL OVER INTERNET**” under our supervision from December 2020 to April 2021.

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ABSTRACT

The main aim is to illustrate a typical e-Pharmacy starting from a cloud that is connected to pharmacists, doctors, and patients. This enables the digital transfer of data through an online medium rather than the conventional method of buying medicines from pharmacies. On this secured data transfer protocol patients can receive the proper medicines with clear prescriptions on time with transparent knowledge about the drugs they intake. In further we follow a roundrobin algorithm of sending OTP to their registered mobile number. The person who gets the OTP can approach the pharmacy within 10 mins to receive their medicines. This process reduces the waiting time of patients and makes them flexible to manage the stocks of the drugs. Through proper OTP access, we can receive the medicines through the vending machines. Over the 40 years in the pharmacy world, we come across a lot of malfunctions due to handwritten prescriptions and few pharmacies are still offering tablets without doctor's prescriptions. If all the server data is synchronized with the single digital cloud the rate consumption variation of medical drugs can also be under control. If this system is achieved we can get the global value of medicines in the market.

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LIST OF ABBREVIATIONS

SQL	Structured Query Language
RFID	Radio Frequency Identifier
IoT	Internet of Things
MQTT	Message Queuing Telemetry Transport
MEMS	Micro electrical Mechanical System
CRD	Cathode Ray Tube

PTAM	Parallel Tracking and Mapping
BCI	Brain Computer Interface
ARA	Augmented Reality Automation
SDK	Software Development Kit
OGC	Open Geospatial Consortium
NPI	New Product Introduction
IDE	Integrated Development Environment

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CHAPTER 1

INTRODUCTION

1.1 DIGITAL PHARMACY

A smart Pharmacy is a technologically modern urban area that uses different types of electronic methods, voice activation methods and sensors to collect specific data. Information gained from that data is used to manage assets, resources and services efficiently; in return, that data is used to improve operations across the Pharmacy.

This includes data collected from citizens, devices, buildings and assets that is processed and analyzed to monitor and manage traffic and transportation systems, power plants, utilities, water supply networks, waste, crime detection, information systems, schools, libraries, hospitals, and other community services. Smart Pharmacy are defined as smart both in the ways in which their governments harness technology as well as in how they monitor, analyze, plan, and govern the Pharmacy.

The smart Pharmacy concept integrates information and communication technology ('ICT'), and various physical devices connected to the Internet of things ('IoT') network to optimize the efficiency of Pharmacy operations and services and connect to citizens.

Smart Pharmacy technology allows Pharmacy officials to interact directly with both community and Pharmacy infrastructure and to monitor what is happening in the Pharmacy and how the Pharmacy is evolving. ICT is used to enhance quality, performance and interactivity of urban services, to reduce costs and resource consumption and to increase contact between citizens and government. Smart

Pharmacy applications are developed to manage urban flows and allow for real-time responses.

A smart Pharmacy may therefore be more prepared to respond to challenges than one with a conventional "transactional" relationship with its citizens. Yet, the term itself remains unclear in its specifics and therefore, open to many interpretations.

1.1.1 Terminology

Due to the breadth of technologies that have been implemented under the smart Pharmacy label, it is difficult to distil a precise definition of a smart Pharmacy. Deakin and Al Waer list four factors that contribute to the definition of a smart Pharmacy:

1. The application of a wide range of electronic and digital technologies to communities and Pharmacy.
2. The use of ICT to transform life and working environments within the region.
3. The embedding of such Information and Communications Technologies in government systems.
4. The territorialisation of practices that brings ICT and people together to enhance the innovation and knowledge that they offer.

Deakin defines the smart Pharmacy as one that utilizes ICT to meet the demands of the market (the citizens of the Pharmacy), and states that community involvement in the process is necessary for a smart Pharmacy. A smart Pharmacy would thus be a Pharmacy that not only possesses ICT technology in particular areas, but has also implemented this technology in a manner that positively impacts the local community.

Alternative definitions include:

1. Business Dictionary: "A developed urban area that creates sustainable economic development and high quality of life by excelling in multiple key areas; economy, mobility, environment, people, living, and government. Excelling in these key areas can be done so through strong human capital, social capital, and/or ICT infrastructure.

2. Caragliu and Nijkamp 2009: "A Pharmacy can be defined as 'smart' when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory action and engagement."
3. Department for Business, Innovation and Skills, UK 2023: "The concept is not static, there is no absolute definition of a smart Pharmacy, no end point, but rather a process, or series of steps, by which Pharmacy become more 'liveable' and resilient and, hence, able to respond more quickly to new challenges."
4. European Commission : "A smart Pharmacy is a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business."
5. Frost & Sullivan 2014: "We identified eight key aspects that define a smart Pharmacy: smart governance, smart energy, smart building, smart mobility, smart infrastructure, smart technology, smart healthcare and smart citizen."
6. Giffinger et al. 2007: "Regional competitiveness, transport and Information and Communication Technologies economics, natural resources, human and social capital, quality of life, and participation of citizens in the governance of Pharmacy."
7. Indian Government 2015: "Smart Pharmacy offers sustainability in terms of economic activities and employment opportunities to a wide section of its residents, regardless of their level of education, skills or income levels."
8. Institute of Electrical and Electronics Engineers smart Pharmacy: "A smart Pharmacy brings together technology, government and society to enable the following characteristics: smart Pharmacy, a smart economy, smart mobility, a smart environment, smart people, smart living, smart governance."
9. Smart Pharmacy Council: "A smart Pharmacy is one that has digital technology embedded across all Pharmacy functions."

1.1.2 Characteristics

It has been suggested that a smart Pharmacy (also community, business cluster, urban agglomeration or region) uses information technologies to:

1. Make more efficient use of physical infrastructure (roads, built environment and other physical assets) through artificial intelligence and data analytics in order to support a strong and healthy economic, social, cultural development.
2. Engage effectively with local governance officials by use of open innovation processes and e-participation, improving the collective intelligence of the Pharmacy's institutions through e-governance, with emphasis placed on citizen participation and co-design.
3. Learn, adapt and innovate and thereby respond more effectively and promptly to changing circumstances by improving the intelligence of the Pharmacy.

They evolve towards a strong integration of all dimensions of human intelligence, collective intelligence, and also artificial intelligence within the Pharmacy. The intelligence of Pharmacy "resides in the increasingly effective combination of digital telecommunication networks (the nerves), ubiquitously embedded intelligence (the brains), sensors and tags (the sensory organs), and software (the knowledge and cognitive competence)".

These forms of intelligence in smart Pharmacy have been demonstrated in three ways:



Figure 1.1 Bletchley Park often considered to be the first smart community.

1. **Orchestration intelligence:** Where Pharmacy establish institutions and community-based problem solving and collaborations, such as in Bletchley Park, where the Nazi Enigma cipher was decoded by a team led by Alan

Turing. This has been referred to as the first example of a smart Pharmacy or an intelligent community.

2. **Empowerment intelligence:** Pharmacy provide open platforms, experimental facilities and smart Pharmacy infrastructure in order to cluster innovation in certain districts. These are seen in the Kista Science Pharmacy in Stockholm and the Cyberport Zone in Hong Kong. Similar facilities have also been established in Melbourne and Kyiv.



Figure 1.2 Hong Kong Cyberport 1 and Cyberport 2 Buildings

3. **Instrumentation intelligence:** Where Pharmacy infrastructure is made smart through real-time data collection, with analysis and predictive modelling across Pharmacy districts. There is much controversy surrounding this, particularly with regards to surveillance issues in smart Pharmacy. Examples of Instrumentation intelligence are those implemented in Amsterdam. This is realized through:

1. A common IP infrastructure that is open to researchers to develop applications.
2. Wireless meters and devices transmit information at the point in time.
3. A number of homes being provided with smart energy meters to become aware of energy consumption and reduce energy usage.
4. Solar power garbage compactors, car recharging stations and energy saving lamps.

Some major fields of intelligent Pharmacy activation are:

Innovation economy	Urban infrastructure	Governance
Innovation in industries, clusters, districts of a Pharmacy	Transport	Administration services to the citizen
Knowledge workforce: Education and employment	Services to the citizen: Quality of life	Participatory and <u>direct</u> <u>democracy</u>
Creation of knowledge- intensive companies	Protection of the environment / Safety	Services to the citizen: Quality of life

According to David K. Owens, the former executive vice president of the Edison Electric Institute, two key elements that a smart Pharmacy must have are an integrated communications platform and a "dynamic resilient grid.

1.1.3 Data Collection

Smart Pharmacy have been conceptualized using the OSI model of 'layer' abstractions. Smart Pharmacy are constructed by connecting the Pharmacy's public infrastructure with Pharmacy application systems and passing collected data through three layers, the perception layer, the network layer and the application layer. Pharmacy application systems the use data to make better decisions when controlling different Pharmacy infrastructures. The perception layer is where data is collected across the smart Pharmacy using sensors.

This data could be collected through sensors such as cameras, RFID, or GPS positioning. The perception layer sends data it collects using wireless transmissions to the network layer. The network layer is responsible for transporting collected data from the perception layer to the application layer.

The network layer utilizes a Pharmacy's communication infrastructure to send data meaning it can be intercepted by attackers and must be held responsible for keeping collected data and information private. The application layer is responsible for processing the data received from network layer. The application layer uses the

data it processes to make decisions on how to control the Pharmacy infrastructure based on the data it receives.

1.1.4 Framework

The creation, integration, and adoption of smart Pharmacy capabilities require a unique set of frameworks to realize the focus areas of opportunity and innovation central to smart Pharmacy projects. The frameworks can be divided into 5 main dimensions which include numerous related categories of smart Pharmacy development

1.1.4.1 Technology framework

A smart Pharmacy relies heavily on the deployment of technology. Different combinations of technological infrastructure interact to form the array of smart Pharmacy technologies with varying levels of interaction between human and technological systems.

