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DEVELOPMENT OF AN APPLICATION TO SHARE HEALTH THINGS

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In The Name of **ALLAH**, The Most Beneficent, The Most Merciful.

All praise belongs to **ALLAH** alone, and blessings and peace be upon the final Prophet.

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Part I

GENERAL INTRODUCTION

This part has one chapter of general introduction of the project and we talk about overview, motivation and problematic issues

1

GENERAL INTRODUCTION

1.0.1 *Overview*

Today, and with the growth of technologies and communication technologies the processes of sharing informations and things become more easier and with this effect a lot of society problems can be solved. Some of those technologies is information system, which is a system composed of people and computers that processes or interprets information. The term is also sometimes used in more restricted senses to refer to softwares that can be used to runs a computerized database. Artificial intelligence is another technologies which defined by computer science as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. A more elaborate definition characterizes AI as "a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.

1.0.2 *Motivation*

There are a lot of people who need help or want to help others, So we proposed a solution which is a platform that can allow people to communicate with each others in order to make the process of sharing things more easier and more faster.

1.0.3 *Organization of dissertation*

Our dissertation is divided into four parts. The first contains the general introduction of the project and we talk about overview, motivation and problematic issues. The second part contains the litterateur topics which help the reader to understand more about this field, this part include two chapter. while the third

part will talk about design and implementation of our proposed solution. The last part is the general conclusion and future work.

Part II

LITERATURE PART

This part contains the litterateur topics which help the reader to understand more about this field, and is include two chapter Information system and Artificial Intelligence, and Health Information Technology and Charities.

2

INFORMATION SYSTEM AND ARTIFICIAL INTELLIGENCE

2.1 INFORMATION SYSTEM

An Information system is a combination of hardware and software and telecommunication networks that people build to collect, create and distribute useful data, typically in an organizational, It defines the flow of information within the system. The objective of an information system is to provide appropriate information to the user, to gather the data, processing of the data and communicate information to the user of the system.[1].

2.1.1 *Components Of Information Systems*

The main components of information systems are computers, software, databases, network, and individuals (human resources) as shown below:

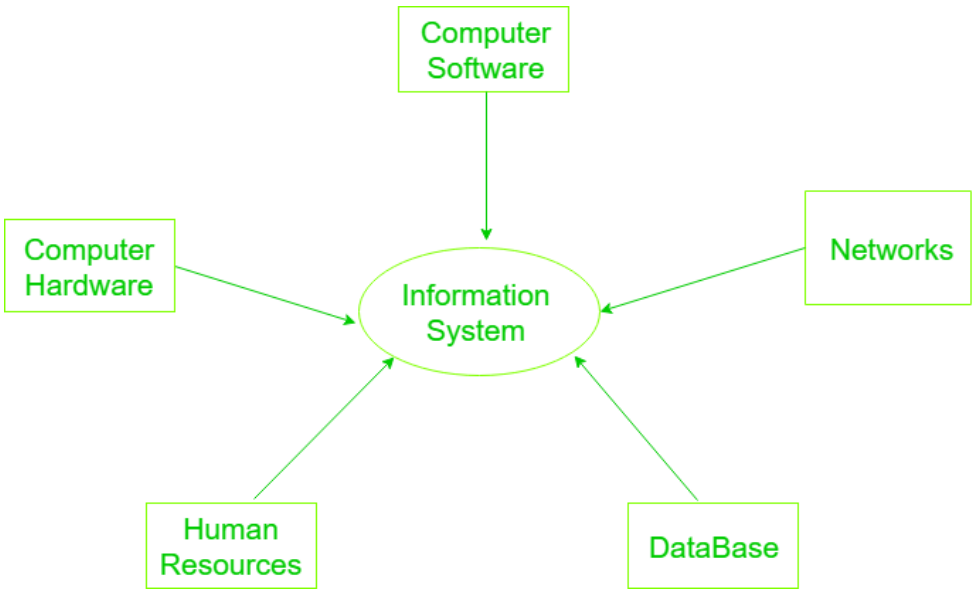

Figure 1: Information System Components

[1]

- **Computer Hardware:**
  Computer and all devices and peripherals connected to computers, such as, mouse, keyboard, hard disk, monitor etc. are collectively called hardware resource. Hardware resources also includes media devices[37].

- **Computer Software:**
  These are programs that run on the hardware. The software is broken down into two major categories namely system software and applications software. System software refers to the operating system i.e. Windows, Mac OS, and Ubuntu, etc. Applications software refers to specialized software for accomplishing business tasks such as a Payroll program, banking system, point of sale system, etc[2].

- **Databases:**
  Data are the raw facts and figures that are unorganised that are and later processed to generate information. Softwares are used for organising and serving data to the user, managing physical storage of media and virtual resources. As the hardware can't work without software the same as software needs data for processing. Data are managed using Database management system[1].

  Database software is used for efficient access for required data, and to manage knowledge bases.

- **Network:**
  Network resources refer to the telecommunication networks like intranets, extranets, and the Internet. These resources facilitate the flow of communication in the organization and are therefore essential for computer-based information systems. The telecommunication network components in the organization comprise computer systems, communication processors like modems and internetwork processors, and other devices. All these components should be interconnected by a medium of communication and should be controlled by the communication software such as network operating systems and Internet browser packages[22].

- **People (Human Resources):**
  Information systems professionals and users who analyse organisational

information needs, design and construct information systems, write computer programs, operate the hardware, and maintain software[39].

2.1.2 *Types of information system*

There are many information systems, and this is due to the process of the classification, which is simply a way to classify things or classify them together so that they can be dealt with as if it were one unit. one of classification methods of information systems is the pyramid model, below we will talk about the most commune types that described in the four-level pyramid model based on the different levels of hierarchy in the organization.

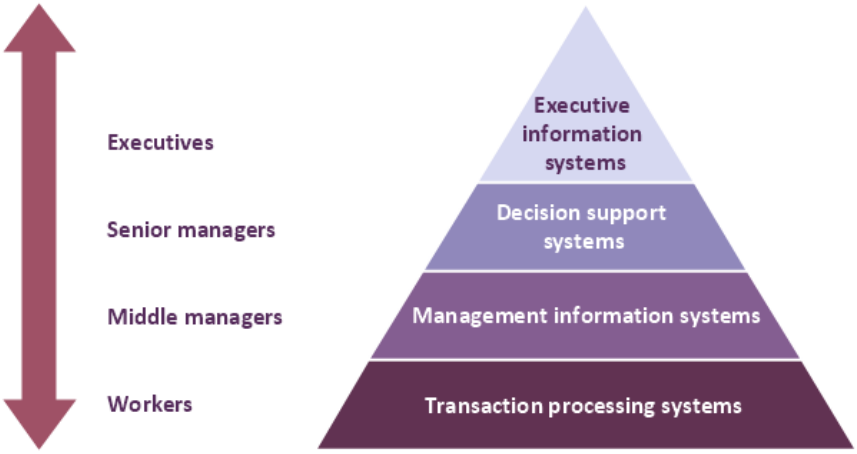

Figure 2: Information System Types (level 4 diagram)
[3]

- **Executive Support Systems (ESS):**
  This type of IS was designed to help senior management support the business and make strategic decisions. It gathers, analyses and summarises the key internal and external information used in the everyday business. It supports an inventory of all present information assets; projected revenue figures based on new product sales expectations and reasonable sales figures between one week and the next. For example, a chief executive officer (CEO) may require overall sales for the company, along with sales for every department separately, and general economic data for the year[21].

- **Decision Support System (DSS):**
  It is an information system that offers the kind of information that may not be predictable. Business professionals may need such information only once. These systems do not produce regularly scheduled management reports. Instead, they are designed to respond to wide range of requests. It is true that all the decisions in an organization are not of a recurring nature. Decision support systems assist managers, who make decisions that are not highly structured, often called unstructured or semi structured decision. The decision support systems support, but do not replace, judgments of managers[48].

- **Management Information Systems (MIS):**
  These systems make use of information technology to help managers ensure a smooth and efficient running of the organization. Information collected by these systems is structured so that the managers can easily evaluate the company's current performance vis-Ã -vis previous outputs. Some of the common types of Management Information Systems include process control systems, human resource management systems, sales and marketing systems, inventory control systems, office automation systems, enterprise resource planning systems, accounting and finance systems and management reporting systems[42].

- **Transaction Processing Systems (TPS):**
  A Transaction Processing Systems (TPS) is used primarily for record keeping which is required in any organization to conduct the business. Examples of TPS are sales order entry, payroll, and shipping records etc. TPS is used for periodic report generation in a scheduled manner. TPS is also used for producing reports on demand as well as exception reports[45].

2.1.3 *Managing Information Systems*

- **Infomation system infrastructure and architecture:**
  A well-designed information system rests on a coherent foundation that supports responsive change -and, thus, the organization's agility- as new business or administrative initiatives arise. Known as the information sys-

tem infrastructure, the foundation consists of core telecommunications networks, databases and data warehouses, software, hardware, and procedures managed by various specialists.

With business globalization, an organization's infrastructure often crosses many national boundaries. Establishing and maintaining such a complex infrastructure requires extensive planning and consistent implementation to handle strategic corporate initiatives, transformations, mergers, and acquisitions. Information system infrastructure should be established in order to create meaningful options for future corporate development. When organized into a coherent whole, the specific information systems that support operations, management, and knowledge work constitute the system architecture of an organization. Clearly, an organization's long-term general strategic plans must be considered when designing an information system infrastructure and architecture[4].

- **Organization of information services :**
  Information services of an organization are delivered by an outside firm, by an internal unit, or by a combination of the two. Outsourcing of information services helps with such objectives as cost savings, access to superior personnel, and focusing on core competencies.

  An information services unit is typically in charge of an organization's information systems. When the systems are largely outsourced, this unit is of a limited size and concentrates on aligning the systems with the corporate competitive strategy and on supervising the outside company's services. When information services are provided in-house and centralized, this unit is responsible for planning, acquiring, operating, and maintaining information systems for the entire organization. In decentralized structures, however, the central unit is responsible only for planning and maintaining the infrastructure, while business and administrative specialists supervise systems and services for their own units. A variety of intermediate organizational forms are possible.

  In many organizations, information systems are headed by a chief information officer (CIO) or a chief technology officer (CTO). The activities of information services are usually supervised by a steering committee consisting

of the executives representing various functional units of the organization. Steering committees set the priorities for the development of future systems. In the organizations where information systems play a strategic role, boards of directors need to be involved in their governance. As described below, a vital responsibility of an information services unit is to ensure uninterrupted service and integrity of the systems and information in the face of many security threats[4].

2.1.4 *Impacts Of Information Systems*

- Modern technology can significantly boost your company's performance and productivity. Information systems are no exception. Organizations worldwide rely on them to research and develop new ways to generate revenue, engage customers and streamline time-consuming tasks.
- With an information system, businesses can save time and money while making smarter decisions. A company's internal departments, such as marketing and sales, can communicate better and share information more easily.
- Since this technology is automated and uses complex algorithms, it reduces human error. Furthermore, employees can focus on the core aspects of a business rather than spending hours collecting data, filling out paperwork and doing manual analysis.
- Thanks to modern information systems, team members can access massive amounts of data from one platform. For example, they can gather and process information from different sources, such as vendors, customers, warehouses and sales agents, with a few mouse clicks[44].

2.2 HEALTHCARE

Healthcare is the maintenance or improvement of health via the prevention, diagnosis, treatment, recovery, or cure of disease, illness, injury, and other physical and mental impairments in people. Health care is delivered by health profession-

als in allied health fields. Physicians and physician associates are a part of these health professionals. Dentistry, pharmacy, midwifery, nursing, medicine, optometry, audiology, psychology, occupational therapy, physical therapy, athletic training and other health professions are all part of health care. It includes work done in providing primary care, secondary care, and tertiary care, as well as in public health[24].

2.2.1 *Types of Healthcare*

- **Primary care:**
  Is the day-to-day healthcare given by a health care provider. Typically this provider acts as the first contact and principal point of continuing care for patients within a healthcare system, and coordinates other specialist care that the patient may need. Patients commonly receive primary care from professionals such as a primary care physician (general practitioner or family physician), a nurse practitioner (adult-gerontology nurse practitioner, family nurse practitioner, or pediatric nurse practitioner), or a physician assistant. In some localities, such a professional may be a registered nurse, a pharmacist, a clinical officer (as in parts of Africa), or an Ayurvedic or other traditional medicine professional (as in parts of Asia). Depending on the nature of the health condition, patients may then be referred for secondary or tertiary care[5][6].

