**SRS Document**

**Introduction**

•**Purpose**: The purpose of this project is to develop a Convolutional Neural Network (CNN)-based system to estimate cholesterol levels and assess the risk of cardiovascular diseases. The system will analyze socioeconomic, behavioral, and clinical risk factors to predict cholesterol levels.

•**Scope**: This project will primarily target medical institutions, researchers, and healthcare providers interested in assessing and predicting cholesterol-related health risks. The system will automate cholesterol level estimation using advanced machine learning techniques, making the process faster, more accurate, and scalable.

•**Intended Audience**: Medical researchers, healthcare professionals, and institutions, data scientists, and software developers working on health-tech solutions.

**Overall Description:**

•**System Overview**: The system will accept input data such as socioeconomic, behavioral, and clinical factors (e.g., age, lifestyle, dietary habits, genetic factors, and pre-existing health conditions). Using CNNs, the system will process this data and output a predicted cholesterol level. The system will consist of data preprocessing modules, a CNN model, and result visualization tools.

•**Product Features**:

oData input handling (clinical, behavioral, socioeconomic).

oCNN-based cholesterol estimation.

oVisual representation of cholesterol prediction and risk analysis.

oUser-friendly interface for medical professionals.

•**Assumptions and Dependencies**:

oThe system assumes access to clean and structured patient data.

oThe project is dependent on the availability of a dataset with labeled cholesterol values and associated risk factors.

**Functional Requirements:**

•**FR1**: The system shall allow users to input data related to socioeconomic, behavioral, and clinical factors.

•**FR2**: The system shall process input data through a CNN model to estimate cholesterol levels.

•**FR3**: The system shall display the predicted cholesterol levels and associated risk in a user-friendly dashboard.

•**FR4**: The system shall provide data visualization tools to analyze trends in cholesterol levels across different demographic groups.

•**FR5**: The system shall allow users to export results in standard formats like PDF or CSV for further analysis.

•**FR6**: The system shall have the ability to re-train the CNN model as new data becomes available.

**Non-Functional Requirements:**

•**NFR1**: The system shall provide real-time processing and prediction within acceptable response times (< 3 seconds).

•**NFR2**: The system shall be accessible via web and mobile platforms with intuitive user interfaces.

•**NFR3**: The system shall ensure data privacy and security, particularly concerning sensitive patient information (HIPAA compliance).

•**NFR4**: The system shall support multiple users with role-based access controls (e.g., doctors, researchers).

•**NFR5**: The system shall be scalable to accommodate large datasets and multiple users simultaneously.

**System Design Constraints**:

•**Technology Stack**: The system will use Python for backend processing and CNN implementation using TensorFlow and keras library and sklearn library, with a frontend designed using web frameworks like React or Angular. The database will use SQL or NoSQL (MongoDB) to store patient and cholesterol data.

•**Hardware Constraints**: The system must run on servers equipped with GPUs to support neural network training and prediction.