- **Digital:** A service oriented infrastructure is required to connect individuals and devices in a smart Pharmacy. These include innovation services and communication infrastructure. Yovanof, G. S. & Hazapis, G. N. define a digital Pharmacy as "a connected community that combines broadband communications infrastructure; a flexible, service-oriented computing infrastructure based on open industry standards; and, innovative services to meet the needs of governments and their employees, citizens and businesses."
- **Intelligent:** Cognitive technologies, such as artificial intelligence and machine learning, can be trained on the data generated by connected Pharmacy devices to identify patterns. The efficacy and impact of particular policy decisions can be quantified by cognitive systems studying the continuous interactions of humans with their urban surroundings.

- **Ubiquitous:** A ubiquitous Pharmacy provides access to public services through any connected device. U-Pharmacy is an extension of the digital Pharmacy concept because of the facility in terms of accessibility to every infrastructure.
- **Wired:** The physical components of IT systems are crucial to early-stage smart Pharmacy development. Wired infrastructure is required to support the IoT and wireless technologies central to more interconnected living. A wired Pharmacy environment provides general access to continually updated digital and physical infrastructure. The latest in telecommunications, robotics, IoT, and various connected technologies can then be deployed to support human capital and productivity.
- **Hybrid:** A hybrid Pharmacy is the combination of a physical conurbation and a virtual Pharmacy related to the physical space. This relationship can be one of virtual design or the presence of a critical mass of virtual community participants in a physical urban space. Hybrid spaces can serve to actualize future-state projects for smart Pharmacy services and integration.
- **Information Pharmacy:** The multiple pharmacy of interactive devices in a smart Pharmacy generates a large quantity of data. How that information is interpreted and stored is critical to Smart Pharmacy growth and security.

1.1.4.2 Human framework

Smart Pharmacy initiatives have measurable positive impacts on the quality of life of its citizens and visitors. The human framework of a smart Pharmacy – its economy, knowledge networks, and human support systems – is an important indicator of its success.

- **Creativity:** Arts and culture initiatives are common focus areas in smart Pharmacy planning. Innovation is associated with intellectual curiosity and creativeness, and various projects have demonstrated that knowledge workers participate in a diverse mix of cultural and artistic activities.
- **Learning:** Since mobility is a key area of Smart Pharmacy development, building a capable workforce through education initiatives is necessary. A Pharmacy's

learning capaPharmacy includes its education system, including available workforce training and support, and its cultural development and exchange.

- **Humanity:** Numerous Smart Pharmacy programs focus on soft infrastructure development, like increasing access to voluntary organizations and designated safe zones. This focus on social and relational capital means diversity, inclusion, and ubiquitous access to public services is worked in to Pharmacy planning.
- **Knowledge:** The development of a knowledge economy is central to Smart Pharmacy projects.^[52] Smart Pharmacy seeking to be hubs of economic activity in emerging tech and service sectors stress the value of innovation in Pharmacy development.

1.1.4.3 Institutional framework

According to Moser, M. A., since the 1990s, the smart community's movement took shape as a strategy to broaden the base of users involved in IT. Members of these Communities are people that share their interest and work in a partnership with government and other institutional organizations to push the use of IT to improve the quality of daily life as a consequence of different worsening in daily actions. Eger, J. M. Said that a smart community makes a conscious and agreed-upon decision to deploy technology as a catalyst to solving its social and business needs.

It is very important to understand that this use of IT and the consequent improvement could be more demanding without the institutional help; indeed institutional involvement is essential to the success of smart community initiatives. Again Moser, M. A. explained that "building and planning a smart community seeks for smart growth"; smart growth is essential for the partnership between citizen and institutional organizations to react to worsening trends in daily issues like traffic congestion, school overcrowding and air pollution.

However, it is important to note that technological propagation is not an end in itself, but only a means to reinventing Pharmacy for a new economy and society. To sum up, it is possible to assert that any smart Pharmacy initiatives necessitate the government's support for their success.

The importance of these three different dimensions is that only a link among them can make possible the development of a real smart Pharmacy concept. According to the definition of smart Pharmacy given by Caragliu, A., Del Bo, C., & Nijkamp, P., a Pharmacy is smart when investments in human/social capital and IT infrastructure fuel sustainable growth and enhance quality of life, through participatory governance.

1.1.4.4 Energy framework

Smart Pharmacy use data and technology to create efficiencies, improve sustainability, create economic development, and enhance quality of life factors for people living and working in the Pharmacy. It also means that the Pharmacy has a smarter energy infrastructure. More formally, a smart Pharmacy is: "An urban area that has securely integrated technology across the information and Internet of Things (IoT) sectors to better manage a Pharmacy's assets." Employment of smart technologies enables the more efficient application of integrated energy technologies in the Pharmacy allowing the development of more self-sustaining areas or even Positive Energy Districts that produce more energy than consume.

A smart Pharmacy is powered by "smart connections" for various items such as street lighting, smart buildings, distributed energy resources (DER), data analytics, and smart transportation. Amongst these things, energy is paramount; this is why utility companies play a key role in smart Pharmacy. Electric companies, working partnership with Pharmacy officials, technology companies and a number of other institutions, are among the major players that helped accelerate the growth of America's smart Pharmacy.

1.1.4.5 Data Management framework

Smart Pharmacy employ a combination of data collection, processing, and disseminating technologies in conjunction with networking and computing technologies and data security and privacy measures encouraging the application of innovation to promote the overall quality of life for its citizens and covering dimensions that include: utilities, health, transportation, entertainment and government services.

1.1.5 ROADMAP

A smart Pharmacy roadmap consists of four/three (the first is a preliminary check) major components

1. Define exactly what the community is: maybe that definition can condition what you are doing in the subsequent steps; it relates to geography, links between Pharmacy and countryside and flows of people between them; maybe – even – that in some Countries the definition of Pharmacy/community that is stated does not correspond effectively to what – in fact – happens in real life.
2. Study the Community: Before deciding to build a smart Pharmacy, first we need to know why. This can be done by determining the benefits of such an initiative. Study the community to know the citizens, the business's needs – know the citizens and the community's unique attributes, such as the age of the citizens, their education, hobbies, and attractions of the Pharmacy.
3. Develop a smart Pharmacy Policy: Develop a policy to drive the initiatives, where roles, responsibilities, objective, and goals, can be defined. Create plans and strategies on how the goals will be achieved.
4. Engage The Citizens: This can be done by engaging the citizens through the use of e-government initiatives, open data, sport events, etc.

In short, People, Processes, and Technology (PPT) are the three principles of the success of a smart Pharmacy initiative. Pharmacy must study their citizens and communities, know the processes, business drivers, create policies, and objectives to meet the citizens' needs. Then, technology can be implemented to meet the citizens' need, in order to improve the quality of life and create real economic opportunities. This requires a holistic customized approach that accounts for Pharmacy cultures, long-term Pharmacy planning, and local regulations.

"Whether to improve security, resiliency, sustainability, traffic congestion, public safety, or Pharmacy services, each community may have different reasons for wanting to be smart. But all smart communities share common attributes—and they all are powered by smart connections and by our industry's smarter energy

infrastructure. A smart grid is the foundational piece in building a smart community."

– Pat Vincent-Collawn, chairman of the Edison Electric Institute and president and CEO of PNM Resources.

1.1.6 HISTORY

The idea and existence of smart Pharmacy is relatively new. Following in the path of "Wired Pharmacy" and "Intelligent Pharmacy", the concept of the smart Pharmacy is focused on a Pharmacy's use of ICT in urban problem-solving. The use of computational statistical analysis by the Community Analysis Bureau in Los Angeles in the late 1960's and the establishment by Singapore of the National Computer Board in 1981 are cited as among the earliest cybernetic interventions into urban planning.

IBM (which counts among its founding patents a method for mechanical tabulation of population statistics for the United States Census Bureau in 1897), launched its "Smarter Pharmacy" marketing initiative in 2008. In 2010, Cisco Systems, with \$25 million from the Clinton Foundation, established its Connected Urban Development program in partnership with San Francisco, Amsterdam, and Seoul. In 2011, a Smart Pharmacy Expo World Congress was held in Barcelona, in which 6000 people from 50 countries attended.

The European Commission in 2012 established the Smart Pharmacy Marketplace, a centralized hub for urban initiatives in the European Union. In 2021, The People's Republic of China took first in all categories of the International AI Pharmacy Challenge, demonstrating the national commitment to smart Pharmacy programs -- "by some estimates, China has half of the world's smart Pharmacy". As time goes on the percentage of smart Pharmacy in the worlds will keep increasing, and by 2050, up to 70% of the world's population is expected to inhabit a smart Pharmacy.

1.1.6.1 POLICIES

ASEAN Smart Pharmacy Network (ASCN) is a collaborative platform which aims to synergise Smart Pharmacy development efforts across ASEAN by facilitating cooperation on smart Pharmacy development, catalysing bankable projects with the private sector, and securing funding and support from ASEAN's external

partners. Pharmacy diplomacy in the context of a smart Pharmacy is highly stimulated by knowledge, creativity, and innovations

The European Union (EU) has devoted constant efforts to devising a strategy for achieving 'smart' urban growth for its metropolitan Pharmacy-regions. The EU has developed a range of programmes under "Europe's Digital Agenda". In 2010, it highlighted its focus on strengthening innovation and investment in ICT services for the purpose of improving public services and quality of life. Arup estimates that the global market for smart urban services will be \$400 billion per annum by 2020.

The Smart Pharmacy Mission is a retrofitting and urban renewal program being spearheaded by the Ministry of Urban Development, Government of India. The Government of India has the ambitious vision of developing 100 Pharmacy by modernizing existing mid-sized Pharmacy.

1.1.7 TECHNOLOGIES

Smart grids are an important technology in smart Pharmacy. The improved flexibility of the smart grid permits greater penetration of highly variable renewable energy sources such as solar power and wind power. Mobile devices (such as smartphones, tablets, are another key technology allowing citizens to connect to the smart Pharmacy services.

