**FORM 2**

**THE PATENT ACT 1970**

(39 OF 1970) AND

The patent rules, 2003

**COMPLETE SPECIFICATION**

(See section 10: rule 13)

**TITLE OF INVENTION**

AI driven CKD and CVD prediction and Hospital Recommendation

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**PREAMBLE TO THE DESCRIPTION**

**[0001]** The following specification particularly describes the invention and the manner in which it is to be performed.

DESCRIPTION

**Technical field of invention:**

**[0002]** The present invention relates to the field of healthcare informatics and medical diagnostics. More particularly, it pertains to a system and method for automated multi-disease prediction using machine learning algorithms, deployed through an interactive web-based interface. The invention is designed to assist in the early-stage risk assessment of chronic diseases such as diabetes, heart disease, and chronic kidney disease by leveraging structured patient health data inputs. This invention contributes to the broader domain of digital health, clinical decision support systems (CDSS), and predictive healthcare technologies..

Summary of the invention:

**[0003]** The invention provides an intelligent, web-based system for the prediction and diagnosis of multiple chronic diseases using structured input from patient health data. Users enter basic clinical parameters such as age, blood pressure, glucose levels, and other medically relevant information. The system then utilizes trained machine learning models to analyze these inputs and predict the likelihood of conditions like diabetes, heart disease, and chronic kidney disease.

The platform features a secure user authentication mechanism allowing individuals to register and log in to access personalized diagnostic results. The system also incorporates automated hospital recommendation, offering users a list of nearby medical institutions based on their diagnosis and geographical location. Unlike traditional methods requiring complex imaging or invasive testing, this invention offers a non-invasive, fast, and accessible method of preliminary disease screening. It is designed to support early intervention, reduce the burden on healthcare professionals, and empower users with timely health insights..

Brief description of drawing:

**[0004]** The accompanying diagram (FIG 1) illustrates the overall system architecture for multi-disease prediction and hospital recommendation. It visualizes the end-to-end workflow beginning with user login and clinical data entry via a user interface, followed by data preprocessing and validation..

**[0005]** The processed inputs are then fed into the disease prediction engine, which utilizes trained machine

learning models to assess the likelihood of conditions such as diabetes, heart disease, and chronic kidney disease. Based on the diagnosis, the system generates personalized hospital recommendations using geolocation and user preferences. The final report is displayed through a user-friendly interface, ensuring accessibility and ease of interpretation for patients and healthcare professionals.

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Detailed description of the invention:

**[0006]** User Input and Data Collection:The system allows users to input clinical parameters such as age, blood pressure, glucose level, BMI, hemoglobin levels, and other routine test values through a secure web interface. These parameters are validated and structured for compatibility with pre-trained machine learning models. This ensures the integrity and accuracy of the data before any prediction takes place..

**[0007]** Disease Prediction and Recommendation Engine:Using logistic regression, decision trees, or similar supervised learning algorithms, the system evaluates the input against medical datasets to predict potential conditions like diabetes, chronic kidney disease, and heart disease. Upon diagnosis, the system leverages geolocation and filtered medical facility data to recommend suitable hospitals or clinics for further consultation and treatment. The results are displayed in a user-friendly report, allowing patients and healthcare professionals to act promptly..

**I/We claim:**

1. The system uses advanced machine learning models to predict Chronic Kidney Disease (CKD) and Cardiovascular Disease (CVD) risk with high accuracy, enabling early intervention.

2. By utilizing IP-based geolocation, the platform helps users discover nearby hospitals and clinics, improving access to timely medical care.

3. Users can easily book appointments with healthcare providers, reducing delays and enhancing coordination between patients and doctors.

4. The platform employs SHA-256 encryption to secure all user data, ensuring that sensitive medical information is protected from unauthorized access.

5. Users can track their health status and receive immediate predictions, fostering proactive health management and reducing future risks.

6. The system integrates predictive healthcare with location-based hospital recommendations and appointment scheduling, offering a comprehensive solution.

7. Designed for users of all ages and tech proficiency, the platform is intuitive, ensuring easy navigation and engagement for a diverse audience.

8. The AI-driven algorithms not only predict disease risks but also suggest tailored lifestyle changes and preventive measures to users.

9. The platform is accessible from a range of devices, including mobile phones, tablets, and desktops, ensuring flexibility and convenience for users.

10. By streamlining appointment bookings and reducing waiting times at hospitals, the platform helps patients save time and reduce healthcare costs, promoting more efficient healthcare delivery.