- **Secondary care:**
  Includes acute care: necessary treatment for a short period of time for a brief but serious illness, injury, or other health condition. This care is often found in a hospital emergency department. Secondary care also includes skilled attendance during childbirth, intensive care, and medical imaging services.

  The term "secondary care" is sometimes used synonymously with "hospital care". However, many secondary care providers, such as psychiatrists, clinical psychologists, occupational therapists, most dental specialties or physiotherapists, do not necessarily work in hospitals. Some primary care services are delivered within hospitals. Depending on the organization and policies

of the national health system, patients may be required to see a primary care provider for a referral before they can access secondary care[23].

- **Tertiary care:**
  Is specialized consultative health care, usually for inpatients and on referral from a primary or secondary health professional, in a facility that has personnel and facilities for advanced medical investigation and treatment, such as a tertiary referral hospital.

  Examples of tertiary care services are cancer management, neurosurgery, cardiac surgery, plastic surgery, treatment for severe burns, advanced neonatology services, palliative, and other complex medical and surgical interventions[26][23].

2.2.2 *Healthcare system*

Healthcare system is the organization of people, institutions, and resources to deliver health care services to meet the health needs of target populations. There is a wide variety of health systems around the world, however health system planning can be broadly classified into Public, Private and Mixed Health Systems. Health systems are generally distributed among market participants including governments, trade unions, charities, religious, or other coordinated bodies[46].

2.2.3 *Goals of Healthcare Systems*

The goals for health systems, according to the World Health Organization, are good health, responsiveness to the expectations of the population, and fair financial contribution. Progress towards them depends on how systems carry out four vital functions: provision of health care services, resource generation, financing, and stewardship[46].

2.2.4 *Healthcare Challenges*

There are a lot of challenges that faces the healthcare in multiple sides, we mentioned some of them below:

- **Cybersecuritye:**
  Due to the highly sensitive patient information collected by healthcare organizations, the industry has become a prime target for cybercriminals. In 2017, the US medical and healthcare sector experienced over 350 data breaches, exposing 4.93 million patient records. Unfortunately, this trend shows no signs of slowing down. In the first half of 2019, there already were 32 million patient records breached.

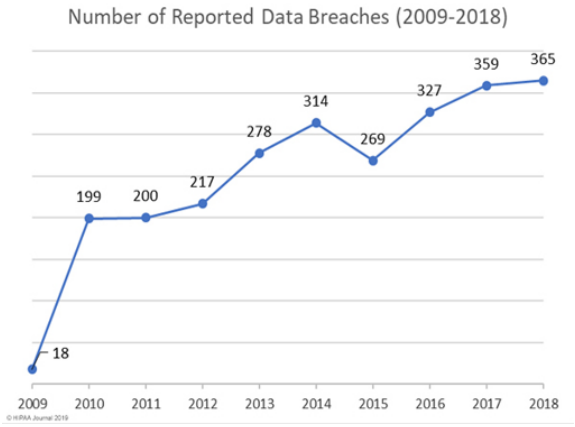

Figure 3: Number of reported Data Breaches 2009-2018

This trend will continue as many healthcare providers are still slow in responding to threats while the decentralized systems make them more vulnerable to attacks.

When a breach occurs, not only are you compromising confidential patient information, but you also face a hefty penalty if youâre found to have violated the many compliant standards regulating the industry.

Besides improving cybersecurity, healthcare providers can also outsource their processes involving sensitive patient information such as invoicing and billing to a HITRUST-certified third-party provider which has dedicated resources to ensure that its system is properly protected against cybercriminals[7].

- **The slow diffusion of medical knowledge:**
  You might be aware that the acceptance of new scientific discoveries into clinical practice can take a long time. However, this diffusion of medical knowledge is more drawn out than many realise. According to Balas, only

14% of new scientific discoveries make their way into daily clinical practice. Furthermore, those that do become accepted, take an average of 17 years to do so.

This essentially means that patients are routinely waiting to be prescribed drugs or undergo procedures and interventions that have actually been proven to be effective decades ago. Unfortunately, there is no simple solution to this problem. That said, the use of CDSS (utilising guidelines built on the most current evidence-based information) at the point of care, will help overcome this challenge[35].

- **Healthcare rising costs:**
  As more people strive to live longer, healthier and more active lifestyles, healthcare concerns increase and so does the costs. Research reveal healthcare costs and spending often rise at rates exceeding inflation, and is expected to increase in the future. The Society for Human Resource Management present that the Office of â1 the Actuary at the Centers for Medicare and Medicaid Services estimates that aggregate health care spending in the United States will grow at an average annual rate of 5.8 percent from 2015 through 2025, or 1.3 percentage points higher than the expected annual increase in the gross domestic product.â This causes a huge concern for leaders as they seek to provide coverage for their employees.

  Leaders must find alternative methods to combat the rising costs of care. They must do the research to find funding, grants and contributors to help them conduct research, setup programs and implement processes at the pace of change. The Health Services Research Information Central (HSRIC) provides a list of "grants, funding and fellowships" leaders might consider helping them train staff members, open up public information sites or labs for processing paperwork and other initiatives[47].

- **Changing consumer behaviors and expectations:**
  Patients today feel empowered as consumers of healthcare. Theyâre not picking the doctor closest to their locationâtheyâre picking the doctor that can offer the greatest convenience and a level of care that meets their ex-

pectations. Theyâre more and more interested in telehealth, in scheduling online appointments, and in having online access to health information.

The challenges in healthcare today often center around these changing patient/consumer behaviors, especially when practices and hospitals fail to adapt to what patients need. Patients are looking for convenience and care. They want the experience to mirror customer service, and if you canât deliver, then patients will look elsewhere[8].

- **Investment in IT healthcare:**
  A study from Health Affairs reveals that US healthcare systems can rely on more "frugal innovations" or say "good enough" products that are economically feasible and not technically inferior as well.

  For example, a report from Science Direct states that investment in IT healthcare such as revenue cycle management software has been proven to reduce the operational cost. According to the author, "The usage of financial management systems is associated with lower hospital operating expenses."

  Besides, it is also the fact that administrative costs of United States account for or around 8% of their overall healthcare costs and the country could save $175 billion in healthcare costs by halving administrative costsâJama Network[9].

2.2.5 *Financial Resources & Funding of Healthcare Systems*

Given below are primary methods of funding health systems and most countries's systems feature a mix of all of the below[46]:

- General taxation to the state, county or municipality.
- Social health insurance.
- Voluntary or private health insurance.
- Out-of-pocket payments.
- Donations to charities.

2.3 ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry[10].

2.3.1 *Types of Artificial Intelligence*

There are four types of artificial intelligence: reactive machines, limited memory, theory of mind and self-awareness.

- **Reactive Machines:**
  This is one of the basic forms of AI. It doesnât have past memory and cannot use past information to information for the future actions. Example: IBM chess program that beat Garry Kasparov in the 1990s.
- **Limited Memory:**
  AI systems can use past experiences to inform future decisions. Some of the decision-making functions in self-driving cars have been designed this way. Observations used to inform actions happening in the not so distant future, such as a car that has changed lanes. These observations are not stored permanently.
- **Theory of Mind:**
  This type of AI should be able to understand peopleâs emotion, belief, thoughts, expectations and be able to interact socially Even though a lot of improvements are there in this field this kind of AI is not complete yet.
- **Self-awareness:**
  An AI that has itâs own conscious, super intelligent, self-awareness and sentient (In simple words a complete human being). Of course, this kind of bot also doesnât exist and if achieved it will be one of the milestones in the field of AI[11].

2.3.2 *Importance of Artificial Intelligence*

Today, the amount of data that is generated, by both humans and machines, far outpaces humans' ability to absorb, interpret, and make complex decisions based on that data. Artificial intelligence forms the basis for all computer learning and is the future of all complex decision making. Computers are extremely efficient at calculating these combinations and permutations to arrive at the best decision[28].

2.3.3 *Applications of Artificial Intelligence*

There are many ways AI can be achived some of them are as follows:

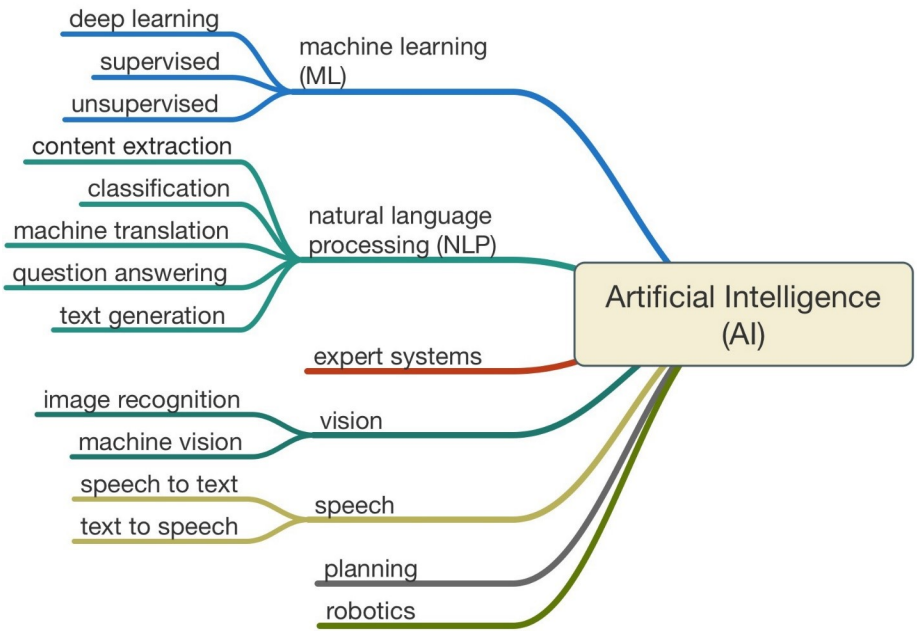

Figure 4: Artificial Intelligence applications

[11]

Fields of Artificial Intelligence:

Artificial Intelligence has various applications in today's society.

- **In Finance:**
  AI and finance industries are the best matches for each other. The finance industry is implementing automation, chatbot, adaptive intelligence, algorithm trading, and machine learning into financial processes.

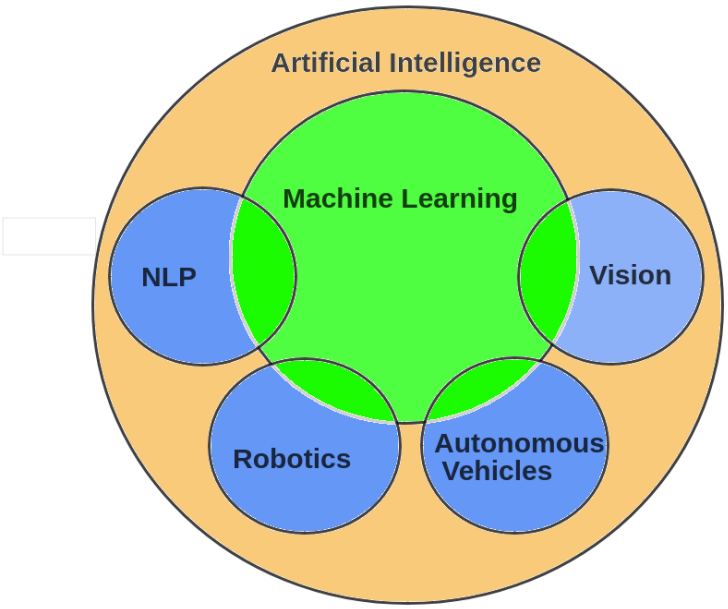

Figure 5: Artificial Intelligence Fields

[11]

- **In Education:**
  AI can automate grading so that the tutor can have more time to teach. AI chatbot can communicate with students as a teaching assistant.

- **In Healthcare:**
  Healthcare Industries are applying AI to make a better and faster diagnosis than humans. AI can help doctors with diagnoses and can inform when patients are worsening so that medical help can reach to the patient before hospitalization.

- **In Social Media:**
  Social Media sites such as Facebook, Twitter, and Snapchat contain billions of user profiles, which need to be stored and managed in a very efficient way. AI can organize and manage massive amounts of data. AI can analyze lots of data to identify the latest trends, hashtag, and requirement of different users[12].

The field of applying artificial intelligence is well broad and not limited to what we mentioned above. We can see other areas like gaming, robotics, automotive industry, transport and more.