Smart Pharmacy also rely on smart homes and specifically, the technology used in them. Bicycle-sharing systems are an important element in smart Pharmacy. Smart mobility is also important to smart Pharmacy. Intelligent transportation systems and CCTV systems are also being developed. Digital libraries have been established in several smart Pharmacy. Online collaborative sensor data management platforms are on-line database services that allow sensor owners to register and connect their devices to feed data into an on-line database for storage and allow developers to connect to the database and build their own applications based on that data. Additional supporting technology include telecommuting, telehealth, the block chain, fintech, online banking technology,

Electronic cards (known as smart cards) are another common component in

smart Pharmacy contexts. These cards possess a unique encrypted identifier that allows the owner to log into a range of government provided services (or e-services) without setting up multiple accounts. The single identifier allows governments to aggregate data about citizens and their preferences to improve the provision of services and to determine common interests of groups. This technology has been implemented in Southampton.

Retractable bollards allow to restrict access inside Pharmacy centres (i.e. to delivery trucks resupplying outlet stores, Opening and closing of such barriers is traditionally done manually, through an electronic pass but can even be done by means of ANPR camera's connected to the bollard system. Energy Data Management Systems (EDMS) can help to save Pharmacy energy by recording data and using it to increase efficiency.

1.1.7.1 Cost-benefit analysis of smart Pharmacy technologies

Cost-benefit analysis has been done into smart Pharmacy and the individual technologies. These can help to assess whether it is economically and ecologically beneficial to implement some technologies at all, and also compare the cost-effectiveness of each technology among each other

1.1.8 Commercialization

Large IT, telecommunication and energy management companies such as Apple, Baidu, Alibaba, Tencent, Huawei, Google, Microsoft, Cisco, IBM and Schneider Electric launched market initiatives for intelligent Pharmacy.

- [1] Baidu is working on Apollo, a self-driving technology
- [2] Alibaba has created the Pharmacy Brain
- [3] Tennent is working on medical technology, such as WeChat Intelligent Healthcare, Tennent Doctor work, and AI Medical Innovation System (AIMIS)
- [4] Huawei has its Safe Pharmacy Compact Solution which focuses on improving safety in Pharmacy
- [5] Google's subsidiary Sidewalk Labs is focusing on smart Pharmacy
- [6] Microsoft has Pharmacy Next

- [7] Cisco, launched the global "Intelligent Urbanization" initiative to help Pharmacy using the network as the fourth utility for integrated Pharmacy management, better quality of life for citizens, and economic development.
- [8] IBM announced its Smarter Pharmacy Challenge to stimulate economic growth and quality of life in Pharmacy and metropolitan areas with the activation of new approaches of thinking and acting in the urban ecosystem.
- [9] Schneider Electric is working on EcoStruxure
- [10] Sensor developers and start-up companies are also continually developing new smart Pharmacy applications.

CHAPTER - 2

LITERATURE REVIEW

2.1 INTRODUCTION:

The following shows a survey done for Digital Pharmacy and it's important to the social network. Here on deep analysis we came to know the various level of methods been handled by the Drug companies to sell their drugs on differential price tags based on the needs of the common man in the society. Further study was extended to make a detailed survey on how the software system was developed on stock maintenance and refilling of goods. Existing software and system has touched some extent when compared to the digital world.

2.2 LITERATURE SURVEY:

2.2.1 Ashutosh D¹. Gaur and Jasmin Padiya², IJSR "A Study Impact of Digital India in Make in India" Program in IT and BPM Sector", GLS University Transaction on Computer Science Engineering 2017.

Digital India Program was launched by Prime Minister Narendra Modi on July1, 2015. In the inaugural speech of this program he has mentioned his dream from digital India i.e. for driving innovation, knowledge is strength and empowers the people, access of information knows no barrier, government is open & governance is transparent, technology ensures quietly

The citizen government interface is incorruptible, governmental services are easy and efficiently available to citizens on mobile devices, government productivity engaged with people through social media, quality education reaches the most inaccessible corners driven by digital learning, quality health care percolates right up to remotest region powered by e health care, farmers are developed

The huge empowered with real-time information to the connected with global market, mobile enable emergency services ensures personal security, cyber security is integral part of national security, mobile & e-banking ensures financial inclusion, ecommerce drive entrepreneurship , world looks to India for next big idea, etc.

Digital India attracted more than 4lakh crore investment and generated more than eighteen lakh job opportunists at its launch. Second highest import category in India is electronics goods in country. This fact is indigestible because India has largest number of IT professional and very large MSME (Micro, small and Medium) sector still it has not developed its capabilities to manufacture in this sector. Government has made the policy with a vision to make net zero import of this category. This aim will be achieved by Make in India and Digital India programme to boost manufacturing and increases domestic demand.

Digital India (Ministry of Electronics & Information Technology, Government of India, 2016) “The digital India programme is a flagship programme of the government of India with a vision to transform India into a digitally empowered society and knowledge economy”

Pros:

Digital India system made the entire unit globalize

Cons:

Due to lot of server maintenance and Tag over loading it's still difficult to combine the data.

2.2.2 A.Martina Franciska¹ & Dr. S. Sahayaselvi² IEEE “A over view on Digital Payment”, IJSCRT Transaction on Information Science Engineering 2019.

The Information Technology (IT) has revolutionized the various aspects of our lives; particularly it has provided an easy way to go for digital payments. During the Demonetization period, the Government of India forced the people directly or indirectly to do all commercial transactions via Digital mode. The common people started to move from traditional payment system towards Digital Payments systems which ensured safe, secure and convenience.

With giant technological leaps in the smart phone and easy internet access has led Indian market to accept Digital Payments. The percentage of the digital payments through other modes is also increasing in a significant speed. The objective of the present study is to know about the various types of Digital payment transactions that are used by the common people in their day- today's lives. This study is chiefly based on Secondary data. Result indicates that the Digital revolution has made the cash less transaction an easy one. As a result that in 2015-2016, a total of 4018 billion has been transacted through mobile banking when compared to 60 billion in 2012-13. The reach of mobile network, Internet and electricity is also expanding digital payments to remote areas. So, it is without doubt said that future transaction system is cashless transaction.

Pros:

Digital system made all the transactions easy, reliable and simple.

Cons:

Due to improper network maintenance there might be a huge chance for payment failure

2.2.3 Jerzy Letkowski¹ IJEEE “Doing Database Design work with SQL”, Research Gate Transactions on Electrical and Electronics Engineers, 2015

Most of the database textbooks, targeting database design and implementation for information systems curricula support the big database systems (Oracle, MS SQL Server, DB/2, etc.).

With respect to the most important aspects of the database management: design and implementation; one should not ignore MySQL—the most widely used, open source, relational database management system developed in Sweden in 1995 and now owned by Oracle Corporation.

This paper shows two database-design learning cases. The first one deals with a forward-engineering technique used to transform a data model into a physical database. The second case shows how to reverse-engineer an existing database into a data model. Both the cases utilize MySQL Workbench and MySQL Community Server. By contrast Microsoft Access can only reverse engineer a physical database into its relationship diagram.

Pros:

Due to integrated data of MQL made the way simple for auto updating process.

Cons:

I don't have a huge support of server database.

2.2.4 Aishwarya Raj Lakshmi¹, and Ayaskanta Misra² “RFID based Logistic Management System using IoT”, Research Gate Transactions on Neural Network, 2018

In this modern era, technology is important for success of an industry, as the market is more volatile, understanding the customer base and forecasting of demand has become more complex.

This has pushed the companies to address the gap through various software applications and a review has been done to evaluate the feasibility of IoT in area of Logistic Management.

IoT is a network of physical objects to exchange data with the manufacturer or the user which can also integrate identification, sensing and communication in that technology that has been used.

Here things refer to unique identity of remote sensing, monitoring and self-configuring. IoT technology and business strategy have influences on process of business and selected IoT application as it implies the interaction between digital and real world. Before reaching the customer, products should cross the multiple business partners to have right information about the identity, location, and other tracking information. This study helped us to bring the need of it in Transportation. Also there should balance of time and money.

This is done by RFID in which make the company aware of, where is the product. The main intention to develop a multimodality system is that it can be used for various applications.

Pros:

Connecting the Logistic data to the IoT is a huge process but they achieved easily with 100% flawless rate

Cons:

It has an immense effect when they club the data to the cloud which in turns requires high firewall protection.

2.2.5 Dipa soni¹, Ashwin Makwana² “A Survey of IoT the Protocol of MQTT”, IJSCRT Transactions on Applied Science, 2018

The network of smart devices approach was discussed in 1982, with a revised Coke machine at Carnegie Mellon University comely the first internet connected machine, in a position to report its catalogue and whether newly loaded drinks were cold. However the word “Internet of Things” was coined by British entrepreneur Kevin Ashton the executive director of Auto-ID center in the year 1999. Nowadays, communicating between similar objects or dispatching instructions to home appliances is not thought anymore with evolution of wireless transmission mechanism and small-scale and less-potential appliances.

But Internet of Things is actually Communication between machine to machine or human to machine. In IoT, message transmission between different devices is

important because an IoT appliance has to deliver an instruction to a further appliance to manage system. Compared to polling protocol, Push protocol is the suitable message communication protocol for IoT appliances as it is constructed in poor bandwidth network. MQTT, XMPP and CoAP protocol were implemented through these push message services.

These protocols are applicable according to different situations. In particular, MQTT has been utilized as part of many IoT gadgets and instant message delivery systems because it was intended to work on low-power machines as a light-weight protocol.

