

Heart Sage: An Advanced ML Predictive Analytics System for Cardiovascular Health

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Abstract – Public healthcare has been paid increasing attention given the exponential growth human population and medical expenses. It is well known that an effective health monitoring system can detect abnormalities of health conditions in time and make diagnoses according to the gleaned data. As a vital approach to diagnosing heart diseases, ECG monitoring is widely studied and applied. In this project, we propose a new method for ECG monitoring based on Internet-of-Things (IoT) techniques. ECG data are gathered using a wearable monitoring node and are transmitted directly to the IoT cloud using Wi-Fi. Both the HTTP and MQTT protocols are employed in the IoT cloud in order to provide visual and timely ECG data to users. Nearly all smart terminals with a web browser can acquire ECG data conveniently, which has greatly alleviated the cross-platform issue. The key components of this Project includes a ESP32 Module, a cloud platform (e.g., AWS, Azure, Google Cloud) for data storage, analysis, and deployment of the machine learning model. Implement an alerting system that can notify users and healthcare professionals when the model predicts a high risk of cardiovascular disease. To ensure robustness and accuracy, the system needs to deploy the machine learning model on the cloud platform so that it can make real-time predictions based on incoming data. Regularly update and improve the model as more data becomes available and research advances in cardiovascular disease prediction and Collecting the feedback from users to improve the user interface and enhance the system's usability. Once Experiments are carried out on healthy volunteers in order to verify the reliability of the entire system. Experimental results reveal that the proposed system is reliable in collecting and displaying real-time ECG data, which can aid in the primary diagnosis of certain heart diseases. The making of such system involves expertise in IoT, machine learning, data engineering, and cloud computing. Additionally, it's crucial to collaborate with healthcare professionals to ensure the model's accuracy and its compliance with medical standards. Data privacy and security should be a top priority throughout the development and deployment process. Creating a methodology for an IoT cloud-based cardiovascular disease predictor using machine learning involves a structured approach that encompasses various phases, tasks, and considerations.



Keywords – ECG, IoT, HTTP, MQTT, Cloud.