2.3.4 *Examples of Artificial Intelligence in use today*

Search on Google, see the products you might be interested in on Amazon, see posts based on your interests on Facebook and flight reservations. All of these daily tasks are based on artificial intelligence in the background.

- **Google's AI-Powered Predictions:**
  Using location data from smartphones, Google Maps (Maps) can analyze the speed of movement of traffic at any given time. Maps can more easily incorporate user-reported traffic incidents like construction and accidents. Access to vast amounts of data being fed to its proprietary algorithms means Maps can reduce commutes by suggesting the fastest routes to and from work.

- **Email spam filters:**
  Spam filters must continuously learn from a variety of signals, such as the words in the message, message metadata (where itâs sent from, who sent it, etc.).

- **Facebook face recognition:**
  When you upload photos to Facebook, the service automatically highlights faces and suggests friends to tag. How can it instantly identify which of your friends is in the photo? Facebook uses AI to recognize faces.

Figure 6: Facebook face recognition

- **Pinterest:**
  Pinterest uses computer vision, an application of AI where computers are taught to "see" in order to automatically identify objects in images (or "pins")

and then recommend visually similar pins. Other applications of machine learning at Pinterest include spam prevention, search and discovery, ad performance and monetization, and email marketing.

- **Smart Personal Assistants:**
  Now that voice-to-text technology is accurate enough to rely on for basic conversation, it has become the control interface for a new generation of smart personal assistants. The first iteration were simpler phone assistants like Siri and Google Now, which could perform internet searches, set reminders, and integrate with your calendar[40].

3

HEALTH INFORMATION TECHNOLOGY AND CHARITIES

3.1 HEALTH INFORMATION TECHNOLOGY

Health IT (health information technology) is the area of IT involving the design, development, creation, use and maintenance of information systems for the healthcare industry. Automated and interoperable healthcare information systems will continue to improve medical care and public health, lower costs, increase efficiency, reduce errors and improve patient satisfaction[13].

3.1.1 *Health information management*

Health information is the basis for understanding situations, assessing needs, vulnerabilities and risks, identifying gaps in responses and knowledge, recognizing priorities and developing strategies. It is critical for decision making, joint planning and monitoring for mitigation, preparedness, response and rehabilitation/recovery purposes. It provides substance for humanitarian coordination, both in the health sector and in other sectors (i.e. at least in food & nutrition and water & sanitation). Health Information management is used here as a broader term to capture the various health information related activities and deliverables to support the strategic priority functions of assessing health situations, co-ordinating the work of health actors, identifying critical gaps in the response to ill health and building capacity for better health action[14].

3.1.2 *Technologies used in HIT*

There are many technologies used in health information technology that we gonna mention one of them below:

- **Electronic health record (EHR):**
  Electronic health records (EHRs) are built to go beyond standard clinical data collected in a provider's office and are inclusive of a broader view of a patient's care. EHRs contain information from all the clinicians involved in a patient's care and all authorized clinicians involved in a patient's care can access the information to provide care to that patient. EHRs also share information with other health care providers, such as laboratories and specialists. EHRs follow patients - to the specialist, the hospital, the nursing home, or even across the country[15].

  - **Comparison with paper-based records:**

    * **Time:** Some providers have reported that EHRs have saved them anywhere from 10 to 20 hours per week in documentation, giving them more time with their patients. However, others argue that EHRs pose a learning curve and force providers to become data entry staff. All of that clicking and typing, some argue, causes physicians to focus on the computer rather than the patient in the room[16].

    * **Environment:** One of the most obvious benefits of going digital is the reduction of adverse environmental impacts. A typical patient's medical record usually encompasses close to hundreds of pages and might even run into the thousands in the most extreme cases. On the other hand, turning to digital solutions saves paper, trees and other resources used to make paper products[32].

    * **Storage Space and Fees:** Paper records take up room, and space must be allocated to store them. As paper records grow, many facilities need to buy or rent off-site storage, which can be costly and can present a security liability. If paper records are stored on-site, they take up valuable space that could be used for revenue-generating activities. EHRs don't require physical storage space. When a practitioner or facility converts to EHRs, the space that's saved on-site can be used for other purposes. Any costs associated with storage are also eliminated[30].

  * **Emergency Response Capability:** Information gathered by a primary care provider and recorded in an EHR tells a clinician in the emergency department about a patient's life-threatening allergy, and emergency staff can adjust care appropriately, even if the patient is unconscious[31].
  * **Security and Compliance Considerations:** Security vulnerabilities can be present in both PPRs and EHRs. Both formats can result in theft and be exposed to the risk of loss from other events such as floods and fire. With paper records that are limited to one copy, EHR provides a security edge with backup copies. Health care professionals should devote plenty of attention to this area - don't cut corners when deciding how to handle compliance and security concerns for your records transition process[29].

– **Clinical point of care technology:**
  Point-of-Care Technologies is a set of technologies used at the location of patient care helping improve healthcare outcomes. Blood glucose monitors, urine dipsticks, pregnancy tests, rapid strep tests, rapid HIV tests, hemoglobin level tests are common examples of PoCT. In past few years PoCT have advanced and the field is showing strong growth, as evidenced by new clinical or consumer products research and development directions. The widespread use of this set of technologies is driven by healthcare emphasis shifting towards greater healthcare awareness, precision treatment, optimization of patient management process, and chronic disease management - combined with advances in electronic devices and information technology[33].

3.1.3 *Benefits and challenges*

– The use of Health IT in medical clinics improves the quality of healthcare that is delivered by providing accurate patient records and allows doctors to better understand the patient's medical history. Having a comprehensive patient history empowers doctors to more accurately treat ailments and prevent over-prescribing medications which can be

fatal. Without medical records, physician's would need to depend on the patient's memory, which can lead to inaccurate medical history due to forgetfulness, complex drug names, and ailments affecting the patient's recollection[43].

- Most obstetrician-gynecologists are now using electronic health records. They have rapidly moved into use because of the recognition of their potential benefits and government programs that incentivize their use. The benefits of health information technology (IT) include its ability to store and retrieve data; the ability to rapidly communicate patient information in a legible format; improved medication safety through increased legibility, which potentially decreases the risk of medication errors; and the ease of retrieval of patient information.
- The potential to improve patient safety exists through the use of medication alerts, clinical flags and reminders, better tracking and reporting of consultations and diagnostic testing, clinical decision support, and the availability of complete patient data.
- Health IT is increasing patient engagement as consumers of health care. It allows patients access to their medical records, which helps them to feel more knowledgeable about their conditions and encourages them to actively participate in shared decision making[49].

3.2 CHARITABLE ORGANIZATIONS

Charitable organization is a kind of institution or a business that falls under the category of NPO or non-profit organization. It can be run privately as well as publicly. This type of organization is often called a foundation or charity. It can be based on educational, religious or even based on public interest activities. The law and regulation of the charity is dependent on the country or the region where it has been established and operated. A charity is something which is gifted or donated to an organization or an individual to help them or to benefit them.

This is generally gifted to make sure that it will help the person and get some kind of relief or for their education and advancement. There are many people around the world who are still under poverty. For this they cannot get a proper treatment or provide proper education to their children. This leads to the increase of poverty as well as illiteracy. Even there are many states that are affected by natural disasters. Charitable organizations are also meant to provide them shelter, foods and many other necessary items[27].

3.2.1 *Charitable organizations Management*

- **Planning:**
  Nonprofit organizations, just like other businesses, must plan out long- and short-term strategies in order to meet revenue goals, connect with stakeholders and foster goodwill in the community. A manager who is able to effectively plan an organization's calendar and commitments will ultimately be responsible for helping to improve the organization's performance. For nonprofit organizations, this means getting more donations in the door and furthering the mission statement. Managers who plan well are also adept at encouraging their employees to work hard, to keep a positive attitude and to set personal work-related goals. These are extremely important attitudes for nonprofit employees to possess.
- **Organizing:**
  Typically, managers who are excellent planners are also great organizers. Organizing is about laying out the plans in a consistent and logical way. This involves deciding when and where decisions will be made, delegating important tasks and setting up a hierarchy of jobs within the organization. In the nonprofit world, donors also respond positively to well-organized businesses, as they want to be sure that their donations are going to efficiently run operations.
- **Leading:**
  Leadership is a key component of nonprofit management. Besides

making essential day-to-day decisions, managers of nonprofits must possess leadership skills. They must be able to motivate their staff, speak passionately about the organization's mission and connect with stakeholders from a variety of backgrounds. Good leaders are concerned about the future of the organization and about the morale of the staff, and they are able to couple these concerns with a strong commitment to organization and planning.

– **Controlling:**
Despite its connotations, controlling is not about being a forceful manager. Instead, it is about monitoring the progress of the organization toward its stated goals and being responsive to situations and issues as they arise. Sometimes non-profits face tough choices: they may need to cut the budget in response to revenue decreases or they may have to change their program goals in response to changing stakeholder populations. These tough scenarios require managers to exercise control over the situation to keep a level head and to reassure staff of the organization's mission and vision[36].

3.2.2 *Funding sources and profits*

– **Presents and Donations:**
Presents and donations can be given in kind by individuals, foundations, charitable trusts, and companies. In order to receive these donations, nonprofit organizations would normally need to apply for them. Receiving donations is a significant source of funds for many charities and nonprofit organizations. Fundraising activities, on the other hand, can pose more of a risk, and can even cause money to be lost or wasted if not managed properly. Unlike donations which are essentially given, a fundraising activity will require capital, proper management, volunteers, as well as participants to take part in the activity, and hence come the risks.

– **Grant funding:**
Grants are exempted from taxes but are not always so easy to receive.

Over time, grant funders have been very strict and selective in terms of funding for nonprofit organizations. Apart from being difficult to attain, grant funders also often come with conditions. These conditions can go as far as the funder getting back funds that weren't used for the proposed project. Ultimately, grant funding gives the funders, mostly charitable trusts, and foundations, a more hands-on approach.

– **Loan financing an equity capital:**
Both loan financing and equity capital isn't very common but nonetheless still used by nonprofits to acquire funds. Loans are typically risky because everything borrowed, ought to be returned, mostly with interest. Most times, nonprofits need to be sure because many banks assets which they can confiscate should you fail to pay in a timely manner. In the case of equity finance, funds aren't being borrowed and do not need to be returned. Instead, parts of the earnings the nonprofit received will also belong to the ones who funded their capital. The investor will then have a permanent position in the organization. Investors usually study the organization well to make sure they can really benefit from this agreement.

– **Contracts:**
A contract is a piece of document binding two parties by law. It is a recognized agreement and non-compliance can be punishable, which is also stated in the respective contracts. Contracts are used as funding sources for nonprofit organizations very often. Just like many other things, a contract can get dangerous if not handled properly. This is why nonprofit organizations should always make sure they'll be able to fulfill all conditions in the contract and be aware of the penalties.

– **Fundraising activities:**
Fundraising activities can be a variety of things such as selling of goods and services all the way to the entertainment industry. Very often, when selling items, it is indicated in the packaging that the money used to purchase the item will go to a specific project. Same goes for selling tickets for shows or plays. A fundraising activity would be a good way for people to get to know more about your organization and

its purpose, as well as to raise money. It's easier to convince people to buy products or tickets to a show rather than simply asking for donations. Sometimes, charities and nonprofits also partner with each other to be more recognized by the public. As much as this is very effective, there are still a few risks which charities and nonprofits should consider. It is best that people are well informed about the projects for continued support in the future[61].

3.2.3 *Challenges facing charitable organizations*

There are a lot of challenges that faces the charitable organizations, we mentioned some of them below:

* **Limited Government Funding:**
  Many nonprofit organizations depend on the assistance of the government. Assistance may be in the form of grants or part of a matching scheme, or it may merely serve as a safety net to fill the gap when funds are short. Shrinking budgets at state, national and municipal levels mean there is less to go around. Most nonprofits end up getting less than they want, and some are left completely without[17].
* **Stable Income and Accurate Budgeting:**
  Having a steady income from any source is hard for nonprofits, and that can make budgeting a real challenge. Moreover, income may be unsteady throughout the year, so your focus usually falls on securing enough to cover administrative costs before seeing what is left for projects, and the organization often runs on a shoestring just in case[17].
* **Long-Term Sustainability:**
  Sustainability is a critical consideration. Traditionally, nonprofits were founded on a primary platform or issue, with leadership, resources and services designed around that purpose. As business and society evolves, it's important to continually evaluate

one's mission and align with changing customer needs and preferences to ensure it is broad and relevant enough for long-term sustainability[38].