The rest of the paper is organized as follows. Section 2 represents the MQTT introduction. Section 3 briefly describes the architecture of MQTT. Section 4 gives real life applications of MQTT. Section 5 presents different brokers of MQTT. Section 6 discusses concerns in MQTT. Section 7 presents future trend. Finally, Section 8 concludes survey study with references

Pros:

Implementing Stack over processing and IoT claims a huge difference on the MQTT system

Cons:

Since it is a free server usage this system will fail on port 8080

2.2.6 Carton Rafel¹, Mandro jasel², Victoria parnav³, “White paper super twilio network infrastructure on universal OTP in Automation”, IEEE Computer Science Transactions on Mobile Device, 2021

However, there are not enough elements that can generate an ordinary applied system that commonly involves technologies beyond the course, leaving much to the imagination. Nowadays the engineering labs have the necessary physical devices to perform experiments that reinforce the theoretical knowledge of the course.

That is the focus of this paper. Augmented Reality Automation (ARA) is an innovation that incorporates augmented reality technology to the classical

experiments, allowing the integration and interaction of several technologies, developing mixed experiments, both real and virtual, that is visualized through a mobile device, such as smartphone or tablet, for the purpose of creating deeper and clearer vision of knowledge.

Pros:

Auto OTP generation with 655866 protostome if an excellent move in server.

Cons:

Error Factors are high since it is purely based on local server data.

2.2.7 Immaculate Titus¹, Colserbeg stalin², Kali Giuawlior³, INCC “Importance of virtual to universal linkage”, INSTC Transactions on National Security Science and Network, 2021

This paper presents an overview of basic aspects of White paper analysis on auto incrimination of Twilio server Reality and the main concepts of this technology. Compared to polling protocol, Push protocol is the suitable message communication protocol for IoT appliances as it is constructed in poor bandwidth network. MQTT, XMPP and CoAP protocol were implemented through these push message services.

These protocols are applicable according to different situations. In particular, MQTT has been utilized as part of many IoT gadgets and instant message delivery systems because it was intended to work on low-power machines as a light-weight protocol. It describes the main fields in which AR is applied nowadays and important AR devices. Some characteristics of Augmented Reality systems will be discussed

Pros:

Auto incrimination of server data with five bit module is the clear move

Cons:

Less parameter feature are noted in the results

2.2.8 Daniel G. Van Olst, Jamey Graham, Berna Erol, Qifa Ke, Hidenobu Kishi, Jonathan J. Hull, Jorge Moraleda, Research Gate “Paper-Based Augmented Reality”, Research Gate Transaction on Camera and Paper documentation, 2017

An implementation on a camera phone is discussed that lets users retrieve data and access links from paper documents to electronic data. Recognition is performed at 4 frames per second on a Treo 700w and support is provided for several user applications, including “clickable paper” – printed web pages whose appearance is unchanged but that can be navigated with a camera phone. Applicable to both commercially printed documents as well as documents that are output from PC’s, the technique we call Paper-Based Augmented Reality substantially improves the utility of paper.

Pros:

Linking patches of text will increase lot of security reasons

Cons:

Digital Parameter with server automation was brought to physical world with paper content

2.2.9 Neethi¹, Thammathip Piumsomboon² , Gun A. Lee² , and Mark Billingham², Research Gate “A study of RFID Based Applications”, Research Gate Transactions on Augmented Reality in Computer Science Engineering, 2018

Radio Frequency Identification (RFID) is a promising technology for process automation and beyond that capable of identifying objects without the need for a line-of-sight. However, the trend towards automatic identification of objects also increases the demand for high quality RFID applications. Therefore, research on testing RFID systems and methodical approaches for testing are needed. This thesis presents a novel methodology for the system level test of RFID applications. The approach called ITERA, allows for the automatic generation of tests, defines a semantic model of the RFID system and provides a test environment for RFID applications.

The method introduced can be used to gradually transform use cases into a semi-formal test specification. Test cases are then systematically generated, in order to execute them in the test environment. It applies the principle of model based testing from a black-box perspective in combination with a virtual environment for automatic test execution. The presence of RFID tags in an area, monitored by an RFID reader, can be modelled by time-based sets using set-theory and discrete events. Furthermore, the proposed description and semantics can be used to specify RFID systems and their applications, which might also be used for other purposes than testing.

The approach uses the Unified Modelling Language to model the characteristics of the system under test. Based on the ITERA Meta model test execution paths are extracted directly from activity diagrams and RFID specific test cases are generated. The approach introduced in this thesis allows to reduce the efforts for RFID application testing by systematically generating test cases and the automatic test execution. In combination with Meta model and by considering additional parameters, like unreliability factors, it not only satisfies functional testing aspects, but also increases the confidence in the robustness of the tested application. Mixed with the instantly available virtual readers, it has the potential to speed up the development process and decrease the costs - even during the early development phases.

ITERA can be used for highly automated testing, reproducible tests and because of the instantly available readers, even before the real environment is deployed. Furthermore, the total control of the RFID environment enables to test applications which might be difficult to test manually. This thesis will explain the motivation and objectives of this new RFID application test methodology. Based on a RFID system analysis it proposes a practical solution on the identified issues. Further, it gives a literature review on testing fundamentals, model based test case generation, the typical components of a RFID system and RFID standards used in industry.

Pros:

Accuracy has reached 97% with simple algorithm

Cons:

97% precise and accurate but depends purely on real time saturation and hue point of target images

2.2.10 Kubo¹, A. Divija, G. V V N Vijayalakshmi, P. Vamsi, JARTMS “The Research of IoT based on RFID Tags”, IEEE explore Transactions on Reality and Web Interface, 2021

Internet of Things is the third wave of global information industry following computer, the Internet and mobile communication network. The International Telecommunication Union proposes four key application technologies of IoT: RFID technology, sensor technology, and smart technology and Nano technology. RFID technology, which is short for radio frequency identification, is introduced in this paper. The background, connotation and architecture of IoT is firstly presented, then is the RFID technology, including its components, principles and standards. On the basis of it, applications of IoT system bases on RFID technology is presented, such as product line and logistics management, food security supervision, hospital assets, personnel and container management, and monitoring for miners. Among these, EPC IoT system is specially outlined, which is composed of RFID hardware, Savant middleware and the Internet system. Lastly, the development of RFID technology in our country is presented. Although there are some difficulties at present, we believe that RFID technology will be further developed and innovated to provide more convenient services for users in the future.

Pros:

EPC IoT system is specially outlined

Cons:

Less parameter feature are noted in the results

2.3 MAJOR DISADVANTAGES TO OVERCOME:

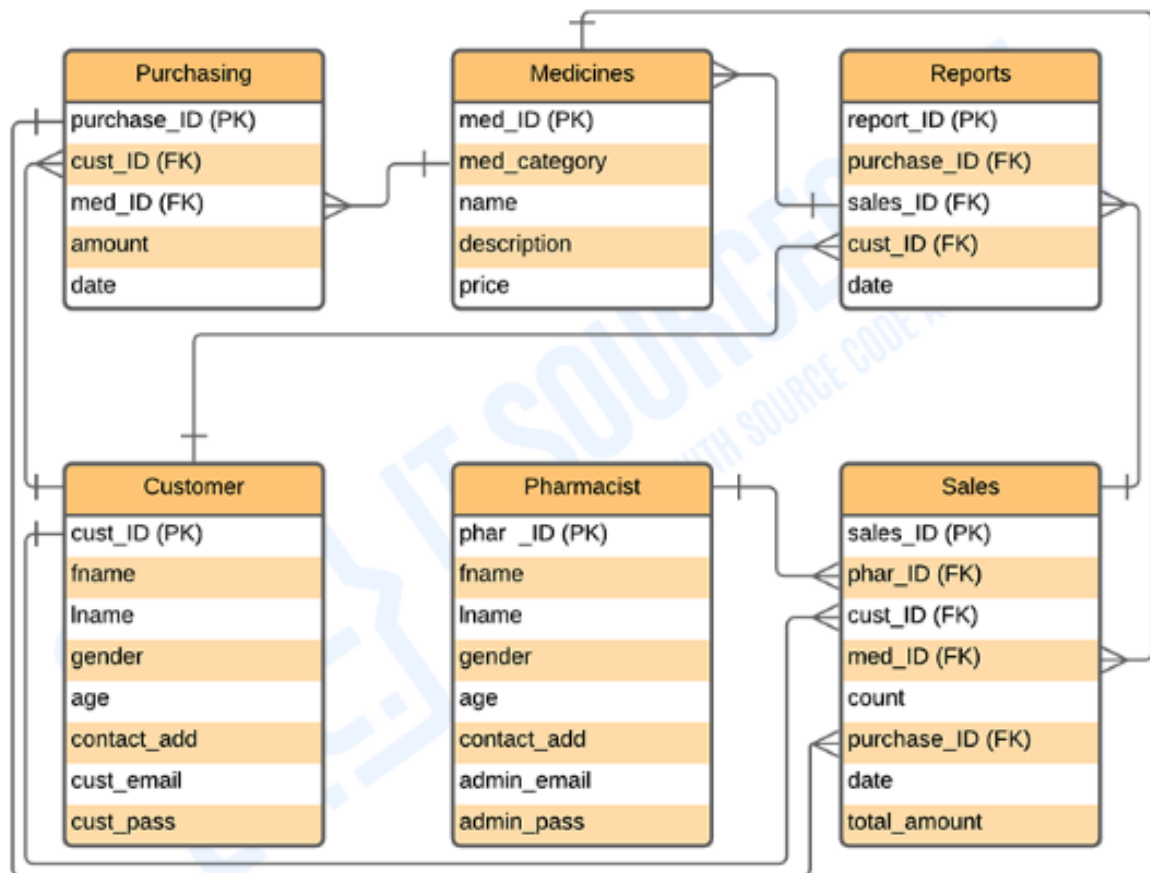
One of the biggest disadvantage of the online pharmacy model is the lack of physical evaluation capacity. In some cases, physical evaluations can be made and situation analysis can be done very effectively. Even if the online evaluation process

is done, this process will not be done by licensed healthcare professionals. One of the disadvantages of E-Pharmacy is that there is no one you can contact face to face.

