CHAPTER 1 INTRODUCTION

1.1 Introduction:

The health problem is the gap between an acceptable or desirable health status and the present status. In today's life, health problems are occurred more than last 25-30 years ago because of modernization, industrialization. Suddenly, changes in environment are directly affect to health condition. So, more health-related problems are occurring day by day, require to daily checkup health conditions. This project is based on real time implementation as well as more informative and realistic it can be highly used in Medical Diagnosis and understanding the different feasibilities of model.

1.2 Problem Statement:

In such unprecedented times, with a fragile healthcare infrastructure, the medical facilities for people are scarce and even fewer for people with special needs. The healthcare sector got so pre-occupied with Covid-19 cases that people with other ailments didn't even get a chance to avail medical assistances. So, we are here to present a model to mitigate the scarcity of facilities & the lack of medical management.

1.3 Objectives:

The objective of developing monitoring systems is to reduce health care costs & time by reducing physician office visits, hospitalizations, and diagnostic testing procedures.

1.4 Scope:

Setting up alarm alert system & adding more diseases to our model that increase our feasibility & compatibility with market.
Adding more body parts model that increase people knowledge that would lead to training purposes to the nurses.

CHAPTER 2 LITERATURE REVIEW

2.1 Machine learning techniques for classification of diabetes and cardiovascular diseases Machine learning methods are playing an increasingly important role in data analysis because they can deal with massive amounts of data. In fact, the more data the better. Most machine learning methods construct hypotheses from data. our growing abilities to store large amounts of data in rapid-access computer memories and to compute with these data has enabled techniques that store and use all the data as they are needed.
These insights yield connections between deep learning and diverse physical and mathematical topics, including random landscapes, spin glasses, jamming, dynamical phase transitions, chaos, Riemannian geometry, random matrix theory, free probability, and nonequilibrium statistical mechanics. Indeed, the fields of statistical mechanics and machine learning have long enjoyed a rich history of strongly coupled interactions, and recent advances at the intersection of statistical mechanics and deep learning suggest these interactions will only deepen going forward.

2.2 Supervised learning & Unsupervised Learning
ML methods that aim to learn a function from a given training data set constitute the second main approach, called supervised learning. Two main criteria for the success of supervised learning algorithms are prediction and generalization. The learned function should be able to successfully predict the output for data other than in the training set used. At the same time, it should act as a model that captures the underlying characteristics of the training data and generalize to new data points.
Supervised ML techniques offer an invaluable set of formalized computing methods to develop computer-assisted detection, analysis, and decision systems for network security. These methods have been successfully applied to a wide variety of fields ranging from image recognition, speech processing, and data mining. the opposite behaviour is called overfitting where the function describes the training data perfectly but has poor predictive power. The performance of a supervised learning algorithm is quantitatively assessed using a test data set and cross-validation techniques.

2.3 Regression Techniques
Linear regression analysis is often used by life scientists. For example, the equation for the regression of one variable on another may suggest hypotheses about why the two variables are functionally related. More practically, regression can be used in situations where the dependent variable is difficult, expensive, or impossible to measure, but its values can be predicted from another easily measured variable to which it is functionally related. Logistic regression is an extension of linear regression. Rather than modelling a linear relationship between the independent variable x and the probability of the outcome, which is unnatural

since it would allow predicted probabilities outside the range of 0–1, it assumes a linear (straight line).

A major advantage of logistic regression compared to other similar approaches like probity regression—and therefore, a reason for its popularity among medical researchers—is that the exponentiated logistic regression slope coefficient (e^b) can be conveniently interpreted as an odds ratio. The odds ratio indicates how much the odds of a particular outcome change for a 1-unit increase in the independent variable (for continuous independent variables) or versus a reference category.

2.4 Support Vector Machine in medical fields

Support Vector Machine is a supervised Machine Learning Algorithms that can be used for both classification or regression challenges. However, it is mostly used in classification problems. In the SVM algorithm, we plot each data item as a point in n-dimensional space (where n is several features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes very well.

The SVM kernel is a function that takes low dimensional input space and transforms it to a higher dimensional space i.e., it converts not separable problem to separable problem. It is mostly useful in non-linear separation problem. Simply put, it does some extremely complex data transformations, then finds out the process to separate the data based on the labels or outputs you've defined.