* **Pressure to Show Results:**
  In the past, the emphasis in the nonprofit world was on showing that programs were being used and accessed by those they aimed to support. Now, largely because there is less to go around, the pressure has shifted. Your nonprofit must demonstrate that its social impact objectives are being achieved, which can be a much harder calculation[17].

3.3 SOCIAL MEDIA

Social media is a collective term for websites and applications which focus on communication, community-based input, interaction, content-sharing and collaboration. Different types of social media are normally dedicated to forums, microblogging, social networking, social bookmarking, social curation, and wikis are among them.

Many individuals will use social media to stay in touch and interact with friends and family, while others use it to communicate with different communities. Many businesses will use social media as a way to market and promote their products. In addition, business to consumer (B2C) websites include social components, such as comment fields for users. Other tools have been created to aid in tracking the number of mentions and brand perception.

Social media has become larger and more accessible thanks to access to mobile applications.

Here are some examples of popular social media platforms:

* **Facebook:** is a popular free social networking website that allows registered users to create profiles, upload photos and video, send messages and keep in touch with friends, family and colleagues.

* **Twitter:** is a free microblogging service that allows registered members to broadcast short posts called tweets. Twitter members can broadcast tweets and follow other users' tweets by using multiple platforms and devices.
* **Wikipedia:** is a free, open content online encyclopedia created through the collaborative effort of a community of users known as Wikipedians. Anyone registered on the site can create an article for publication; however, registration is not required to edit articles. Wikipedia was founded in January of 2001.
* **LinkedIn:** is a social networking site designed specifically for the business community. The goal of the site is to allow registered members to establish and document networks of people they know and trust professionally.
* **Reddit:** is a social news website and forum where stories are socially curated and promoted by site members. The site is composed of hundreds of sub-communities, known as "subreddits." Each subreddit has a specific topic such as technology, politics or music. Reddit site members, also known as, "redditors," submit content which is then voted upon by other members. The goal is to send well-regarded stories to the top of the site's main thread page.
* **Pinterest:** is a social curation website for sharing and categorizing images found online. Pinterest requires brief descriptions, but the main focus of the site is visual. Clicking on an image will take a user to the original source. For example, clicking on a picture of a pair of shoes might redirect users to a purchasing site and an image of blueberry pancakes might redirect to the recipe[18].

3.3.1 *Social media and Charity*

* Using social media as a marketing tool has quickly become the norm throughout a range of industries. According to IDC, a global marketing intelligence firm, buyers who use social media regularly

have larger budgets than those who do not use social media. Typically, this budget is 84% larger[19].

* These days, it's very likely that your favourite charities will have a presence on social media. The ability to promote charitable work, fundraising events and ways to donate are widely used and encouraging connections can make social media an essential part of any charity's marketing plan.
* Real-time content is fast becoming the next big social media trend. It gives an immediate live snapshot of whatever a charity is up to at that particular moment in time, such as a fundraising event or working on the ground delivering aid, truly making its supporters part of the action[25].
* Just like a for-profit business, non-profits need an active online presence to maintain a connection with their target audience. By leveraging the power of a comprehensive non-profit social media strategy, charity organizations can experience a boost in both donations and brand awareness[19].

3.3.2 *Benefits and disadvantages*

Here are some of the pros and cons that most people are familiar with:

1. **Benefits:**

    * **Connectivity:** The first and main advantage of the social media is connectivity. People from anywhere can connect with anyone. Regardless of the location and religion. The beauty of social media is that you can connect with anyone to learn and share your thoughts[34].
    * **Educational process:** Using online social networks in the educational process has been supported by several educational technology researchers, who have emphasized the benefits of technologies. Rising of social networking sites, and a general

interest in students have attracted attention to the use of internet tools to develop distance education[20].

* **Online marketing:** You can build a relationship with your customers that makes them more likely to use your services. You can get the feedback right away[20].
* **Noble Cause:** Social media can also be used for the noble causes. For example, to promote an NGO, social welfare activities and donations for the needy people. People are using social media for donation for needy people and it can be a quick way to help such people.
* **Awareness:** Social media also create awareness and innovate the way people live. It is the social media which has helped people discover new and innovative stuffs that can enhance personal lives. From farmers to teachers, students to lawyers every individual of the society can benefit from the social media and its awareness factor[34].

2. **Disadvantages:**

* **Privacy problems:** Sharing your online location or getting in trouble at work because of tweeting something inappropriate or sharing too much with the public can cause you some issues that sometimes can't ever be solved[20].
* **Addiction:** The addictive part of the social media is very bad and can disturb personal lives as well. The teenagers are the most affected by the addiction of the social media. They get involved very extensively and are eventually cut off from the society. It can also waste individual time that could have been utilized by productive tasks and activities.
* **Reputation:** Social media can easily ruin someone's reputation just by creating a false story and spreading across the social media. Similarly businesses can also suffer losses due to bad reputation being conveyed over the social media.

* **Health Issues:** The excess usage of social media can also have a negative impact on the health. Since exercise is the key to lose weight, most of the people get lazy because of the excessive use of social networking sites. Which in result brings disorder in the routine life[34].

Part III

APPLICATION PART

This part contains one chapter which are the design and development of our system, that show full view about our work from concept to final product, and the tools we used.

4

DESIGN AND IMPLEMENTATION

4.1 INTRODUCTION

In this chapter we will present the conceptions of our platform and the general structure of the environment in which we have developed the website. In the end we will explain the website some basic snapshots of the system.

4.2 OBJECTIVE

We aim to develop a platform that allow the people to help each other by:

* Donate medical equipment or medicines.
* Ask for medical equipment or medicines or medical information.
* Blood donation.

4.3 GENERAL STRUCTURE OF THE ENVIRONMENT

We will talk in this section about the environment that we developed our website with the mention of programming language used in development and some of the libraries and packages imported.

4.3.1 *Programming language*

In the development of the website, we used the JavaScript language.

* **JavaScript:**
  JavaScript , often abbreviated as JS, is a programming language that conforms to the ECMAScript specification. JavaScript is high-level, often just-in-time compiled, and multi-paradigm. It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.

  Alongside HTML and CSS, JavaScript is one of the core technologies of the World Wide Web. JavaScript enables interactive web pages and is an essential part of web applications. The vast majority of websites use it for client-side page behavior, and all major web browsers have a dedicated JavaScript engine to execute it.

  As a multi-paradigm language, JavaScript supports event-driven, functional, and imperative programming styles. It has application programming interfaces (APIs) for working with text, dates, regular expressions, standard data structures, and the Document Object Model (DOM). However, the language itself does not include any input/output (I/O), such as networking, storage, or graphics facilities, as the host environment (usually a web browser) provides those APIs.

  JavaScript engines were originally used only in web browsers, but they are now embedded in some servers, usually via Node.js. They are also embedded in a variety of applications created with frameworks such as Electron and Cordova[53].

4.3.2 *Development environment*

We will talk about Microsoft development environment Visual studio code, data storage using MySQL, Wamp server and Node js.

* **Visual Studio Code:**

Figure 7: Visual Studio Code

Visual Studio Code is a free source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality. The source code is free and open-source, released under the permissive MIT License. The compiled binaries are freeware for any use[59].

* **MySQL:**

Figure 8: MySQL

MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language.

MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation). In 2010, when Oracle ac-

quired Sun, Widenius forked the open-source MySQL project to create MariaDB.

MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, Apache, MySQL, Perl/PHP/Python. MySQL is used by many database-driven web applications, including Drupal, Joomla, phpBB, and WordPress. MySQL is also used by many popular websites, including Facebook, Flickr, MediaWiki, Twitter, and YouTube[54].

* **Wamp server:**

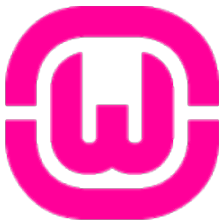

Figure 9: Wamp Server

WampServer refers to a software stack for the Microsoft Windows operating system, created by Romain Bourdon and consisting of the Apache web server, OpenSSL for SSL support, MySQL database and PHP programming language[60].

* **Node.js:**

Figure 10: Node.js

Node.js is an open-source, cross-platform, JavaScript runtime environment that executes JavaScript code outside a web browser. Node.js lets developers use JavaScript to write command line tools and for server-side scripting-running scripts server-side to produce dynamic web page content before the page is sent to the

user's web browser. Consequently, Node.js represents a "JavaScript everywhere" paradigm, unifying web-application development around a single programming language, rather than different languages for server- and client-side scripts.

Though .js is the standard filename extension for JavaScript code, the name "Node.js" doesn't refer to a particular file in this context and is merely the name of the product. Node.js has an event-driven architecture capable of asynchronous I/O. These design choices aim to optimize throughput and scalability in web applications with many input/output operations, as well as for real-time Web applications (e.g., real-time communication programs and browser games).

The Node.js distributed development project was previously governed by the Node.js Foundation, and has now merged with the JS Foundation to form the OpenJS Foundation, which is facilitated by the Linux Foundation's Collaborative Projects program.

Corporate users of Node.js software include GoDaddy, Groupon, IBM, LinkedIn, Microsoft, Netflix, PayPal, Rakuten, SAP, Voxer, Walmart, and Yahoo![55].

4.3.3 *Framework and Library*

In the development of the retrieval system we used some libraries and frameworks, for example:

* **React:**

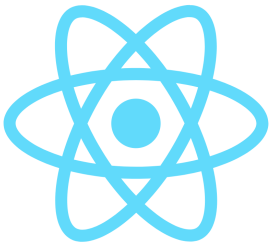

Figure 11: React

React (also known as React.js or ReactJS) is an open-source JavaScript library for building user interfaces. It is maintained by Facebook and a community of individual developers and companies.

React can be used as a base in the development of single-page or mobile applications. However, React is only concerned with rendering data to the DOM, and so creating React applications usually requires the use of additional libraries for state management and routing. Redux and React Router are respective examples of such libraries[56].

* **Axios:**
  Axios is a library that helps us make http requests to external resources. In our React applications we often need to retrieve data from external APIs so it can be displayed in our web pages. ... Axios uses methods like get() and post() that perform http GET and POST requests for retrieving or creating resources[41].

* **Bootstrap:**

Figure 12: Bootstrap

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components[50].

* **Font Awesome:**

Figure 13: Font Awesome

Font Awesome is a font and icon toolkit based on CSS and LESS. It was made by Dave Gandy for use with Bootstrap, and later was incorporated into the BootstrapCDN. Font Awesome has a 38% market share among those websites that use third-party font scripts on their platform, ranking it second place after Google Fonts[52].

4.4 GENERAL STRUCTURE OF THE SOLUTION

We will show in this section the general structure of our solution and its main components.

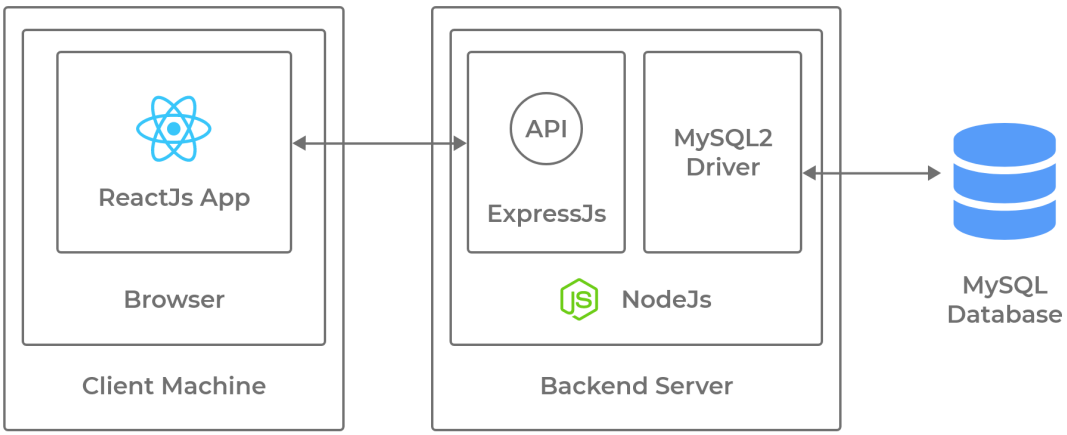

Figure 14: General Structure

4.5 DESIGN

In this section we will present the conceptual aspect of our work using the Unified Modeling Language (UML) modeling language.

4.5.1 *Use Case Diagram*

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses[58].

