Project Design Phase-I
Solution Architecture

Date	23 October 2022
Team ID	TEAM-591549
Project Name	**Project -** AudiometricAI: Transforming Hearing Test Diagnosis Through Machine Learning
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

1. Find the Best Tech Solution to Solve Existing Business Problems:

a) ***Business Problem****:* The project aims to address the inconvenience and cost of traditional hearing health check-ups, which can lead to delays and avoidance.
b) ***Tech Solution:*** The chosen solution is a web app called "AudiometricAI" that uses machine learning to help users check their hearing health at home.
c) ***Considerations:*** The app should be cost-effective, accessible, and provide more accurate results than traditional methods. Partnerships with healthcare providers and employers may also be explored for additional revenue streams.

2. Describe the Structure, Characteristics, Behaviour, and Other Aspects of the Software to Project Stakeholders:

a) ***Structure:*** The system consists of a web application (user interface), a backend for data processing and machine learning, and a database for user profiles and feedback.
b) ***Characteristics:*** The app's features include user data input, machine learning model integration, prediction reporting, user communication, and feedback collection.
c) ***Behavior:*** The app interacts with users through an intuitive interface, collects and processes data, communicates with the machine learning model for predictions, and provides users with prediction reports.

3. Define Features, Development Phases, and Solution Requirements:

a) ***Features:*** Features include user registration, data input, machine learning integration, prediction reporting, user communication, and feedback collection.
b) ***Development Phases:*** Phases include system design, machine learning model development, web application development, testing, deployment, and ongoing maintenance.
c) Requirements:

FUNCTIONAL REQUIREMENTS

FR No.	FUNCTIONAL REQUIREMENTS	DISCRIPTION

FR-1	Data Input	1. Users should be able to input their characteristics, such as age, physical score, and potentially other relevant information for the hearing test prediction.
FR-2	Machine Learning Model Integration	1. Integration of classification algorithms, such as Logistic Regression and Support Vector Machine, for hearing test prediction. 2. Model training using a dataset
FR-3	Prediction and Reporting	1. The system should provide users with the prediction outcome, indicating the likelihood of positive or negative hearing test results. 2. Users receive a report with the prediction details.
FR-4	User Communication	1. Users can communicate with the system, ask questions, or request additional information related to their hearing test results.
FR-5	Feedback and Improvement	2. The system should collect user feedback to improve the accuracy of predictions.

NON - FUNCTIONAL REQUIREMENTS

FR No.	**NON - FUNCTIONAL REQUIREMENTS**	**DISCRIPTION**
FR-1	Usability	1. The application should have an intuitive and user-friendly interface for easy data input. 2. Users should receive clear and understandable predictions and reports.
FR-2	Security	1. Data privacy and security measures must be in place to protect user information. 2. Secure transmission of data to and from the machine learning model.
FR-3	Reliability	1. The system should be reliable and available for users at all times. 2. Backup and recovery mechanisms for user data.
FR-4	Performance	1. The application should provide quick predictions and responses. 2. Machine learning model should have reasonable inference times.

FR-5	Availability	1. Redundancy and failover systems to ensure high availability.
FR-6	Scalability	1. The system should be able to handle a growing user base. 2. Scalability should be achieved through load balancing and cloud resources.

4. Provide Specifications According to Which the Solution Is Defined, Managed, and Delivered:

a) ***Specifications:*** Detailed specifications include the technology stack (Python, Flask, Scikit-learn, etc.), data storage and user interface design.
b) ***Project Management:*** Utilize project management methodologies, such as Agile or Scrum, and collaboration tools like Jira.
c) ***Acceptance and Delivery Criteria:*** Clear criteria for acceptance, such as testing protocols, model accuracy benchmarks, and quality assurance standards.

Example - Solution Architecture Diagram:

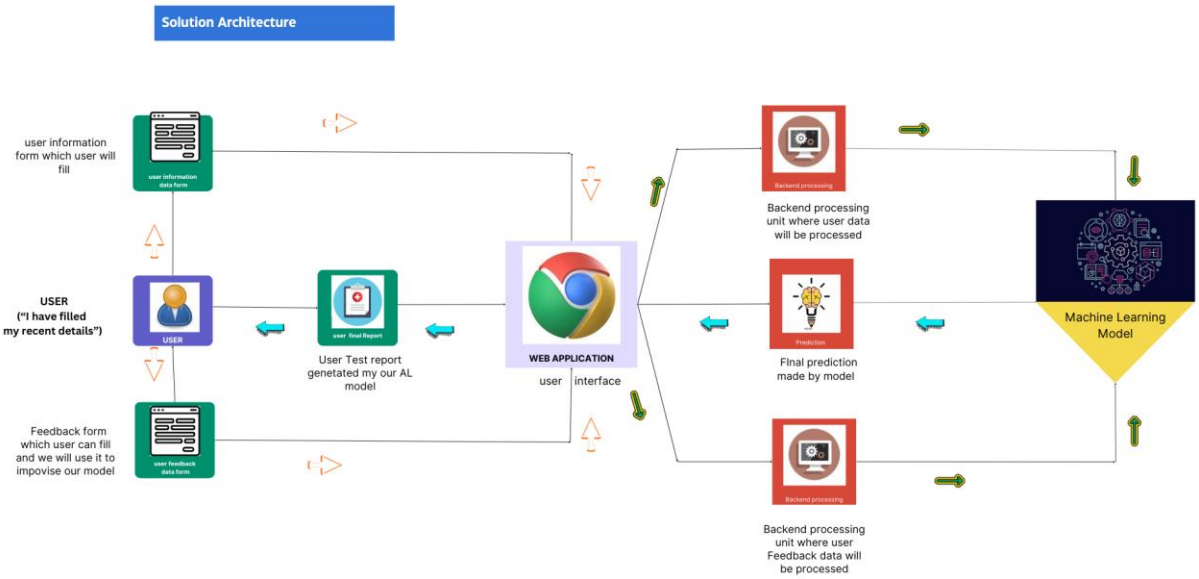

Figure : Architecture and data flow of the patient.