2.5 Research and Analysis of the Front-end Frameworks and Libraries in E-Business Development

With web technology rapidly expands out in recent years, there is a significant trend that Hypertext Markup Language (HTML)5 turns into a worldwide web consortium and leads the front-end development to stand on the front stage of internet history. However, there are numerous front-end development frameworks and libraries such as React, Angular and Vue. How to select a suitable framework or library to establish the e-Business and reach out to maximize the user experience becomes a priority operation in web development. This paper starts with introducing an overview of the leading frameworks and libraries in the field of front-end development and examine each performance in web services.

2.6 A review and analysis of technologies for developing web Applications

Web applications tend to be multi-tiered by nature, with the most common structure being the three- tiered architecture. In its most common form, the three tiers are • Presentation layer: The presentation tier is the front-end layer in the 3- tier system and consists of the user interface. This user interface is often a graphical one accessible through a web browser or web-based application and which displays content and information useful to an end user. The four big technologies in this layer are HTML, CSS, JavaScript and jQuery. The workflows by which the data and requests travel through the back end are encoded in a business layer. Scripting languages that are uses are ColdFusion, Ruby, WebObjects, and Python.

[3]

2.7 Research on HTML5 in Web Development

The purpose of this study was about HTML (Hypertext Markup Language) is the code that is used to structure a web page and its content. It is the building block of a website. HTML5 is the next major revision of the HTML standard superseding HTML 4.01, XHTML 1.0, and XHTML HTML5 is a standard for structuring and presenting content on the World Wide Web. HTML5 is a cooperation between the World Wide Web Consortium (W3C) and the Web Hypertext Application Technology Working Group (WHATWG). The lesson was about new tags that are introduced in HTML5. With the development of HTML5 it has wide range of applications in multimedia direction. It can play audio and video and supports animations from the browser without the need of the proprietary technologies. HTML5 introduces a number of new elements and attributes that can help you in building modern websites.

2.8 Challenges in Android Application Development

The following are the challenges faced by the Android App developers The most common challenge is to set the properties of app for different devices with different screen sizes, resolution etc. There are many versions of each android device and while releasing the app, version specific details need to be checked this makes the task very critical. Currently, the Development Environment does not have enough tools for testing. There is a need of testing techniques for the Android Platform. Also debugging features must be made available. Sometimes different devices have different capabilities in terms of software support like some browsers has poor support for HTML5.

CHAPTER 3 PROPOSED METHODOLOGY

Integration of clinical decision support with computer-based patient records could reduce medical errors, enhance patient safety, decease unwanted practice variation and improve practice outcome which can help significantly improve the quality of clinical decisions using the data mining modelling technique & Integrate doctors and patients via interacting and user-friendly interface so that Patient can easily utilize in emergency situations. There are three primary goals of this model tend to be prediction, description, and presentation.

- **Scalability:**
  - The primary objective of a SWOT analysis is to help organizations develop a full awareness of all the factors involved in making a business decision.
  - Strength: Small (4-5 employees) can change and adapt quickly & gives a unique advantage.
  - Weakness: Team members who are not much trained in both technical and professional engineering. No one has been through any such type of technical training programs.
  - Opportunity: Market trends & Economic trends will take us to new heights.
  - Threats: Political, environmental, economic regulations & Funding part is our main threat.

- **How Realistic to Achieve/Make?**
  - It can be easily implementable because in this pandemic period most of peoples are technically advanced & they are mostly relying on the internet.
  - It can be widely spread on different social media platforms, Application based platforms like google play store, Appstore etc.
  - It can be easily accessed & modified.