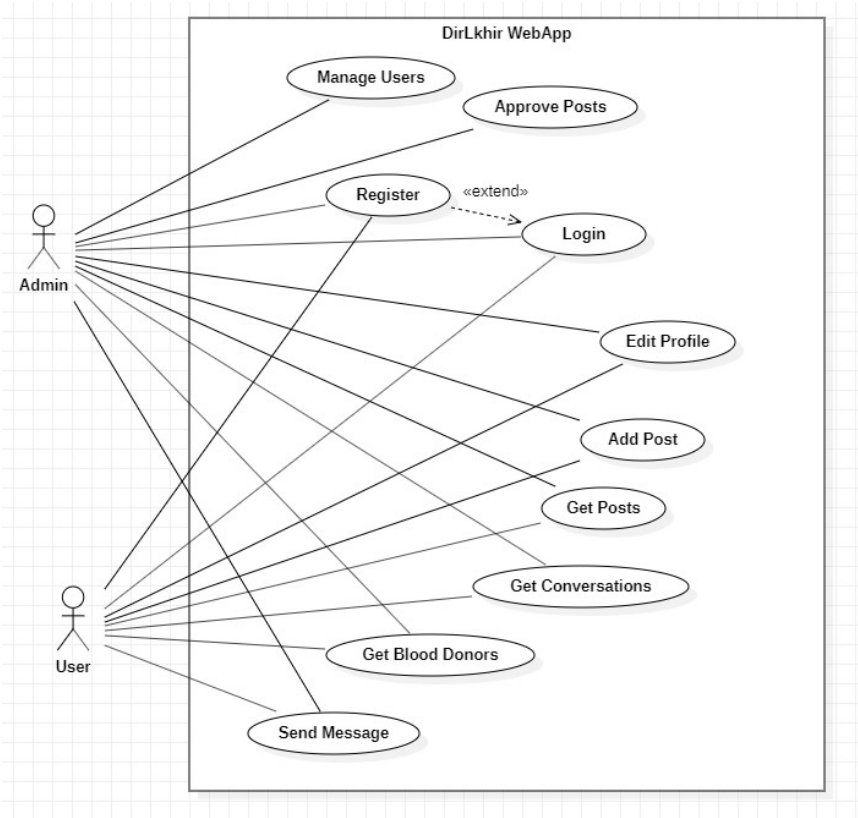

Figure 15: Use Case Diagram

4.5.2 *Sequence Diagram*

A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios[57].