When patients want to ask questions about the drugs they are taking, it is very difficult for them to reach a licensed pharmacist. For this reason, it may not be possible for patients to access their medication on the same day. Some online pharmacies can dispense medicines to patients without requiring a prescription. In such a case, patients can get sick much more severely instead of healing. Therefore, when buying drugs from the pharmacy, pharmacists must definitely request a prescription. Some illegal online pharmacies sell over-the-counter drugs by putting human health at risk, and it is very difficult to prevent this.

One of the issues that raise questions about the E-Pharmacy application is the privacy of personal and financial information. Therefore, online pharmacies should create their own privacy policy pages on their websites and ensure that personal information and financial information are not shared with third parties.

PHARMACY MANAGEMENT SYSTEM



ENTITY RELATIONSHIP DIAGRAM

Figure 2.1 Proposed Relationship Diagram

CHAPTER - 3

SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

Pharmacy is the branch of medical science which deals with the study of drugs (Medicine). The persons who own the pharmacy must be a citizen of India between the ages of 18 – 60. He is responsible for the proper quality of the drugs dispatched to the customers. We know that without the prescription of doctors, pharmacists are not allowed to distribute the medicines to the common people. Still, we could be able to see some uncivilized people approach pharmacy to get direct medicines. Since they distribute the medicines to those persons without billing, it is considered as a false act in the field of medical science. This long term practice can be eliminated with our project and its guidelines. In addition, persons cannot wait in a queue line for a longer period of time. Due to digital processing, all the data handling and dispatching process will be much faster when compared to the existing system.

3.2 DISADVANTAGES OF EXISTING SYSTEM:

If you ask any of your patients why they do not like going to the pharmacy, they are likely to give you an extensive list of the disadvantages of pharmacy dispensing. Some patients may claim they do not like the time and effort it takes from when they receive the prescription to when they receive their medication. Others may report they don't like everyone else in the pharmacy line being able to hear or see their transactions. Patients do not ask for much when it comes to their health. They want you to help them relieve negative symptoms. They want their privacy protected. They want quick service and they want all of this at the lowest price possible. Pharmacies do not seem to take any of these factors into consideration. Not necessarily because they are mean or don't want to help, but pharmacists are busy. They are too busy to put the patient first. Keep reading to find out the most common disadvantages of pharmacy dispensing.

3.2.1 Capitalizing on Inconvenience

Studies have shown that patients are not satisfied with pharmacies, especially chain pharmacies. Much of their dissatisfaction is due to the amount of time patients spend waiting to receive their medicine. During this wait time, patients end up spending too much money on items they do not need. Pharmacies are set up to up-sell products that could be purchased for much less at the dollar store. Patients get bored, however, and to kill time they shop. Pharmacies capitalize on the wait time of

patients. Also, the longer the time at the pharmacy, the longer a patient must wait for relief. When someone is in pain, they will do almost anything for relief, even if temporary. This includes impulse shopping.

3.2.2 Potential Compounding Errors

A medication error is defined as any event that can be prevented but due to error on the part of the physician, pharmacist or patient, causes harm to the patient. Pharmacy errors are increasing each year. Medication errors can include the following: giving the patient the wrong medication; giving the patient someone else's medication; pharmacist authorizing the wrong dose on the medication; pharmacist or pharmacy technician contaminating the medication. These errors happen, and they happen on a regular basis across the country. The use of pharmaceutical technicians is also a concern. They are not trained as well to spot errors, prevent cross-contamination and keep up with the enormous demands of busy pharmacies today, which are major disadvantages of pharmacy dispensing. During a recent flu epidemic, when drug stores ran out of Tamiflu, the FDA simply posted their recipe and instructed pharmacists to recreate the formula as they need it. This tactic lead to major medical issues for patients, and even killed some. Accidents like these can lead to allergic reactions in patients who trust the pharmacist to get it right. An overdose can happen when a patient takes a higher dose of a medication than they should have. An overdose can also happen when a patient takes the wrong medicine, thinking it was the right medicine. Furthermore, an overdose can happen when a patient takes too many medications.

3.2.3 Privacy Is Compromised

Confidentiality is a big deal to patients. If they feel their confidentiality could be or has been violated, they will be hurt and angry. Patients do not want to ask personal questions in front of a line of people like they must do at a pharmacy. There are no confidential areas at pharmacies that provide the secrecy patients are seeking. Even those who do choose to speak with a pharmacist are forced to whisper, and then made to feel rushed so the pharmacist can return to filling more prescriptions. Situations like this often cause patients to avoid getting their medicine, making them

out of compliance.

3.2.4 Compliance Is Not a Priority

Compliance is when your patient follows through with the recommended treatment plan you created. If they are recommended to take prescription medicines, then they will most likely follow your orders. When you send a patient to a pharmacy to pick up their prescription, you do not really know if they followed through with that action. You don't even really know if they went to the pharmacy at all. You are left to rely on the word of your patients. Pharmacists do not have to ensure patients are compliant with their medicines. While it would be nice, and ethical, they are not required to do so. They are not even required to report their suspicions or concerns to you when they feel a patient may be abusing their medicine.

3.2.5 Disadvantages of Pharmacy Dispensing

It's tempting for patients to seek advice from pharmacists. They think because they work with medications, pharmacists should know how to direct them when they have a problem. While pharmacists can offer their opinion and yes, they are well-educated on the prescription medicines they fill, they are not the right person to recommend treatment options for patients. Pharmacists are not trained like physicians to offer treatment options, and they would not want to risk their license in doing so. Pharmacists can, however, explain in detail the medication or treatment you have been prescribed. For example, if a patient is prescribed an anti-depressant, pharmacists can consult with the patient on everything related to that anti-depressant. This can include side effects and what to do in case of an accidental overdose. This same pharmacist, even if they feel the patient has been given a poor medication, cannot explain all other treatment options to a patient. They can simply refer them back to their physician which is another of the disadvantages of pharmacy dispensing. Other disadvantages of pharmacy dispensing include the possibility of cross contamination if medications are compounded on unclean surfaces. Or, if staff members are sick with the flu or other illnesses and are not following safe handling procedures. Patients do not want to deal with the disadvantages of pharmacy

dispensing and many more. Providing them with services such as in-office dispensing turns these disadvantages into advantages. It also turns patients into happy, satisfied and loyal customers. When you have loyal patients, your practice will thrive.

3.3 PROPOSED SYSTEM:

In our proposed system medicines can only be dispatched to the person having the registered loyalty card. Through this we can log of detailed information about the patient, doctor and the person who received the medicine, location and their contact. This system will be safe and secure for a longer period of time. We have improved the system with digital notification since there won't be any unnecessary queue line to receive the tablets. The person who receives the OTP can alone reach the medical dispatch to receive the drugs. He must carry his loyalty card and the recent OTP to receive the medicines within the time bound of collection. This methodology saves time, create a detailed data log, proper intimation can be sent to the patient regarding their medical stock.

3.4 ADVANTAGES OF THE PROPOSED SYSTEM:

1. The traditional system is bit insecure and there is no proper details about the person who purchased the medicines.
2. In our proposed system even the time log of purchase and buyer information will be clear and digital for a longer period of time.
3. Medicines can only be dispatched to person having the loyalty card.
4. Our Loyalty tag will carry the digital theme of doctor's prescription.
5. On most of the case common man could not be aware to read doctor's prescription properly.
6. Here due to digital prescription they can easily know about the importance of medicines and dosage of medicines on right propositions.
7. If our system is globalized we can eliminate the middle man profits and fix up a global value for the medicine throughout India.
8. We strongly believe that dreams about digital India will be even more effective if we get practice to digital pharmacy.

3.4.1 Bench-Mark Result Analysis of our Proposed System

1. Our system can be even more precise and secure if we upgrade to biometric scanning to retrieve the data.
2. Loyalty card is the entire key to receive the medicine for the patient
3. The person who carry the loyalty card can receive the medicine without having additional proof.
4. We some time face insecure due to this particular limitation.
5. But this insecurity flaw can be eliminated by back through protocol through the registered mobile number.
6. The person who lost the loyalty card can immediately use this back through protocol to block his loyalty card to avoid such scenarios.
7. If we have a network failure we need a man power team to solve the dispatching process
8. If the person having a damaged loyalty card also will be restricted to receive the medicines
9. On such scenarios biometric method of handling the data will be more secure and intelligent move

3.4.2 Limitations

1. Total system must be connected to internet to use the services
2. 24x7 power backup is required for proper functioning
3. Loyalty card must maintained with safety measures
4. In case of system failure additional man power source is mandate to solve the timely situation
5. During network crash and system failure manual data entry will be required to update the details for future use
6. Entire area must be under surveillance to improve the security
7. Additional service tax will be distributed to the customers for proper maintenance
8. But when compared to other factors these expense are negligible
9. If we make the system globalized the total price value of medicines will be reduced to half since it avoid middle man robbery

3.5 APPLICATIONS:

Digitalization has been one of the most important trends in India over the past few years. This rapid growth helps propel India to the forefront of digital and technological innovation, particularly leveraging the energies of the country's young population. We strongly believe that our proposal would be a valuable key in digitalization. Medical standard can be increased in our nation on following our few principles our proposed system can also boost the GDP of our nation to some extent. Our system must be upgraded to bio medical scanning devices. This can create high security and avoid false play. Online and UPI money portal must be introduced to the system. Through this transaction portal service our system can be even more robust. General awareness medical log about the prescription must be added to the digital prescription. This can create huge awareness among the public on medical drugs and its causes.