- **Any Threat/Risk/Problem that you can foresee?**
  Bad Design, Poor user Experience, Slopy implementation, feature creep, & lack of quality control all contribute to product failure.
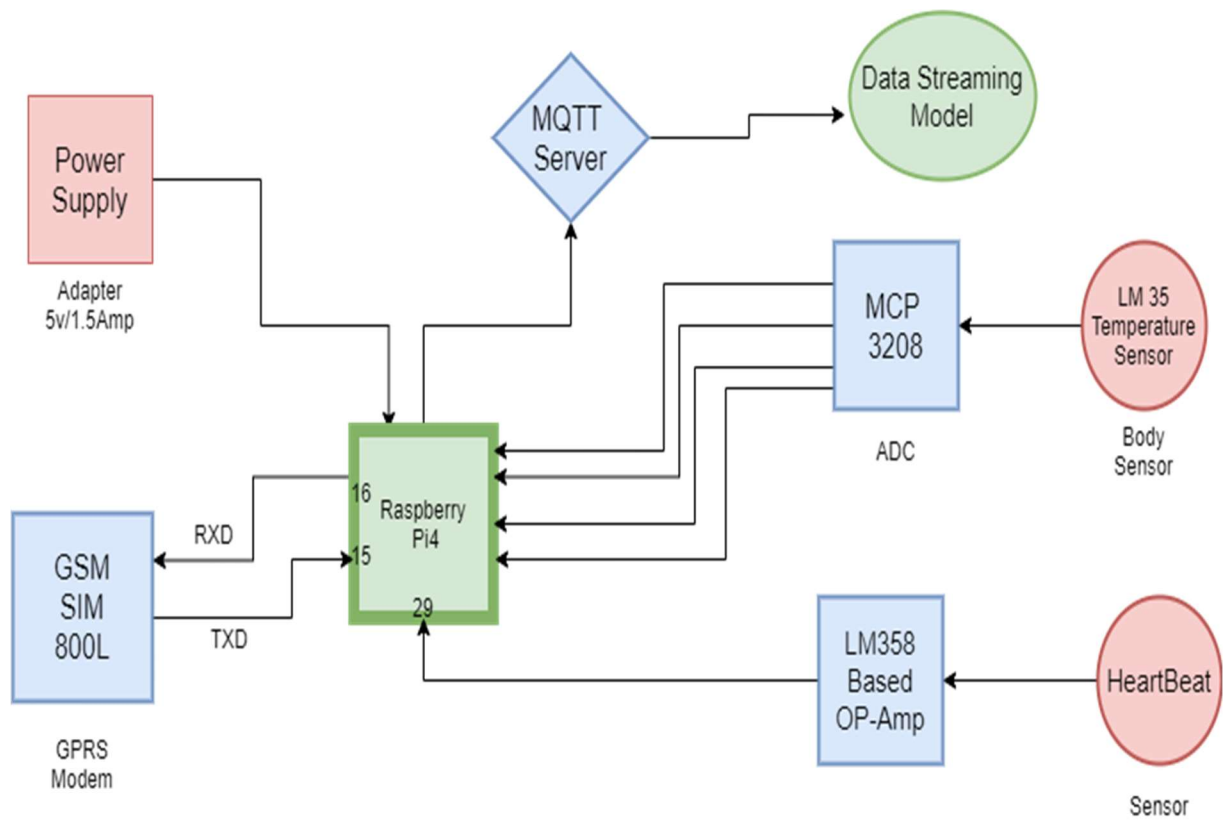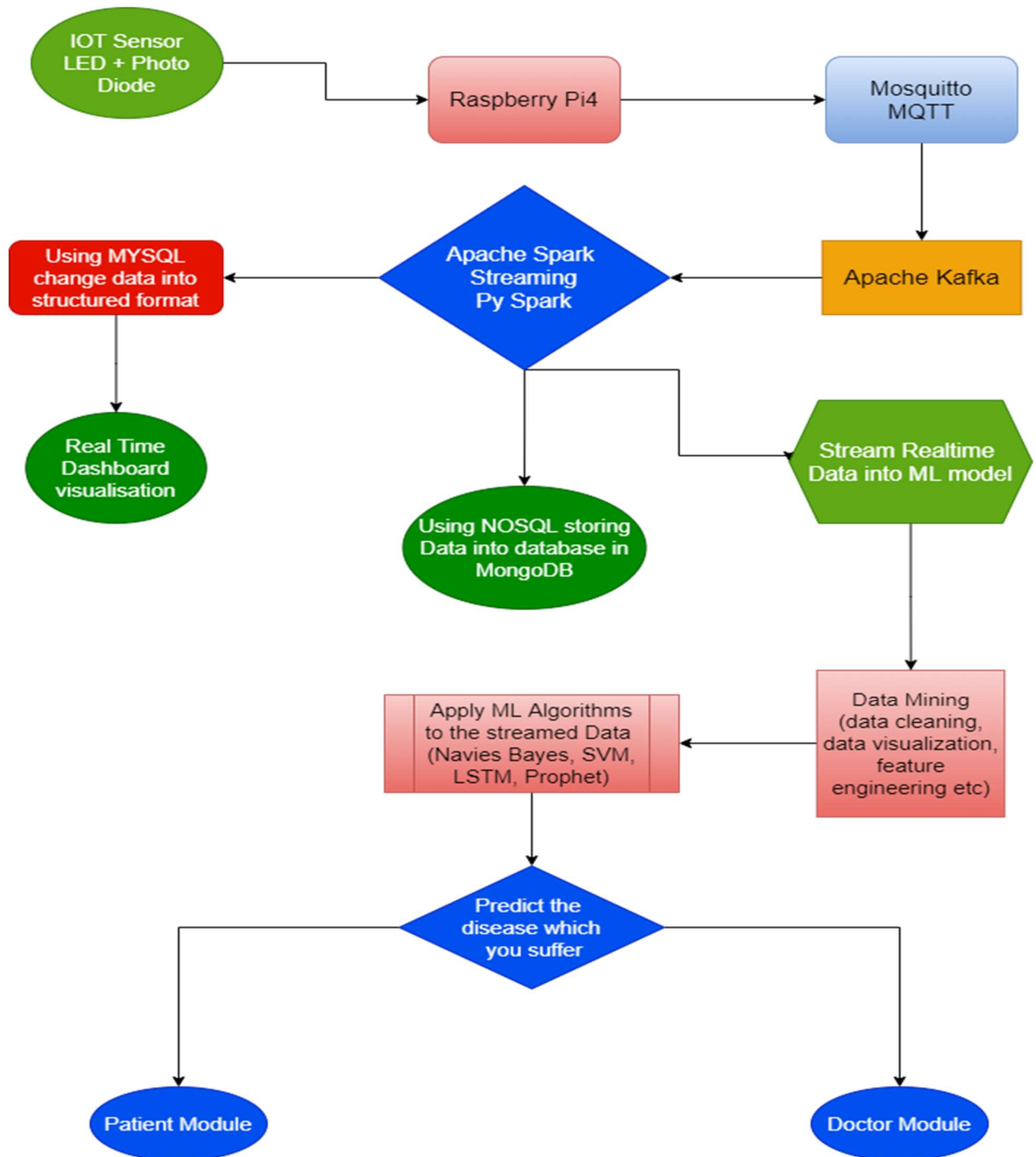
3.1 FLOWCHART