* **Register User:**

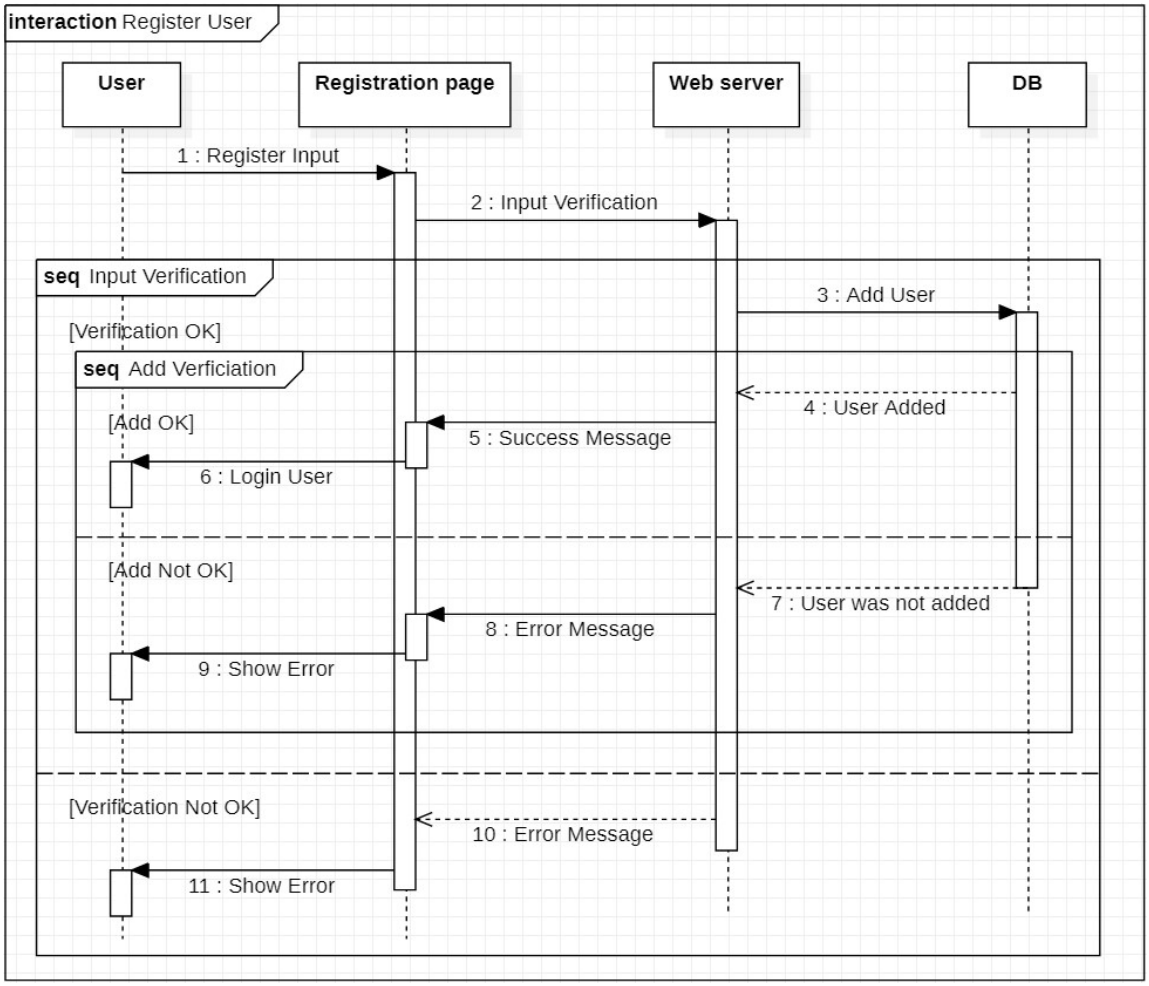

Figure 16: Register User Sequence Diagram

* **Add Post:**

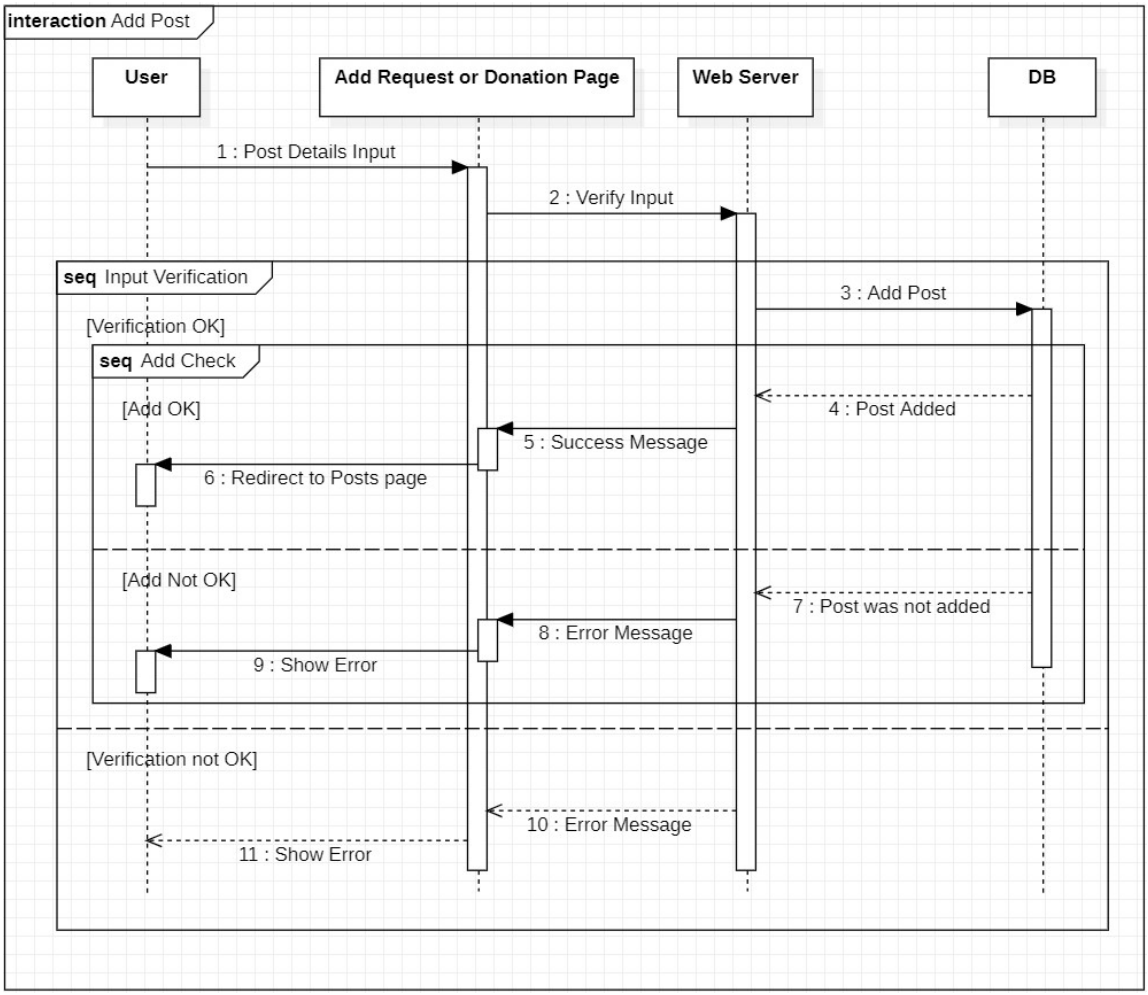

Figure 17: Add Post Sequence Diagram

* **Approve Posts:**

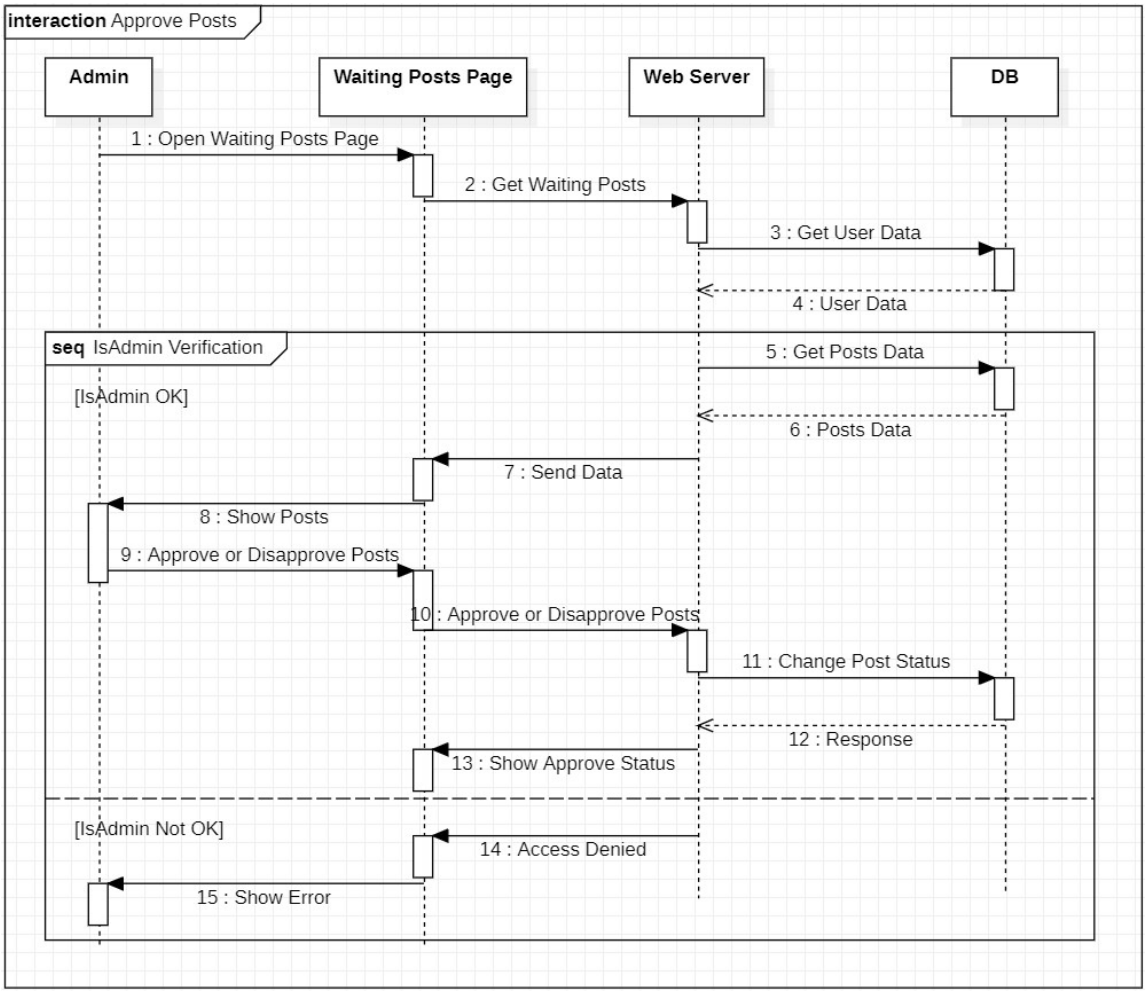

Figure 18: Approve Posts Sequence Diagram

* **Blood Donors List:**

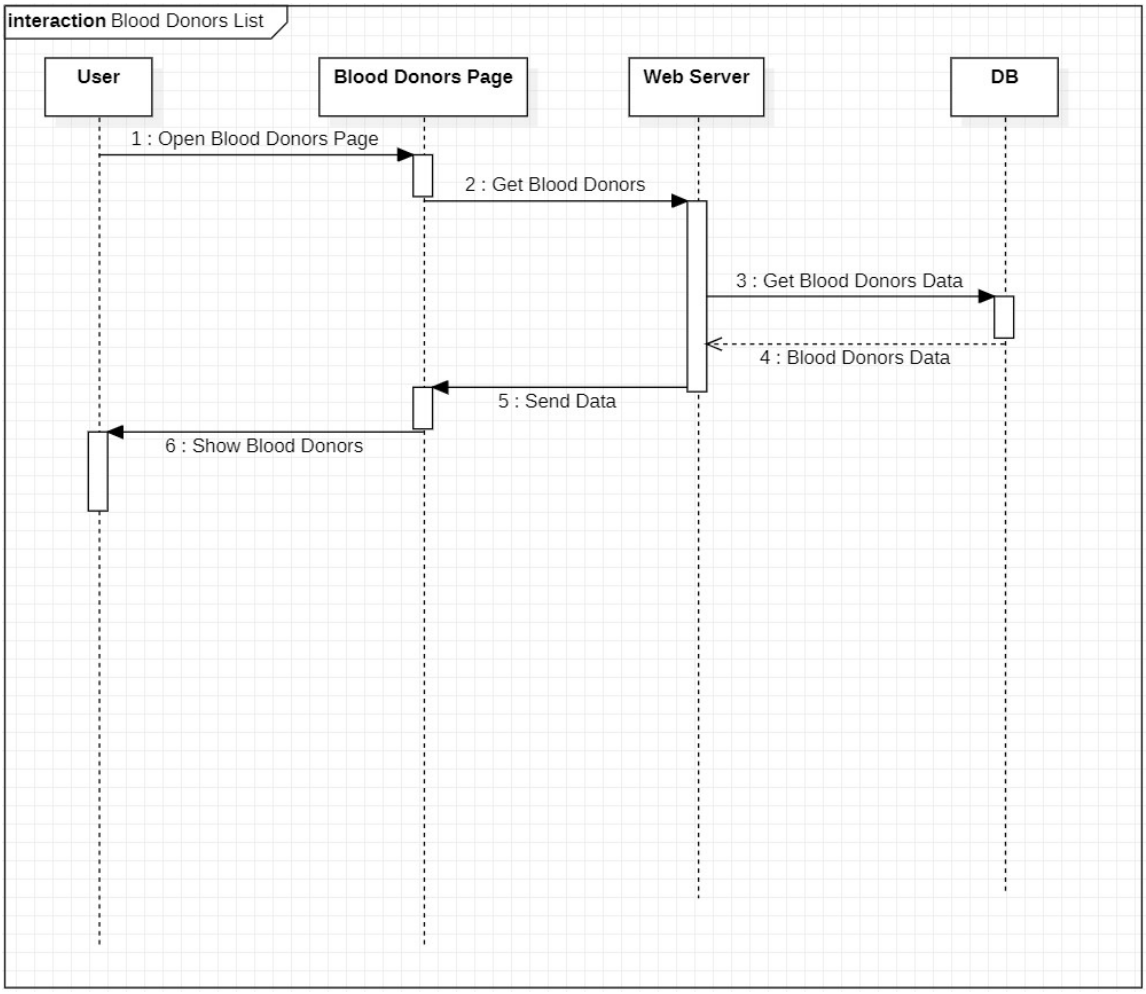

Figure 19: Blood Donors List Sequence Diagram

* **Messages:**

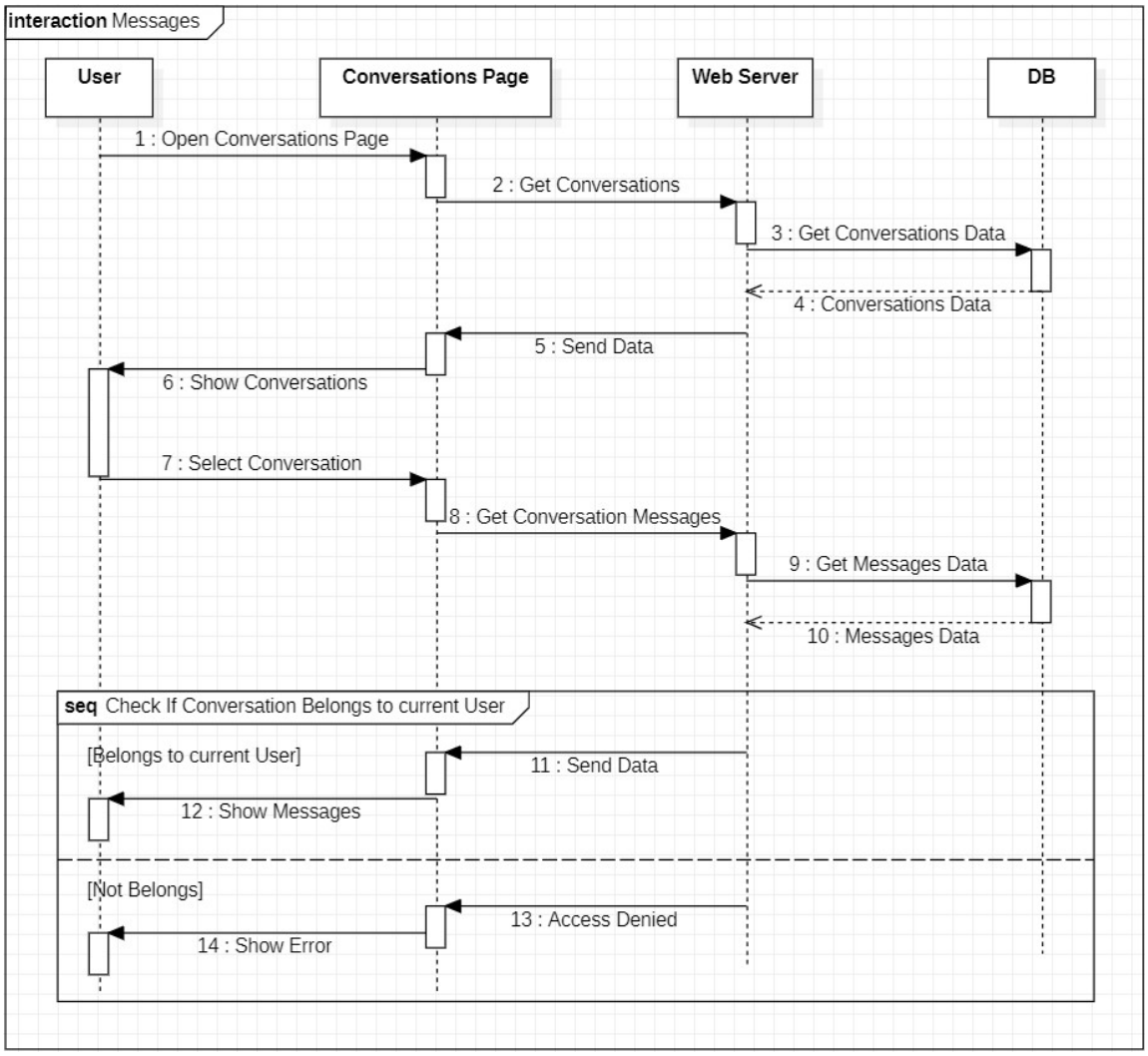

Figure 20: Messages Sequence Diagram

4.5.3 *Class Diagram*

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects[51].

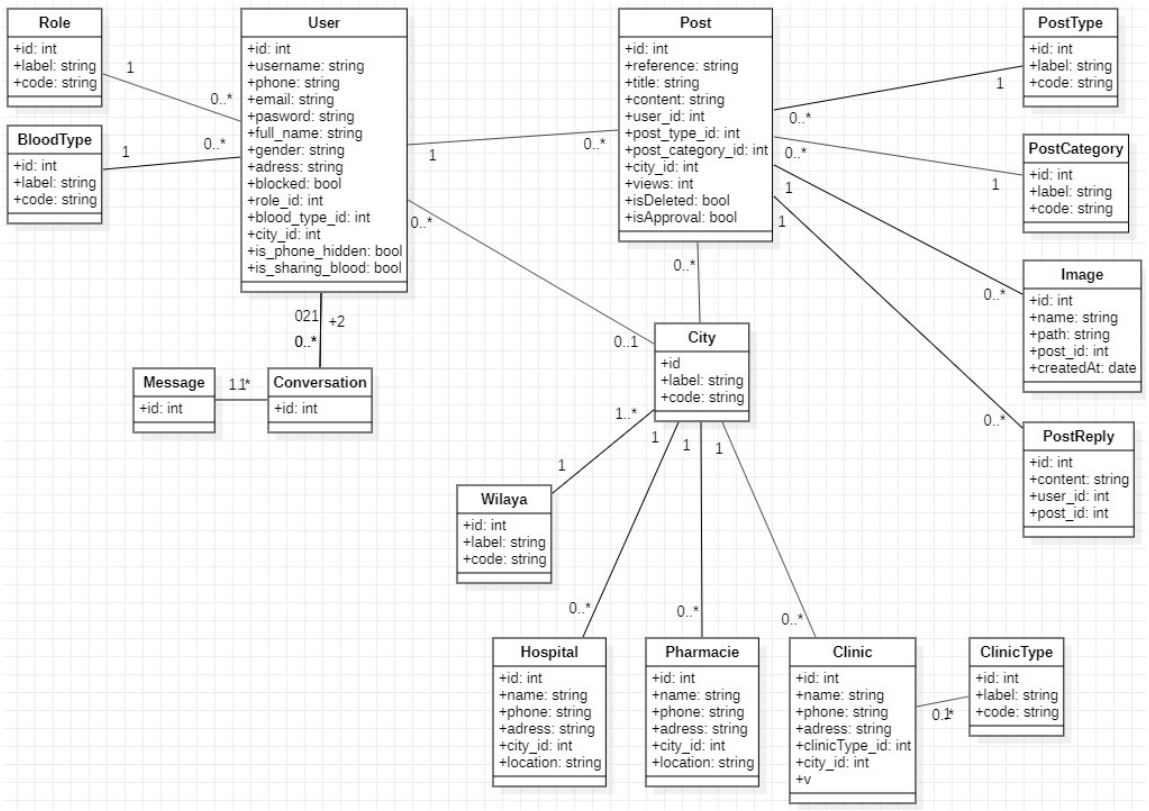

Figure 21: Class Diagram

4.6 IMPLEMENTATION

In this section we will show snapshots of the main parts of our website.