ARCHITECTURE DIAGRAM:

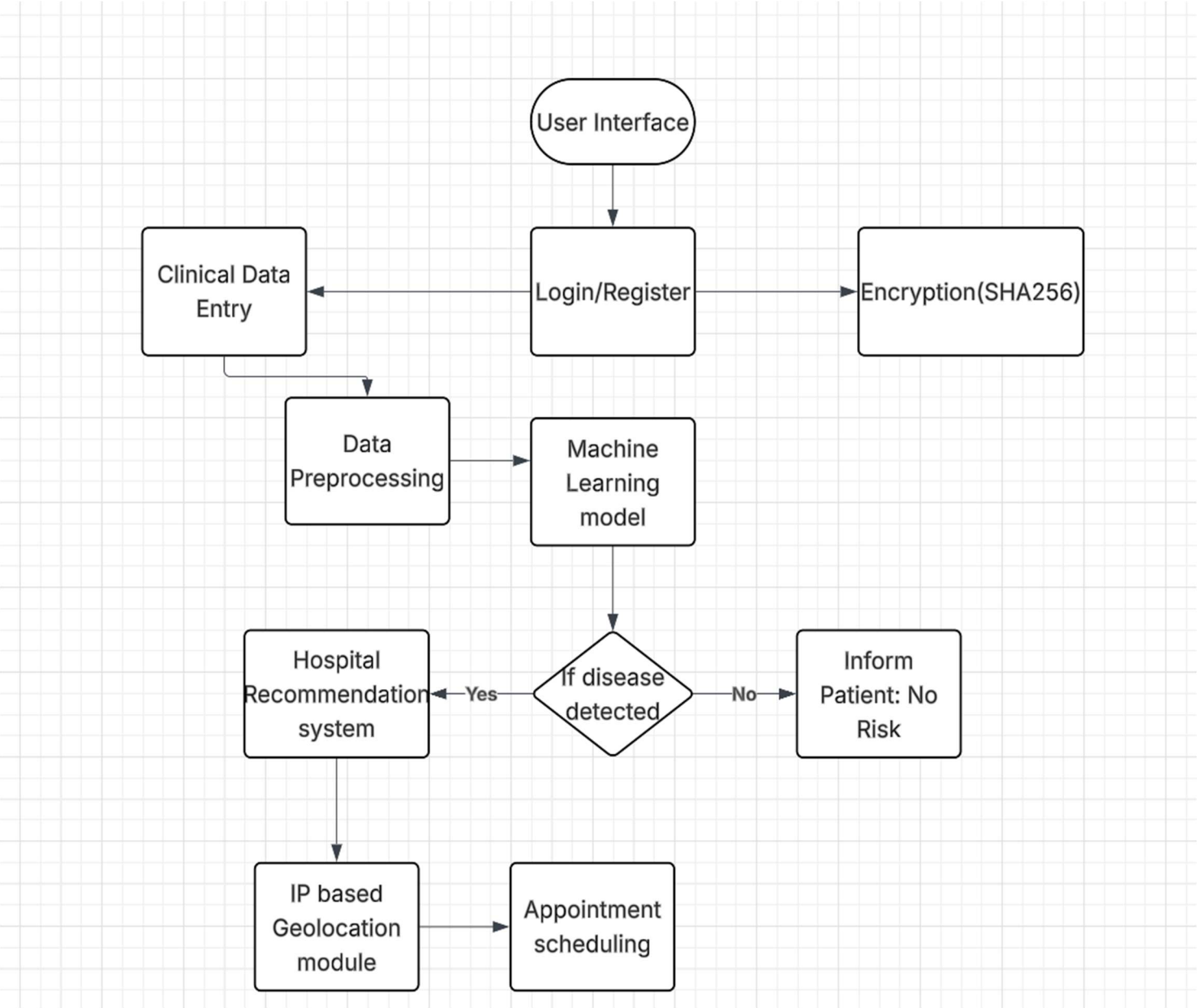


Figure 1

## ABSTRACT

As artificial intelligence (AI) continues to transform the healthcare landscape, there is a growing need for intelligent, accessible diagnostic tools that can support early disease detection and preventive care. This paper introduces the development and implementation of a web-based Multi-Disease Prediction System designed to assess the risk of multiple medical conditions—namely diabetes, heart disease, and Parkinson's disease—through the application of advanced machine learning algorithms.

The system is built using Streamlit, a Python-based framework that facilitates the creation of dynamic, interactive web applications with minimal overhead. The user interface is designed with usability in mind, enabling seamless interaction for both medical professionals and general users. To safeguard user data, the application incorporates a secure authentication mechanism featuring user registration and login functionality. Credentials are protected using SHA-256 hashing, and all user-related information is stored securely using a lightweight, file-based backend system powered by JSON, ensuring data integrity and privacy without the complexity of a full-scale database.

At the core of the system lie pre-trained and highly optimized machine learning models, each tailored to predict the probability of a specific disease based on clinical input parameters provided by the user. These models leverage structured healthcare data to deliver real-time predictions, empowering users with immediate insights into their potential health risks. The proposed solution serves as a preliminary screening and decision-support tool, aiming to bridge the gap between initial symptom presentation and formal medical diagnosis. By integrating AI with an accessible and user-friendly interface, this system demonstrates a scalable, efficient, and deployable approach to enhancing early diagnosis and promoting proactive health management in diverse settings, from individual use to clinical environments..


**[To be published with figure 1]**