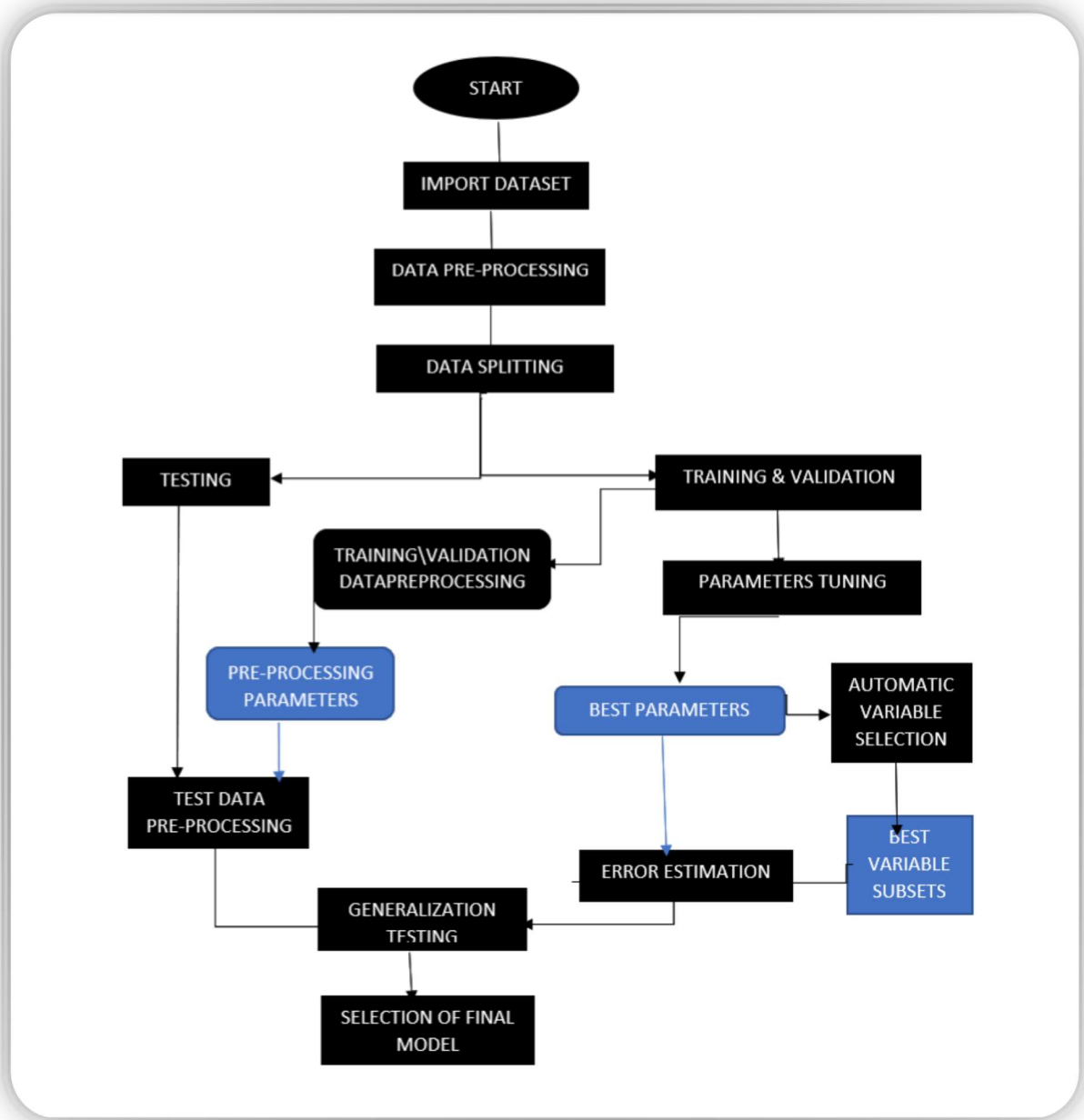Fig 1: IOT Model

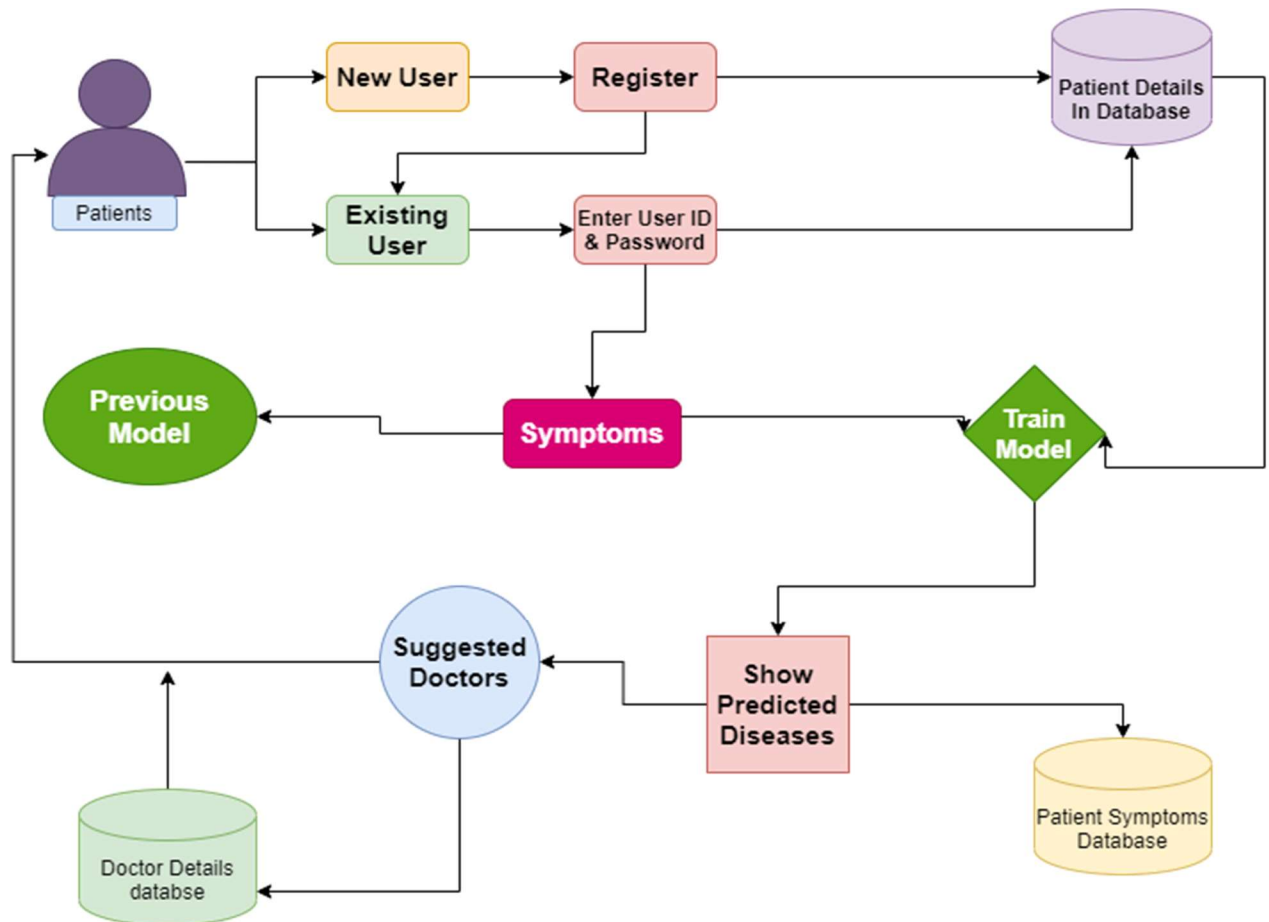Fig 2: Data Streaming Model

Fig 3: Machine Learning Model

Fig 4: Web Development Model

3.2 IMPLEMENTATION ACTIVITY

Disease diagnosis using Machine Learning & Deep Learning Models
• This project focused on many health issues from which not only India but the whole World is suffering. Visualize the dataset & using All ML & DL algorithms to diagnose Diseases.
• Dataset used: Kaggle Cardiovascular, diabetes, Kidney, Breast Cancer, malaria etc. dataset
• Project GitHub Link: https://github.com/ankiii07/Automate-Diagnosis

- **Economic Sustainability:**
    - We first go personally to many hospitals for our product launching & later with some remote areas so that they use our application & get more & more benefits from it from anywhere.
    - At Initial Stage we just put more & more efforts to setup in market not on generating revenue.
    - it's not for generating revenue but later after this product get popular and provide more & more benefits to people, then we take charges for using this application which is affordable to our middle order people.

- **Environment Sustainability:**
    - The idea is much innovative and not implemented with such mixed technology so for which made the people to their comfort and so guide them to reach their desire.
    - Apart from this it is an initiative which has not been seen so far and it has Less development and maintenance cost and high profit values.
    - This Project is Environment Sustainable & much helpful to Remote areas public, rural area public & it does not cause any environmental damage.

CHAPTER 4 TECHNOLOGY USED

- **Web Development**
  VS Code, HTML, CSS, ReactJS, Django etc.

- **Machine Learning & Deep Learning**
  Anaconda, Jupyter Notebook, EDA, Data Collection, Cleaning, Visualisation, NumPy, Pandas, Seaborn, SciPy, Matplotlib, Pandas, Sklearn Libraries, ML Algorithms

- **Augmented Reality**
  Unity, Vuforia SDK, AR Core, A Frame, JDK, Augmented Reality integrated with Machine Learning

- **Internet of Things**
  Raspberry Pi4, GSM module, Sensors.

CHAPTER 6 CONCLUSION

As health care services are important part of our society, automating these services lessen the burden on humans and eases the measuring process. Also, the transparency of this system helps patients to trust it. When threshold value is reached, the alarm system that consists of buzzer and LED alerts the doctors and he can act more quickly.

The IOT technology helps the server to update the patient data on website. Many further improvements can be made in our system to make it better and easily adaptable such as adding more advanced sensors. The biometric information of the patient which is stored and published online & transmit to cellular can be given to scientists and researchers of medical fields to analyze the value and find patterns or for other research work.

Future work will focus on monitoring additional health-related parameters using a broader combination of transducers, sensors, and correlation techniques, and on improving system reliability and robustness to patient movement and connectivity losses.

REFERNCES

[1] D. Fagella, *7 Applications of Machine Learning in Pharma and Medicine*, 2017, [online]

[2] V. S. Pendyala and S. Figueira, "Automated Medical Diagnosis from Clinical Data," *2017 IEEE Third International Conference on Big Data Computing Service and Applications (BigDataService)*, 2017, pp. 185-190, doi: 10.1109/BigDataService.2017.14.

[3] F. Santos, F. Silva and P. Georgieva, "Automated Diagnosis of Skin Lesions," 2020 IEEE 10th International Conference on Intelligent Systems (IS), 2020, pp. 545-550, doi: 10.1109/IS48319.2020.9200090.

[4] V. Datla *et al.*, "Automated clinical diagnosis: The role of content in various sections of a clinical document," *2017 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2017, pp. 1004-1011, doi: 10.1109/BIBM.2017.8217794.

[5] J. Siddiqi, B. Akhgar, A. Gruzdz, G. Zaefarian and A. Ihnatowicz, "Automated Diagnosis System to Support Colon Cancer Treatment: MATCH," *Fifth International Conference on Information Technology: New Generations (itng 2008)*, 2008, pp. 201-205, doi: 10.1109/ITNG.2008.62.

[6] P. Ongsulee, "Artificial intelligence, machine learning and deep learning," *2017 15th International Conference on ICT and Knowledge Engineering (ICT&KE)*, 2017, pp. 1-6, doi: 10.1109/ICTKE.2017.8259629.

[7] R. Chellappa, S. Theodoridis and A. van Schaik, "Advances in Machine Learning and Deep Neural Networks," in *Proceedings of the IEEE*, vol. 109, no. 5, pp. 607-611, May 2021, doi: 10.1109/JPROC.2021.3072172.

[8] F. Ertam and G. Aydın, "Data classification with deep learning using Tensorflow," *2017 International Conference on Computer Science and Engineering (UBMK)*, 2017, pp. 755-758, doi: 10.1109/UBMK.2017.8093521.

[9] H. Božiković and M. Štula, "Web design — Past, present and future," *2018 41st International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)*, 2018, pp. 1476-1481, doi: 10.23919/MIPRO.2018.8400266.

[10] D. S. Blyth, "Web page design for HTML (and friends)," *IPCC 96: Communication on the Fast Track. IPCC 96 Proceedings*, 1996, pp. 89-103, doi: 10.1109/IPCC.1996.552585.

[11] H. Ran, W. Zhuo and X. Jianfeng, "Web Quality of Agile Web Development," *2009 IITA International Conference on Services Science, Management and Engineering*, 2009, pp. 426-429, doi: 10.1109/SSME.2009.112.

[12] S. Drobi, "Play2: A New Era of Web Application Development," in *IEEE Internet Computing*, vol. 16, no. 4, pp. 89-94, July-Aug. 2012, doi: 10.1109/MIC.2012.84.

[13] H. Sugimura *et al*., "Development of immersive display system of web service in living space," *2014 IEEE 3rd Global Conference on Consumer Electronics (GCCE)*, 2014, pp. 49-50, doi: 10.1109/GCCE.2014.7031106.

[14] N. Sandhya and K.R. Charanjeet, "A review on Machine Learning Techniques", *International Journal on Recent and Innovation Trends in Computing and Communication*, pp. 395-399, 2016, ISSN 2321-8169.