* **Register:**
  This is the register page to our website:

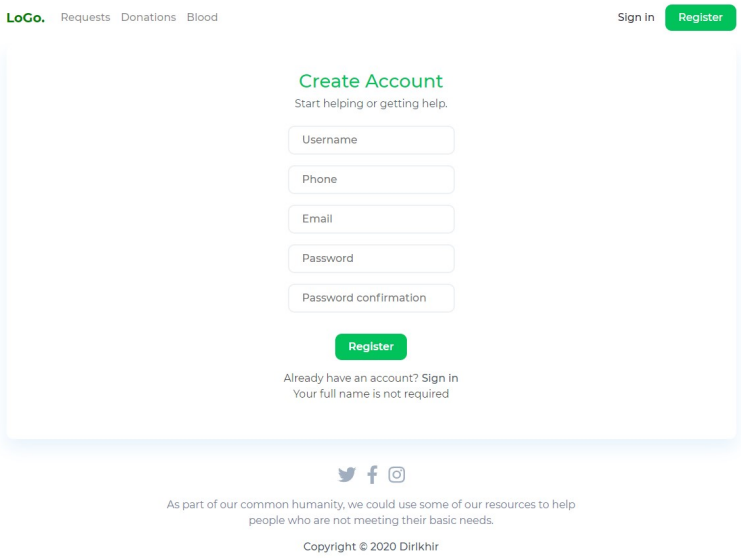

Figure 22: Register

* **Sign in:**
  This is the sign in page:

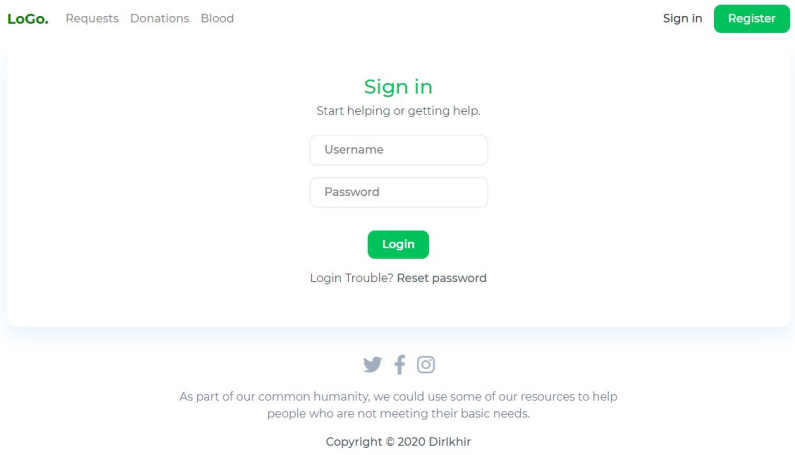

Figure 23: Sign in

* **Home Page:**

  This is the Home Page of our website:

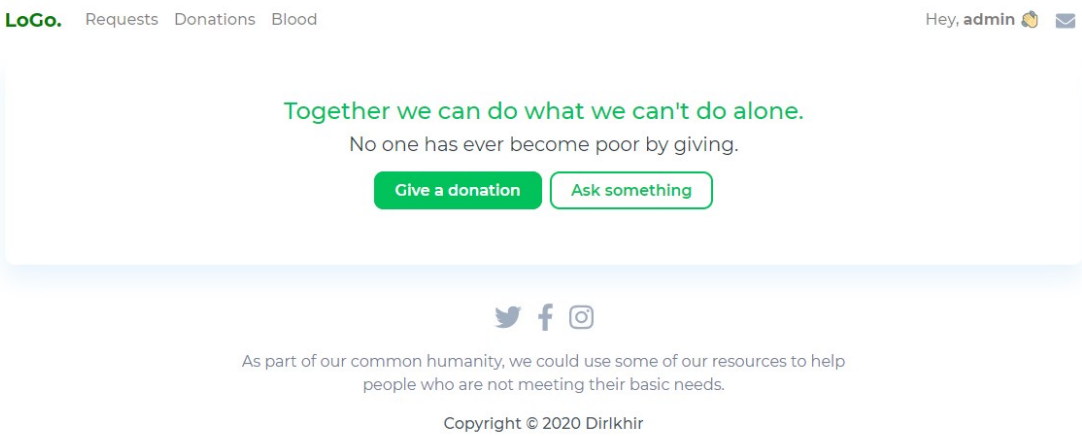

Figure 24: Home Page

* **Blood donors:**

  This is the Blood donors page:

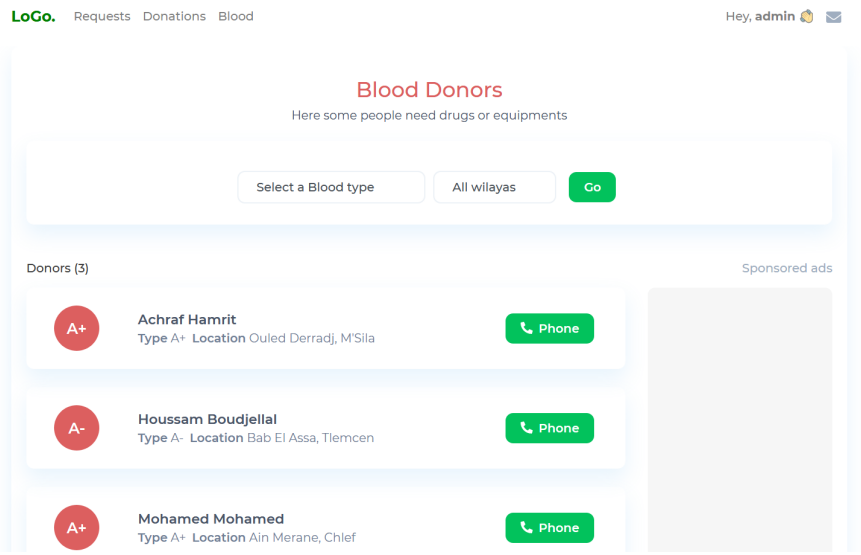

Figure 25: Blood donors

* **Requests:**

  This is the Requests page:

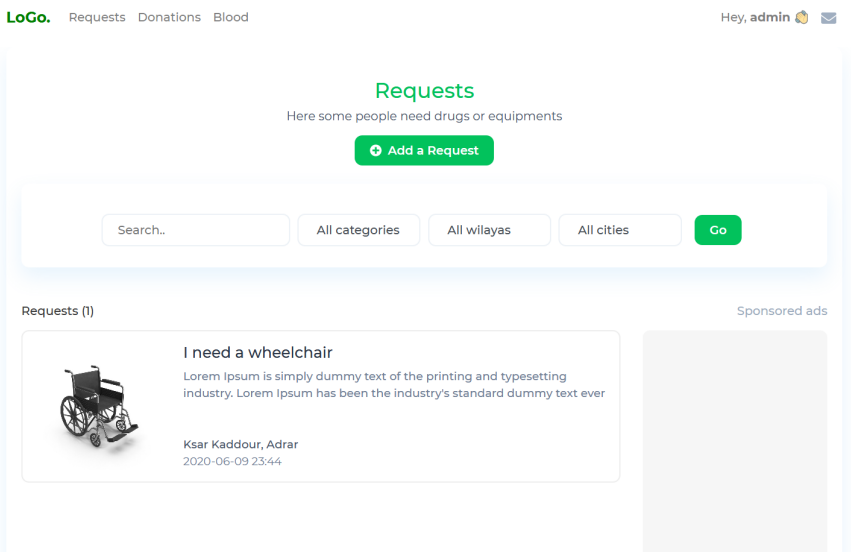

Figure 26: Requests

* **Donations:**

  This is the Donations page:

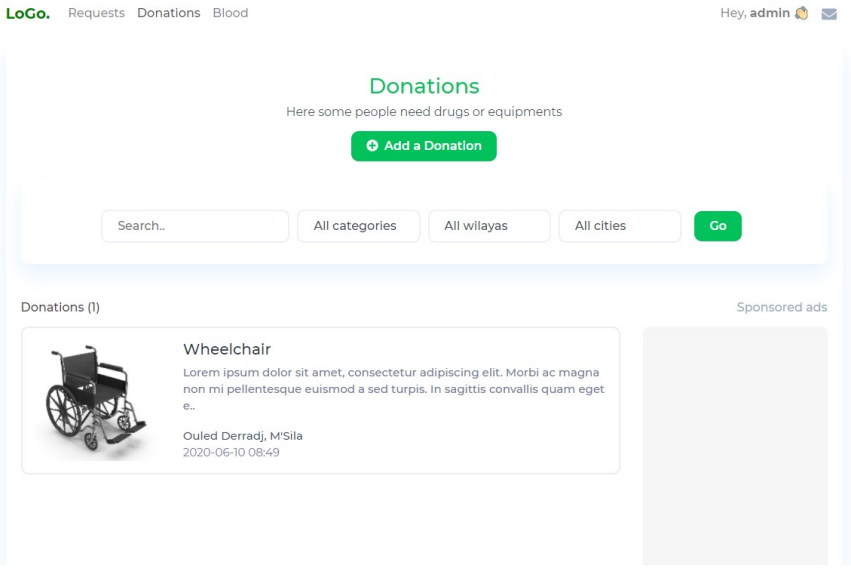

Figure 27: Donations

* **Post Details:**

  This is the Post Details page:

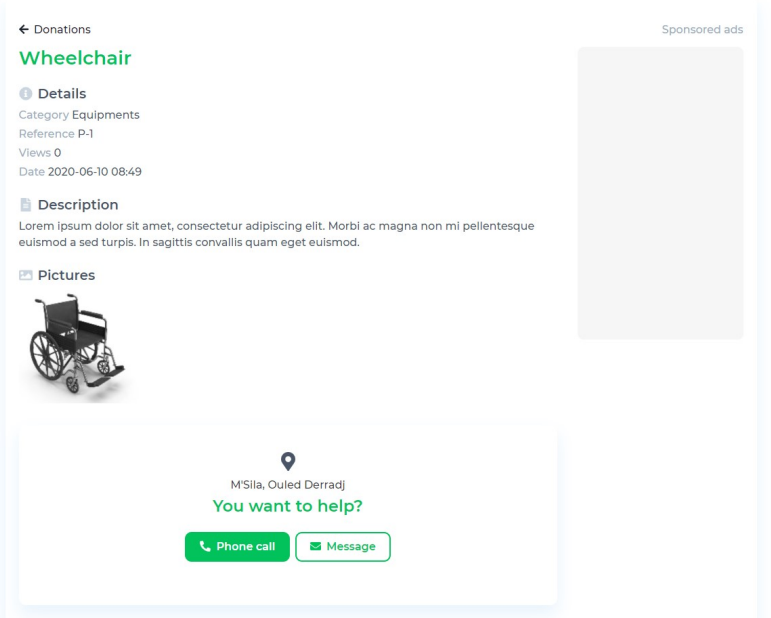

Figure 28: Post Details

* **Messages:**

  This is the Messages page:

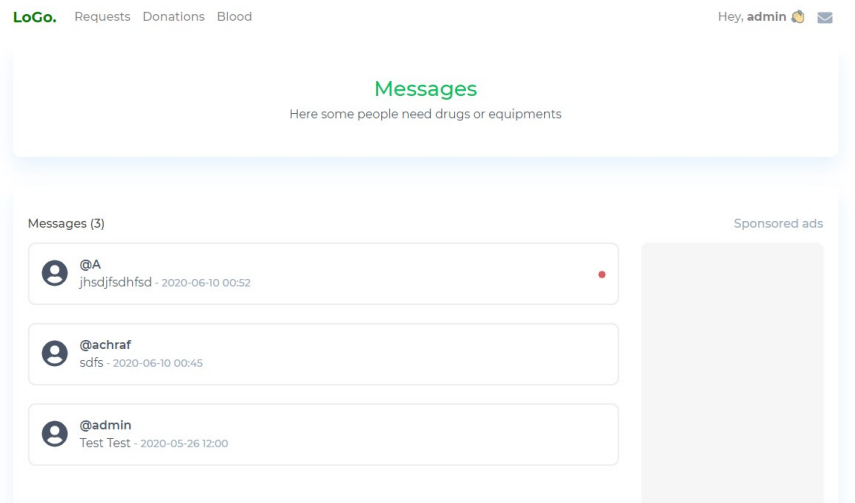

Figure 29: Messages

* **Conversation:**

  This is the Conversation page:

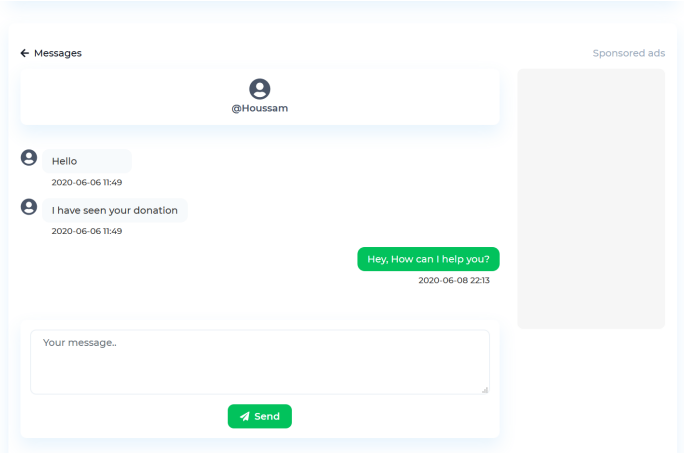

Figure 30: Conversation

* **Profile:**

  This is the Profile page of user:

