<p align="center">**ASSIGNMENT-4**</p>

<p align="center">**Task:** Take one domain and build business Understanding.</p>
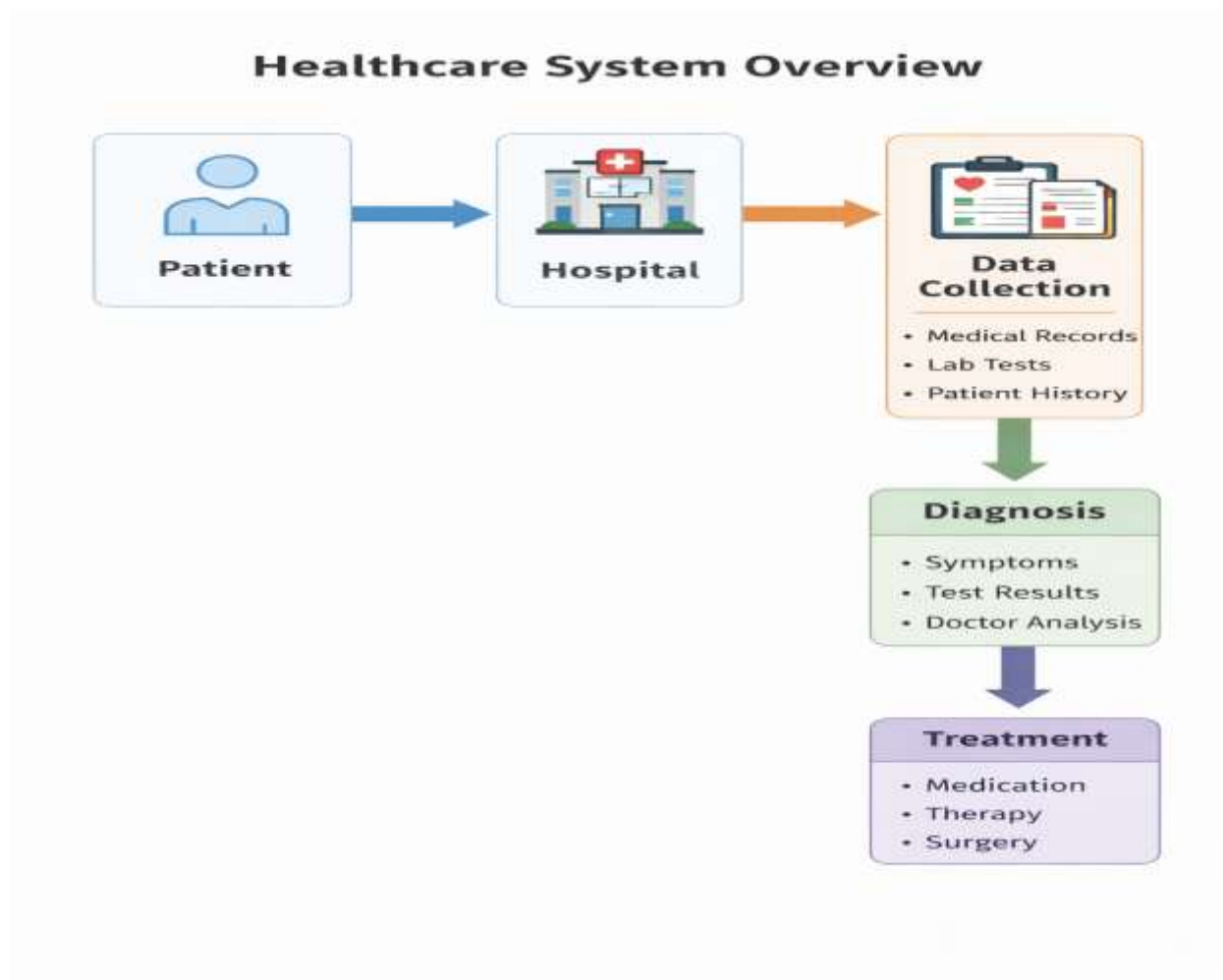
<p align="center">Business Understanding</p>

<p align="center">**Domain Chosen:** Healthcare – Disease Prediction System</p>

1. Introduction to the Domain

The **healthcare domain** focuses on maintaining and improving human health through medical services, diagnosis, treatment, and prevention of diseases. With the advancement of technology, healthcare systems now generate large volumes of digital data such as patient records, lab reports, diagnostic results, and treatment histories.

Managing and analysing this data manually is difficult and time-consuming. Hence, **machine learning techniques** are increasingly used to analyse healthcare data and support doctors in making accurate and timely decisions.

2. Business Background

Hospitals and clinics handle thousands of patients daily. Each patient generates data related to:

- Symptoms

- Medical history

- Test results

- Diagnosis and treatment

Doctors rely on experience and reports to diagnose diseases. However, due to high patient volume and complex data, there is a possibility of delayed or inaccurate diagnosis. This can affect patient health and increase treatment costs.

3. Business Problem Statement

The major business problem in the healthcare domain is **early and accurate disease prediction**.

Problems faced:

- Delay in disease diagnosis

- Human errors due to workload

- Difficulty in analysing large medical datasets

- Increased treatment cost due to late detection

Early prediction of diseases such as diabetes, heart disease, or liver disease can significantly improve patient outcomes.

4. Business Objective

The primary objective of this project is:

To build a machine learning–based disease prediction system that assists healthcare professionals in early diagnosis.

Secondary Objectives:

- Improve diagnostic accuracy

- Reduce diagnosis time

- Support doctors in decision-making

- Provide cost-effective healthcare services

5. Scope of the Business Problem

The scope of this project includes:

- Using historical patient data
- Predicting the likelihood of a disease
- Assisting doctors, not replacing them
- Supporting early-stage diagnosis

The system is intended as a **decision-support tool**, not a complete replacement for medical experts.

6. Proposed Business Solution

A **machine learning model** is proposed to analyse patient data and predict whether a person is likely to have a specific disease.

Disease Prediction Workflow

Patient Data
- Age
- Symptoms
- Medical History
- Test Results

Data Processing
- Data Cleaning
- Handling Missing Values
- Feature Selection

ML Model
- Training
- Pattern Learning
- Model Validation

Disease Prediction
- Disease Risk (Yes / No)
- Probability Score

How the solution works:

1. Patient data is collected (age, symptoms, test values)
2. Data is cleaned and prepared
3. ML model is trained using historical data
4. The model predicts disease risk for new patients

7. Stakeholders Involved

Stakeholder	Role
Doctors	Use predictions for diagnosis support
Patients	Receive early and better treatment
Hospitals	Improve efficiency and care quality
Data Analysts	Build and evaluate models
Management	Strategic healthcare planning

8. Business Constraints

Some limitations and constraints include:

- Availability of quality medical data
- Privacy and security of patient data
- Variations in symptoms among patients
- Dependence on accuracy of historical data

9. Business Success Criteria

The project will be considered successful if:

- Disease prediction accuracy is high
- Diagnosis time is reduced
- Early detection rate improves
- Doctors find the system useful

11. Conclusion

In this business understanding phase, the healthcare domain was analysed and disease prediction was identified as a critical business problem. By using machine learning techniques, healthcare providers can support early diagnosis, reduce medical errors, and improve overall patient care. This project highlights how data-driven solutions can enhance decision-making in real-world healthcare environments.