Enhancing Senior Wellness: Monitoring and Managing Heart Health with IoT-Powered Healthcare Solutions for the Elderly

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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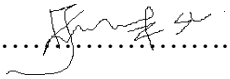
DECLARATION

This is to certify that the work is entirely my own and not that of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

Sign: ……  …….....

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ABSTRACT

The development of technology across all spheres of society has led to a waste of elders' desire for efficient management and monitoring of their cardiac health. IoT is a significant and helpful technology that helps to address the issues that seniors experience on a daily basis. This project includes continuously monitoring the elderly to detect heart problems early and treat them, giving doctors and caregivers access to the elderly's status and information to provide real-time alarms, developing a system for routinely monitoring the elderly with automated reminders, and safeguarding the elderly's sensitive information.

Building an Internet of Things (IoT)-based heart health monitoring system that incorporates machine learning for predictive analysis is the system's main objective, according to the statement. ESP 32 microcontroller, which helps to gather data from a variety of sensors, the MPU 6050 Accelerometer, the Gyroscope, and the DHT11 sensor, which helps to measure temperature and humidity. The HW-827 is also used to monitor the elders' heart rates, and the GPS and sensor data are sent to the fire base for real-time database storage and further analysis.

Additionally, it is crucial to identify the unusual health status of the elderly in this system. The data is processed by a machine learning model, and the system employs a random classifier machine learning model to detect abnormalities based on past sensor readings. Additionally, the random forest model aids in identifying anomalous patterns in elders by using the labeled data for training. