**Phase 1 Report: IT6423**

**Project Domain:** Healthcare Informatics

**Project Name:** Symptom-Based Disease Prediction System Using Machine Learning

**Team Arrangement:**

| **Role** | **Name** | **Responsibilities** |
| --- | --- | --- |
| Project Manager |  | Responsible for overall project management and coordination. |
| ML Engineer |  | Develops machine learning models for disease prediction. |
| Healthcare Research |  | Provides domain expertise in healthcare systems. |
| Software Developer |  | Builds the software application for deploying the prediction system. |

**Problem Statement**

The existing healthcare system heavily relies on manual diagnosis that is time-consuming, error-prone and can result in delayed treatment. This manual procedure also places a considerable load on medical professionals. There is a critical requirement for a more efficient and reliable technique for illness prediction based on symptoms that uses machine learning and healthcare informatics. The aim of this research is to create a machine learning-based system that can reliably forecast illnesses using symptoms supplied by patients. This method intends to increase the efficiency and accuracy of illness diagnosis.

**Objectives:**

* Develop a machine learning model that can accurately predict diseases based on symptoms provided by patients.
* Integrate the prediction system into existing healthcare systems to assist healthcare providers in making faster and more accurate diagnoses.
* Improve patient outcomes using early detection and treatment of diseases.

**Literature Research**

The literature review focuses on current research that applies machine learning algorithms for illness prediction, notably in the context of diabetes and cardiovascular disease. Maniruzzaman et al. (2020) investigated the categorization and prediction of diabetes illness using machine learning paradigms. They investigated several machine learning algorithms and their effectiveness in predicting diabetes and the importance of precise illness prediction in early intervention and care. Ali et al. (2021) investigated cardiac disease prediction using supervised machine learning techniques. They examined and evaluated the effectiveness of several algorithms for predicting cardiac disease, highlighting the importance of precise prediction models in improving patient outcomes and lowering healthcare expenditures. Ali et al. (2020) suggested a smart healthcare monitoring system for heart disease prediction using ensemble deep learning and feature fusion. Their research focused on combining many data sources and applying sophisticated machine learning techniques to improve the accuracy of heart disease prediction models.

### **Motivation for Research**

#### ***Intensity of the Problem:*** The problem of inaccurate and inefficient disease diagnosis is significant in healthcare, as it can lead to serious consequences for patients. Misdiagnosis can result in delayed treatment, worsened health outcomes, and increased healthcare costs.

#### ***Need for the Proposed Solution:*** There is a clear need for a solution that can automate and enhance the diagnostic process in healthcare. An automated prediction system has the potential to reduce the burden on healthcare providers.

#### ***Commercialization Potential:*** A successful disease prediction system has high commercialization potential as it can be adopted by healthcare providers globally to improve their diagnostic capabilities and efficiency. The system has the potential to generate significant interest from healthcare organisations and industry stakeholders.

### **Stakeholders**

#### ***Healthcare Providers:***

* Roles: Use the prediction system to assist in diagnosing patients.
* Importance: The system can improve the efficiency and accuracy of disease diagnosis.

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#### ***Patients:***

* Roles: More accurate and timely diagnosis of patients.
* Importance: The system directly impacts patient care and improves the patient experience in healthcare settings.

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#### ***Medical Researchers:***

* Roles: Use the collected data for further research in disease prediction and treatment.
* Importance: The system can provide valuable insights and data for research purposes.

**References:**  
**[1]** Maniruzzaman, M., Rahman, M. J., Ahammed, B., & Abedin, M. M. (2020). Classification and prediction of diabetes disease using machine learning paradigm. Health information science and systems, 8, 1-14.

**[2]** Ali, M. M., Paul, B. K., Ahmed, K., Bui, F. M., Quinn, J. M., & Moni, M. A. (2021). Heart disease prediction using supervised machine learning algorithms: Performance analysis and comparison. Computers in Biology and Medicine, 136, 104672.

**[3]** Ali, F., El-Sappagh, S., Islam, S. R., Kwak, D., Ali, A., Imran, M., & Kwak, K. S. (2020). A smart healthcare monitoring system for heart disease prediction based on ensemble deep learning and feature fusion. Information Fusion, 63, 208-222.