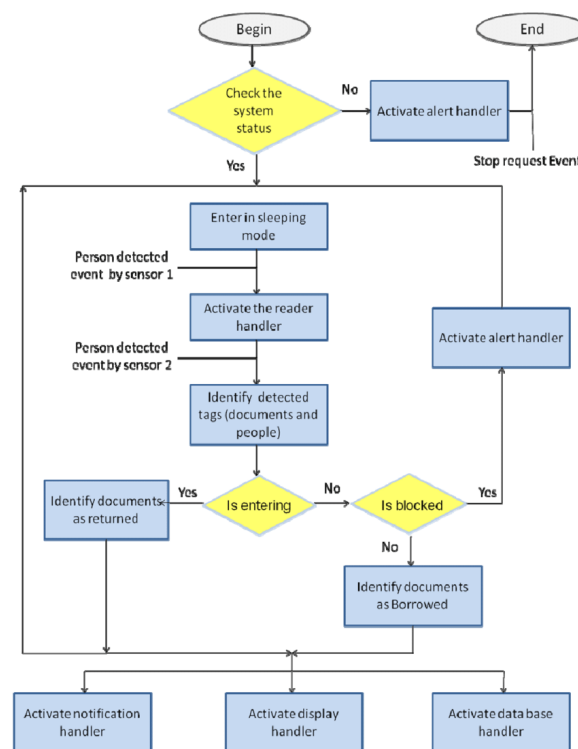


Figure 3.1 Workflow Chart

CHAPTER: 4

SYSTEM DESIGN

4.1 SOFTWARE AND ALGORITHM

MySQL is written in C and C++. Its SQL parser is written in yacc, but it uses a home-brewed lexical analyser, Symbian, SunOS, SCO Open Server, SCO UnixWare, Sanos and Tru64. A port of MySQL to OpenVMS also exists. The MySQL server software itself and the client libraries use dual-licensing distribution. They are offered under GPL version 2, or a proprietary license. Support can be obtained from the official manual. Free support additionally is available in different IRC channels and forums. Oracle offers paid support via its MySQL Enterprise products. They differ in the scope of services and in price. Additionally, a number of third party organisations exist to provide support and services. MySQL has received positive reviews, and reviewers noticed it "performs extremely well in the average case" and that the "developer interfaces are there, and the documentation (not to mention feedback in the real world via Web sites and the like) is very, very good. It has also been tested to be a "fast, stable and true multi-user, multi-threaded SQL database server".

4.1.1 History

MySQL was created by a Swedish company, MySQL AB, founded by Swedes David Axmark, Allan Larsson and Finland Swede Michael "Monty" Widenius. Original development of MySQL by Widenius and Axmark began in 1994.^[22] The first version of MySQL appeared on 23 May 1995. It was initially created for personal usage from mSQL based on the low-level language ISAM, which the creators considered too slow and inflexible. They created a new SQL interface, while keeping the same API as mSQL. By keeping the API consistent with the mSQL system, many developers were able to use MySQL instead of the (proprietary licensed) mSQL antecedent.

4.1.2 Legal disputes and acquisitions

On 15 June 2001, NuSphere sued MySQL AB, TcX DataKonsult AB and its original authors Michael ("Monty") Widenius and David Axmark in U.S District Court in Boston for "breach of contract, tortious interference with third party contracts and relationships and unfair competition". In 2002, MySQL AB sued Progress NuSphere for copyright and trademark infringement in United States district court. NuSphere had allegedly violated MySQL AB's copyright by linking MySQL's GPL'ed code with NuSphere Gemini table without being in compliance with the license. After a preliminary hearing before Judge Patti Saris on 27 February 2002, the parties entered settlement talks and eventually settled. After the hearing, FSF commented that "Judge Saris made clear that she sees the GNU GPL to be an enforceable and binding license."

In October 2005, Oracle Corporation acquired Innobase OY, the Finnish company that developed the third-party InnoDB storage engine that allows MySQL to provide such functionality as transactions and foreign keys. After the acquisition, an Oracle press release mentioned that the contracts that make the company's software available to MySQL AB would be due for renewal (and presumably renegotiation) sometime in 2006. During the MySQL Users Conference in April 2006, MySQL AB issued a press release that confirmed that MySQL AB and Innobase OY agreed to a "multi-year" extension of their licensing agreement. In February 2006, Oracle Corporation acquired Sleepy cat Software, makers of the Berkeley DB, a database engine providing the basis for another MySQL storage engine.

This had little effect, as Berkeley DB was not widely used, and was dropped (due to lack of use) in MySQL 5.1.12, a pre-GA release of MySQL 5.1 released in October 2006. In January 2008, Sun Microsystems bought MySQL AB for \$1 billion. In April 2009, Oracle Corporation entered into an agreement to purchase Sun Microsystems, then owners of MySQL copyright and trademark. Sun's board of directors unanimously approved the deal. It was also approved by Sun's shareholders, and by the U.S. government on 20 August 2009.

On 14 December 2009, Oracle pledged to continue to enhance MySQL as it

had done for the previous four years. A movement against Oracle's acquisition of MySQL AB, to "Save MySQL from Oracle" was started by one of the MySQL AB founders, Monty Widenius. The petition of 50,000+ developers and users called upon the European Commission to block approval of the acquisition. At the same time, some Free Software opinion leaders (including Pamela Jones of Groklaw, Jan Wildeboer and Carlo Piana, who also acted as co-counsel in the merger regulation procedure) advocated for the unconditional approval of the merger.

As part of the negotiations with the European Commission, Oracle committed that MySQL server will continue until at least 2015 to use the dual-licensing strategy long used by MySQL AB, with proprietary and GPL versions available. The antitrust of the EU had been "pressuring it to divest MySQL as a condition for approval of the merger". But, as revealed by WikiLeaks, the US Department of Justice, at the request of Oracle, pressured the EU to approve the merger unconditionally. The European Commission eventually unconditionally approved Oracle's acquisition of MySQL AB on 21 January 2010. In January 2010, before Oracle's acquisition of MySQL AB, Monty Widenius started a GPL-only fork, Maria DB. Maria DB is based on the same code base as MySQL server 5.5 and aims to maintain compatibility with Oracle-provided versions.

4.2 Features

MySQL is offered under two different editions: the open source MySQL Community Server and the proprietary Enterprise Server. MySQL Enterprise Server is differentiated by a series of proprietary extensions which install as server plugins, but otherwise shares the version numbering system and is built from the same code base.

Major features as available in MySQL 5.6:

1. A broad subset of ANSI SQL 99, as well as extensions
2. Cross-platform support
3. Stored procedures, using a procedural language that closely adheres to SQL/PSM
4. Triggers, Cursors, Updatable views, Information schema

5. Online Data Definition Language (DDL) when using the InnoDB Storage Engine.
6. Performance Schema that collects and aggregates statistics about server execution and query performance for monitoring purposes.
7. A set of SQL Mode options to control runtime behaviour, including a strict mode to better adhere to SQL standards.
8. X/Open XA distributed transaction processing (DTP) support; two phase commit as part of this, using the default InnoDB storage engine
9. Transactions with save points when using the default InnoDB Storage Engine.
10. The NDB Cluster Storage Engine also supports transactions.
11. ACID compliance when using InnoDB and NDB Cluster Storage Engines
12. SSL support
13. Query caching
14. Sub-SELECTs (i.e. nested SELECTs)
15. Built-in replication support
16. Full-text indexing and searching
17. Embedded database library
18. Unicode support
19. Partitioned tables with pruning of partitions in optimizer
20. Shared-nothing clustering through MySQL Cluster
21. Multiple storage engines, allowing one to choose the one that is most effective for each table in the application.
22. Native storage engines InnoDB, MyISAM, Merge, Memory (heap), Federated, Archive, CSV, Black hole, and NDB Cluster.
23. Commit grouping, gathering multiple transactions from multiple connections together to increase the number of commits per second.
24. The developers release minor updates of the MySQL Server approximately every two months. The sources can be obtained from MySQL's website or from MySQL's GitHub repository, both under the GPL license.

4.2.1 Limitations

1. When using some storage engines other than the default of InnoDB, MySQL does not comply with the full SQL standard for some of the implemented functionality, including foreign key references.
2. Check constraints are parsed but ignored by all storage engines before MySQL version 8.0.15.
3. Up until MySQL 5.7, triggers are limited to one per action / timing, meaning that at most one trigger can be defined to be executed after an INSERT operation, and one before INSERT on the same table. No triggers can be defined on views.
4. MySQL database's inbuilt functions like `UNIX_TIMESTAMP ()` will return 0 after 03:14:07 UTC on 19 January 2038.
5. Recently, there had been an attempt to solve the problem which had been assigned to the internal queue.

4.2.2 Deployment

MySQL can be built and installed manually from source code, but it is more commonly installed from a binary package unless special customizations are required. On most Linux distributions, the package management system can download and install MySQL with minimal effort, though further configuration is often required to adjust security and optimization settings.

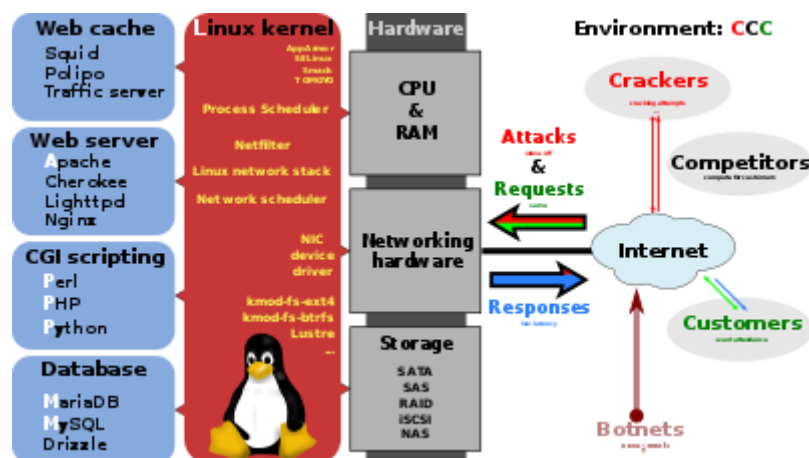


Figure 4.1 Deployment Chart

Though MySQL began as a low-end alternative to more powerful proprietary databases, it has gradually evolved to support higher-scale needs as well. It is still most commonly used in small to medium scale single-server deployments, either as a component in a LAMP-based web application or as a standalone database server. Much of MySQL's appeal originates in its relative simplicity and ease of use, which is enabled by an ecosystem of open source tools such as phpMyAdmin. In the medium range, MySQL can be scaled by deploying it on more powerful hardware, such as a multi-processor server with gigabytes of memory.