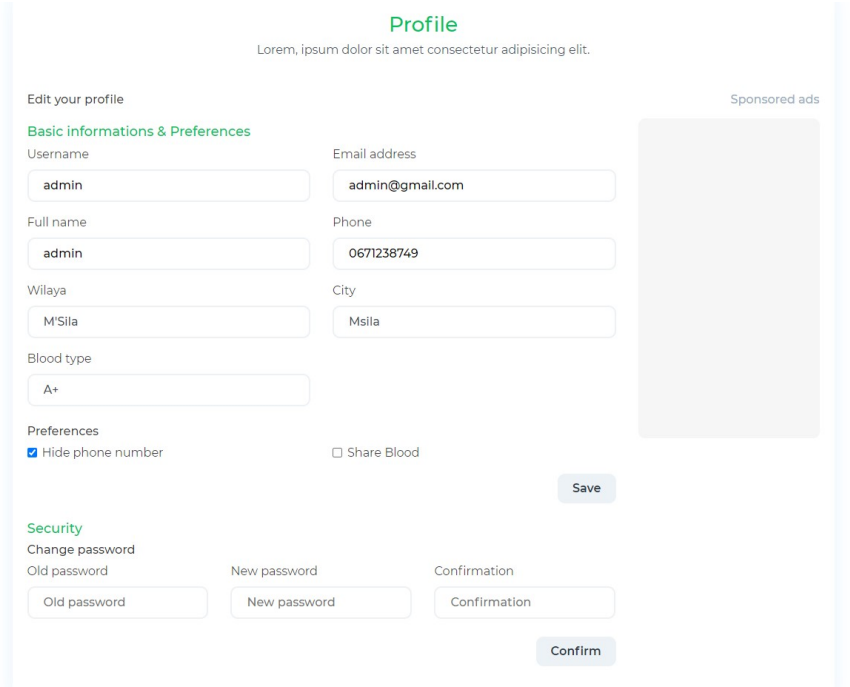

Figure 31: Profile

Part IV

GENERAL CONCLUSION

The last parts is the general conclusion and future work.

5

GENERAL CONCLUSION AND FUTURE WORK

In this dissertation, we set out to create a web application geared toward every person who likes to help others by enabling people to donate drugs, money or medical equipment to associations or people in need in an easy and simple way that a normal user can use it. We encountered obstacles after imposing the quarantine due to the Coronavirus, but these problems were overcome through remote communication between us.

we have tried several models for our system, and we ended up choosing the most appropriate and most efficient, as well as for the design of the application so that we have been keen on the simplicity of the user interfaces in order to make all types of users able to access all the functions of our application.

Our project is not final and we are still working on accomplishing it and adding features and other facilities in order to achieve maximum assistance for people, for this we are planning to make this project as an open-source project in order to encourage developers to help build and improve this application.

BIBLIOGRAPHY

[1] https://www.geeksforgeeks.org/components-of-information-system/.

[2] https://www.guru99.com/rol-component-mis.html.

[3] https://conceptdraw.com/a1073c3/p1/preview/640/pict--pyramid-diagram-4-level-pyramid-model-diagram-information-systems

[4] https://www.britannica.com/topic/information-system/Information-system-infrastructure-and-architecture#ref1134696.

[5] https://www.euro.who.int/en/health-topics/Health-systems/primary-health-care/main-terminology.

[6] https://www.uwo.ca/fammed/csfm/tutor-phc/documentation/trainingpapers/TUTOR_Definitio_%20of_primar_%20health_care.pdf.

[7] https://medium.com/@MailMyStatement/5-major-challenges-facing-the-healthcare-industry-in-2019-60218336385f.

[8] https://healthcaresuccess.com/blog/healthcare-marketing/challenges-in-healthcare-today.html.

[9] https://www.finoit.com/blog/top-10-healthcare-challenges/.

[10] https://builtin.com/artificial-intelligence.

[11] https://medium.com/@chethankumargn/artificial-intelligence-definition-types-examples-technologies-962ea75c

[12] https://www.javatpoint.com/application-of-ai.

[13] https://searchhealthit.techtarget.com/definition/Health-IT-information-technology.

[14] https://www.who.int/hac/techguidance/training/HIM/en/.

[15] https://www.healthit.gov/faq/what-are-differences-between-electronic-

[16] https://searchhealthit.techtarget.com/definition/electronic-health-record-EHR.

[17] https://www.unit4.com/blog/8-challenges-for-nonprofit-organizations.

[18] https://whatis.techtarget.com/definition/social-media.

[19] https://digitalmarketinginstitute.com/blog/how-nonprofits-can-use-social-media-to-boost-donations.

[20] https://medium.com/@clinguen/advantages-and-disadvantages-of-social-m

[21] Common types of information systems. https://eternalsunshineoftheismind.wordpress.com/2013/02/19/common-types-of-information-systems/.

[22] Components of information system assignment help. http://www.expertsmind.com/learning/components-of-information-system-assignment-help-7342872605.aspx.

[23] Emory university. school of medicine. archived 2011-04-23 at the wayback machine accessed 27 june 2011.

[24] Health care. https://en.wikipedia.org/wiki/Health_care.

[25] How to use social media to support your favourite charities. https://www.cafonline.org/my-personal-giving/long-term-giving/resource-centre/how-to-use-social-media-to-support-your-favourite-charities.

[26] Johns hopkins medicine. patient care: Tertiary care definition. accessed 27 june 2011.

[27] What is a charitable organization? https://www.lehighvalleyfoundation.org/what-charitable-organization.

[28] What is artificial intelligence? https://www.netapp.com/us/info/what-is-artificial-intelligence-ai.aspx.

[29] (2014). Paper-based patient records (ppr) vs. electronic health records (ehr). https://www.dataentryoutsourced.com/blog/paper-based-patient-records-ppr-vs-electronic-health-records-ehr/.

[30] (2017). Benefits of using ehr vs. paper records. https://checkpointehr.com/ehr-vs-paper-records/.

[31] (2018). Advantages and disadvantages of emr vs. paper-based records. https://www.medipro.com/electronic-medical-records-vs-paper-records/.

[32] (2019). Ehrs vs paper records: Which is better? https://www.techadvisory.org/2019/02/ehrs-vs-paper-records-which-is-better/.

[33] (2019). Impact of point-of-care technologies on healthcare. https://www.impelsys.com/blog/impact-point-care-technologies-healthcare/.

[34] Ahmad, B. (2016). 10 advantages and disadvantages of social media for society. https://www.techmaish.com/advantages-and-disadvantages-of-social-media-for-society/.

[35] Australia, E. (2018). https://www.elsevier.com/en-au/connect/what-are-the-4-biggest-challenges-facing-the-healthcare-sector.

[36] Bradley, J. The four functions of management in non-profit organizations. https://smallbusiness.chron.com/four-functions-management-nonprofit-organizations-59885.html.

[37] Chakrabarty, T. (2016). What is information systems? what are the components or resources of information systems? https://www.onlineclassnotes.com/2016/05/what-is-information-system-what-are-the-components-information-system.html?part=1.

[38] Council, F. N. (2019). Nine challenges that may impact the nonprofit sector in 2020. https://www.forbes.com/sites/forbesnonprofitcouncil/2019/11/25/nine-challenges-that-may-impact-the-nonprofit-sector-in-2020/#6ecff2376fb8.

[39] Dudovskiy, J. (2012). Information system and its components. https://research-methodology.net/information-system-and-its-components/.

[40] Faggella, D. (2020). Everyday examples of artificial intelligence and machine learning. https://emerj.com/ai-sector-overviews/everyday-examples-of-ai/.

[41] Ferrari, C. Working with axios in react. https://dev.to/cesareferrari/working-with-axios-in-react-540c.

[42] Luenendonk, M. (2017). Management information systems (mis): Definition and how it works. https://www.cleverism.com/management-information-systems-mis.

[43] Neiman, J. (2017). The importance of health information technology in developing areas. https://openmrs.org/2017/07/the-importance-of-health-information-technology-in-developing-areas/.

[44] Picincu, A. (2018). Role of information systems in an organization. https://bizfluent.com/about-6525978-role-information-systems-organization.html.

[45] Reddy, V. (2018). Types of information systems. https://edugeneral.org/blog/business/types-of-information-systems/.

[46] technofunc (2013). https://www.technofunc.com/index.php/domain-knowledge-2/healthcare-industry/item/healthcare-systems-public-private-and-mixed.

[47] Teel, P. (2018). Five top challenges affecting healthcare leaders in the future. https://www.beckershospitalreview.

com/hospital-management-administration/five-top-challenges-affecting-healthcare-leaders-in-the-future.html.

[48] Thakur, D. Discuss the major types of information system. http://ecomputernotes.com/mis/structure-and-classification/discuss-the-major-types-of-information-system.

[49] the American College of Obstetricians and Gynecologists, 409 12th Street, S. P. B. . W. D. .-. (2015). Patient safety and health information technology. https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2015/01/patient-safety-and-health-information-technology.

[50] Wikipedia. Bootstrap. https://en.wikipedia.org/wiki/Bootstrap_(front-end_framework).

[51] Wikipedia. Class diagram. https://en.wikipedia.org/wiki/Class_diagram.

[52] Wikipedia. Font awesome. https://en.wikipedia.org/wiki/Font_Awesome.

[53] Wikipedia. Javascript. https://en.wikipedia.org/wiki/JavaScript.

[54] Wikipedia. Mysql. https://en.wikipedia.org/wiki/MySQL.

[55] Wikipedia. Node.js. https://en.wikipedia.org/wiki/Node.js.

[56] Wikipedia. React. https://en.wikipedia.org/wiki/React_(web_framework).

[57] Wikipedia. Sequence diagram. https://en.wikipedia.org/wiki/Sequence_diagram.

[58] Wikipedia. Use case diagram. https://en.wikipedia.org/wiki/Use_case_diagram.

[59] Wikipedia. Visual studio code. https://en.wikipedia.org/wiki/Visual_Studio_Code.

[60] Wikipedia. Wampserver. https://en.wikipedia.org/wiki/WampServer.

[61] Yu, K. N. Funding sources for charities and nonprofit organisations. https://asianngo.org/magazine/post-magazine/article/article-detail/88/funding-sources-for-charities-and-nonprofit-organisations.

ملخص

فتح التطور الكبير في التكنولوجيا عامة و تكنولوجيا الاتصالات خاصة المجال للعديد من الحلول و التسهيلات في الكثير من الميادين، و من بين الميادين المستفيدة من هذا التطور ميدان التبرع و العمل الخيري و مساعدة الغير، وفي هذا العمل المخصص لمذكرة نهاية الدراسة لقد طورنا منصة تستغل هذا التطور في جعل عملية التواصل بين المحتاجين و المتبرعين سهلة و سريعة.

الكلمات المفتاحية : العمل الخيري، الجمعيات الخيرية، التبرع، التبرع بالدم، انظمة المعلومات، التواصل الاجتماعي، الذكاء الاصطناعي.

Abstract

The great development in technology in general and communication technology in particular has opened the way to many solutions and facilities in many fields, and among the fields benefiting from this development is the field of donation, charitable work and assistance to others, and in this work devoted to the dissertation of end of the study we have developed a platform that exploits this development in making the communication process between the needed people and the donors easy and fast.

Key words: charitable work, charities, donation, blood donation, information systems, social media, artificial intelligence.

Résumé

Le grand développement de la technologie en général et des technologies de la communication en particulier a ouvert la voie à de nombreuses solutions et installations dans de nombreux domaines, et parmi les domaines bénéficiant de ce développement est le domaine des dons, du travail caritatif et de l'assistance aux autres, et dans ce travail consacré à la thèse de la fin de d'étude, nous avons développé une plate-forme qui exploite cette développement pour rendre le processus de communication entre les nécessiteux et les donateurs facile et rapide

Mots clés: oeuvre de bienfaisance, organismes de bienfaisance, don, don de sang, systèmes d'information, médias sociaux, intelligence artificielle.