There are, however, limits to how far performance can scale on a single server ('scaling up'), so on larger scales, multi-server MySQL ('scaling out') deployments are required to provide improved performance and reliability. A typical high-end configuration can include a powerful master database which handles data write operations and is replicated to multiple slaves that handle all read operations. The master server continually pushes binlog events to connected slaves so in the event of failure a slave can be promoted to become the new master, minimizing downtime. Further improvements in performance can be achieved by caching the results from database queries in memory using memcached, or breaking down a database into smaller chunks called shards which can be spread across a number of distributed server clusters.

4.2.3 High availability software

Oracle MySQL offers a high availability solution with a mix of tools including the MySQL router and the MySQL shell. They are based on Group Replication, open source tools. MariaDB offers a similar offer in terms of products.

4.2.4 Cloud deployment

In this implementation, cloud users can upload a machine image of their own with MySQL installed, or use a ready-made machine image with an optimized installation of MySQL on it, such as the one provided by Amazon EC2.

4.3 User Interfaces

Some cloud platforms offer MySQL "as a service". In this configuration, application owners do not have to install and maintain the MySQL database on their

own. Instead, the database service provider takes responsibility for installing and maintaining the database, and application owners pay according to their usage.^[101] Notable cloud-based MySQL services are the [Amazon Relational Database Service](#); [Oracle MySQL Cloud Service](#), [Azure Database for MySQL](#), [Rackspace](#); [HP Converged Cloud](#); [Heroku](#) and [Jelastic](#). In this model the database service provider takes responsibility for maintaining the host and database.

4.3.1 Graphical User Interfaces

A [graphical user interface](#) (GUI) is a type of interface that allows users to interact with electronic devices or programs through graphical icons and visual indicators such as secondary notation, as opposed to text-based interfaces, typed command labels or text navigation. Third-party proprietary and free graphical administration applications (or "front ends") are available that integrate with MySQL and enable users to work with database structure and data visually.

4.3.1.1 MySQL Workbench

[MySQL Workbench](#) is the integrated environment for MySQL. It was developed by MySQL AB, and enables users to graphically administer MySQL databases and visually design database structures. MySQL Workbench is available in three editions, the regular [free and open source](#) Community Edition which may be downloaded from the MySQL website, and the proprietary Standard Edition which extends and improves the feature set of the Community Edition, and the MySQL Cluster CGE.

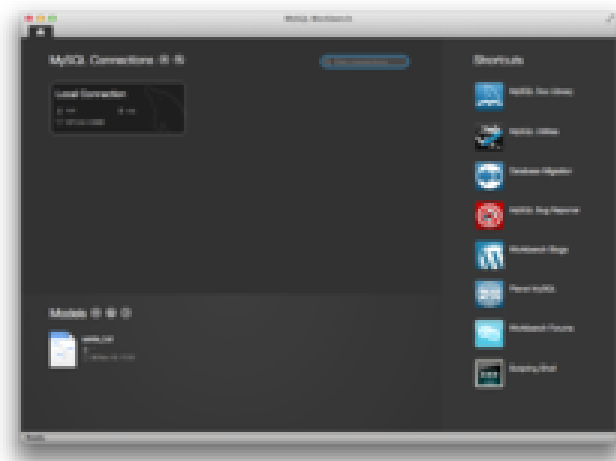


Figure 4.2 MySQL Workbench

4.3.1.2 Other GUI tools

- 1. Adminer**
- 2. Database Workbench**
- 3. DBeaver**
- 4. DBEdit**
- 5. HeidiSQL**
- 6. LibreOffice Base**
- 7. Navicat**
- 8. Openoffice.org**
- 9. PhpMyAdmin**
- 10. SQLBuddy**
- 11. SQLyog**
- 12. Toad for MySQL**
- 13. Webmin**

4.3.2 Command-line interfaces

A command-line interface is a means of interacting with a computer program where the user issues commands to the program by typing in successive lines of text (command lines). MySQL ships with many command line tools, from which the main interface is the MySQL client. MySQL Utilities is a set of utilities designed to perform common maintenance and administrative tasks. Originally included as part of the MySQL Workbench, the utilities are a stand-alone download available from Oracle. Percona Toolkit is a cross-platform toolkit for MySQL, developed in Perl. Percona Toolkit can be used to prove replication is working correctly, fix corrupted data, automate repetitive tasks, and speed up servers. Percona Toolkit is included with several Linux distributions such as CentOS and Debian, and packages are available for Fedora and Ubuntu as well. Percona Toolkit was originally developed as Maatkit,

but as of late 2011, Maatkit is no longer developed. MySQL shell is a tool for interactive use and administration of the MySQL database. It supports JavaScript, Python or SQL modes and it can be used for administration and access purposes.

4.4 Application Programming Interfaces

Many programming languages with language-specific APIs include libraries for accessing MySQL databases. These include MySQL Connector/Net for .NET/CLI Languages and the JDBC driver for Java. In addition, an ODBC interface called MySQL Connector/ODBC allows additional programming languages that support the ODBC interface to communicate with a MySQL database, such as ASP or ColdFusion. The HTSQL – URL-based query method also ships with a MySQL adapter, allowing direct interaction between a MySQL database and any web client via structured URLs. Other drivers exist for languages like Python or Node.js

CHAPTER- 5

HARDWARE AND SOFTWARE DESCRIPTION

5.1 HARDWARE LIST

- 1. NodeMCU ESP8266 Wi-Fi Development Board**
- 2. MRF RC522 RFID Module**

5.1.1 NodeMCU ESP8266 Wi-Fi Development Board

NodeMCU is an open source firmware for which open source prototyping board designs are available. The name "NodeMCU" combines "node" and "MCU" (micro-controller unit). The term "NodeMCU" strictly speaking refers to the firmware rather than the associated development kits. Both the firmware and prototyping board designs are open source. The firmware uses the Lua scripting language. The firmware is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS. Due to resource constraints, users need to select the modules relevant for their project and build a firmware tailored to their needs. Support for the 32-bit ESP32 has also been implemented.

The prototyping hardware typically used is a circuit board functioning as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna. The choice of the DIP format allows for easy prototyping on breadboards. The design was initially based on the ESP-12 module of the ESP8266, which is a WI-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications (see related projects).



Figure 5.1 NodeMCU ESP8266 Wi-Fi Development Board

5.1.1.1 Electrical Parameters

1. Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106.
2. Operating Voltage: 3.3V.
3. Input Voltage: 7-12V.
4. Digital I/O Pins (DIO): 16.
5. Analog Input Pins (ADC): 1.
6. UARTs: 1.
7. SPIs: 1.
8. I2Cs: 1.

5.1.2 MRFRC522 RFID Module

MF RC522 is a highly integrated read and write card chip applied to the 13.56MHz contactless communication. Launched by the NXP Company, it is a low-voltage, low-cost, and small-sized non-contact card chip, a best choice for intelligent instrument and portable handheld devices. The MF RC522 uses advanced modulation and demodulation concept which fully presented in all types of 13.56MHz passive contactless communication methods and protocols. In addition, it supports rapid CRYPTO1 encryption algorithm to verify MIFARE products. MFRC522 also supports MIFARE series of high-speed non-contact communication, with a two-way data transmission rate of up to 424kbit/s. As a new member of the 13.56MHz highly integrated reader card series, MF RC522 is much similar to the existing MF RC500 and MF RC530 when there are also great differences. It communicates with the host machine via the serial manner which needs less wiring. You can choose between SPI,

I2C and serial UART mode (similar to RS232), which helps reduce the connection, save PCB board space (smaller size), and reduce cost.

5.1.2.1 Electrical Parameters

1. Operating current: 13—26mA/DC 3.3V
2. Idle current: 10-13mA/ DC 3.3V
3. Sleep current: <80uA
4. Peak current: <30mA
5. Operating frequency: 13.56MHz
6. Supported Cards: mifare1 S50, mifare1 S70, mifare UltraLight, mifare Pro, mifare Desfire
7. Physical features: size: 40mm×60mm
8. Ambient operating temperature: - 20-80 degrees centigrade
9. Ambient storage temperature: - 40-85 degrees centigrade
10. Ambient relative humidity: 5%—95%



Figure 5.2 MRF RC522 RFID Module

5.2 SOFTWARE LIST

1. **Arduino IDE**

2. Xampp Server

5.2.1 Arduino IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub `main()` into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program `avrdude` to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. By default, `avrdude` is used as the uploading tool to flash the user code onto official Arduino boards. Arduino IDE is a derivative of the Processing IDE, however as of version 2.0, the Processing IDE will be replaced with the Visual Studio Code-based Eclipse Theia IDE framework. With the rising popularity of Arduino as a software platform, other vendors started to implement custom open source compilers and tools (cores) that can build and upload sketches to other microcontrollers that are not supported by Arduino's official line of microcontrollers.

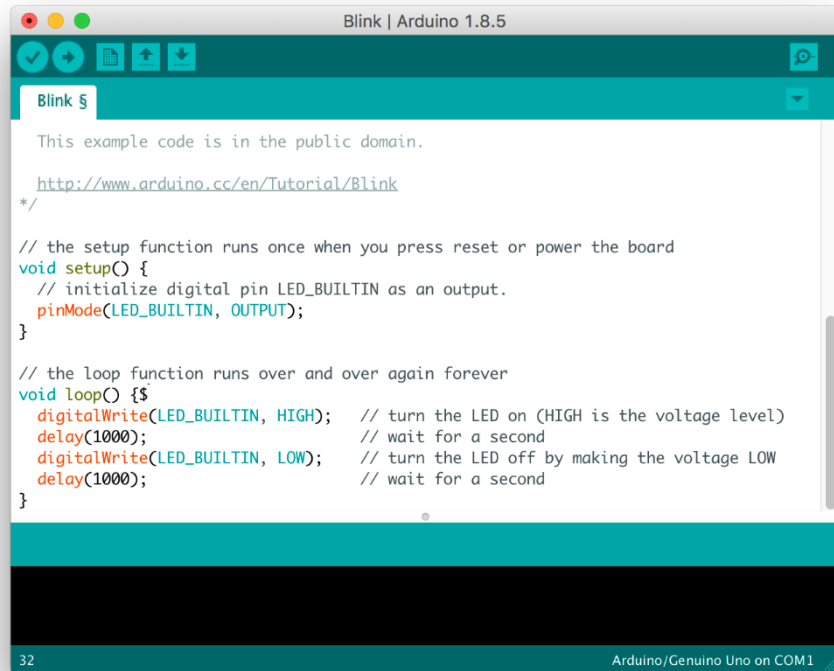


Figure 5.3 *Arduino IDE*

5.2.2 Xampp Server

Bitnami for XAMPP greatly simplifies the development of PHP applications on top of Apache Friends XAMPP, by installing WordPress and many more open source applications on top of XAMPP.

5.2.2.1 System Requirements

Bitnami XAMPP modules require either XAMPP or a Bitnami LAMP, MAMP or WAMP stack already installed. They can be used with XAMPP (installer or zip file) v1.7.4 or later on Windows, v1.8.1 or later on Linux, and v1.8.2 or later on Mac OS X.

5.2.2.2 Installation

Bitnami XAMPP modules require either XAMPP or a Bitnami LAMP, MAMP or WAMP stack already installed. They can be used with XAMPP (installer or zip file) v1.7.4 or later on Windows, v1.8.1 or later on Linux, and v1.8.2 or later on Mac

OS X. During the installation process, you will be prompted for the XAMPP installation directory. The default installation directory is typically C:\xampp on Windows, /opt/lamp on Linux and /Applications/XAMPP on Mac OS X. Bitnami for XAMPP modules require the MySQL root password to create the application databases. The default XAMPP password for the MySQL root account is an empty string. If you have changed this password, you will be prompted for it during the module installation process.

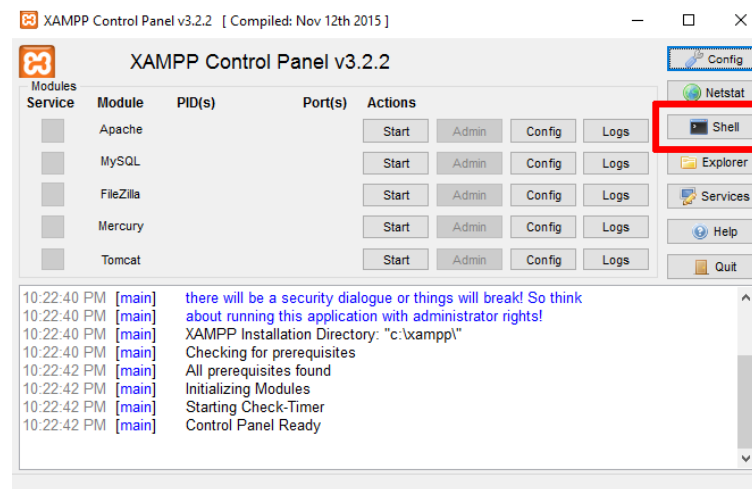


Figure 5.4 Xampp Control Panel

CHAPTER 6

RESULTS AND DISCUSSION

6.1 FINAL RESULTS OBTAINED

In our project proposal, we created a network to Connect RFID to PHP & MySQL Database with NodeMCU ESP8266. Here I have interfaced RFID-RC522 Module with NodeMCU ESP8266 and then I'm sending data of RFID to MySQL Database. Actually, we are just reading the serial data coming from NodeMCU ESP8266 and then publishing that to MySQL Database through python code. Unlike others, this project is Portable because we can access data from any device connected to the Internet. Basically, this project can store the Credentials of Students or employees.

NodeMCU V3 ESP8266 / ESP12E with MYSQL Database



Welcome to NodeMCU V3 ESP8266 / ESP12E with MYSQL Database



Figure 6.1 Digital Pharmacy User Interface

6.2 COMPARISON BETWEEN EXISTING SYSTEM AND PROPOSED SYSTEM

The traditional system is bit insecure and there is no proper details about the person who purchased the medicines. In our proposed system even the time log of purchase and buyer information will be clear and digital for a longer period of time. Medicines can only be dispatched to person having the loyalty card. Our Loyalty tag will carry the digital theme of doctor's prescription. On most of the case common man could not be aware to read doctor's prescription pad properly. Here due to digital prescription they can easily know about the importance of medicines and dosage of medicines on right propositions. If our system is globalized we can eliminate the middle man profits and fix up a global value for the medicine throughout India. We strongly believe that dreams about digital India will be even more effective if we get practice to digital pharmacy. Our system can be even more precise and secure if we upgrade to biometric scanning to retrieve the data. Loyalty card is the entire key to receive the medicine for the patient. The person who carry the loyalty card can receive the medicine without having additional proof. We some time face insecure due to this particular limitation. But this insecurity flaw can be eliminated by back through protocol through the registered mobile number. The person who lost the loyalty card can immediately use this back through protocol to block his loyalty card to avoid such scenarios. If we have a network failure we need a man power team to solve the dispatching process. If the person having a damaged loyalty card also will be restricted to receive the medicines. On such scenarios

biometric method of handling the data will be more secure and intelligent move.

6.3 CONCLUSION

- 1) Digitalization has been one of the most important trends in India over the past few years.
- 2) This rapid growth helps propel India to the forefront of digital and technological innovation, particularly leveraging the energies of the country's young population.
- 3) We strongly believe that our proposal would be a valuable key in digitalization
- 4) Medical standard can be increased in our nation on following our few principles
- 5) Our proposed system can also boost the GDP of our nation to some extend

6.4 FUTURE SCOPE

- 1) Our system must be upgraded to bio medical scanning devices.
- 2) This can create high security and avoid false play.
- 3) Online and UPI money portal must be introduced to the system.
- 4) Through this transaction portal service our system can be even more robust.
- 5) General awareness medical log about the prescription must be added to the digital prescription.
- 6) This can create huge awareness among the public on medical drugs and its causes.

CHAPTER – 7

CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

Digitalization has been one of the most important trends in India over the past few years. This rapid growth helps propel India to the forefront of digital and technological innovation, particularly leveraging the energies of the country's young population. We strongly believe that our proposal would be a valuable key in digitalization Medical standard can be increased in our nation on following our few principles. Our proposed system can also boost the GDP of our nation to some extend

7.2 FUTURE WORK

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APPENDIX

```
#include <ESP8266WebServer.h>
#include <ESP8266HTTPClient.h>
#include <SPI.h>
#include <MFRC522.h>
#define SS_PIN D2
#define RST_PIN D1
MFRC522 mfrc522(SS_PIN, RST_PIN)
#define ON_Board_LED
const char* ssid = "MSJ";
const char* password = "7373771991";
ESP8266WebServer server(80);
int readsucces;
byte readcard[4];
char str[32] = "";
String StrUID;
void setup()
{
  Serial.begin(115200);
  SPI.begin();
  mfrc522.PCD_Init();
  delay(500);
  WiFi.begin(ssid, password);
  Serial.println("");
```

```

pinMode(ON_Board_LED,OUTPUT);
digitalWrite(ON_Board_LED, HIGH);
Serial.print("Connecting");
while (WiFi.status() != WL_CONNECTED)
{
    Serial.print(".");
    digitalWrite(ON_Board_LED, LOW);
    delay(250);
    digitalWrite(ON_Board_LED, HIGH);
    delay(250);
}
digitalWrite(ON_Board_LED, HIGH);
Serial.println("");
Serial.print("Successfully connected to : ");
Serial.println(ssid);
Serial.print("IP address: ");
Serial.println(WiFi.localIP());
Serial.println("Please tag a card or keychain to see the UID !");
Serial.println("");
}

```

```

void loop()
{
    readsuccess = getid();
    if(readsuccess) {
        digitalWrite(ON_Board_LED, LOW);
        HTTPClient http;
        String UIDresultSend, postData;
        UIDresultSend = StrUID;
        postData = "UIDresult=" + UIDresultSend;
        http.begin("http://192.168.39.59/NodeMCU_RC522_Mysql/getUID.php");
    }
}

```

```

int httpCode = http.POST(postData);
String payload = http.getString();
Serial.println(UIDresultSend);
Serial.println(httpCode);
Serial.println(payload);
http.end(); //Close connection
delay(1000);
digitalWrite(ON_Board_LED, HIGH);
}
}
int getid() {
    if(!mfrc522.PICC_IsNewCardPresent()) {
        return 0;
    }
    if(!mfrc522.PICC_ReadCardSerial()) {
        return 0;
    }
    Serial.print("THE UID OF THE SCANNED CARD IS : ");
    for(int i=0;i<4;i++){
        readcard[i]=mfrc522.uid.uidByte[i];
        array_to_string(readcard, 4, str);
        StrUID = str;
    }
    mfrc522.PICC_HaltA();
    return 1;
}
void array_to_string(byte array[], unsigned int len, char buffer[]) {
    for (unsigned int i = 0; i < len; i++)
    {
        byte nib1 = (array[i] >> 4) & 0x0F;
        byte nib2 = (array[i] >> 0) & 0x0F;

```

```
    buffer[i*2+0] = nib1 < 0xA ? '0' + nib1 : 'A' + nib1 - 0xA;  
    buffer[i*2+1] = nib2 < 0xA ? '0' + nib2 : 'A' + nib2 - 0xA;  
}  
buffer[len*2] = '\0';  
}
```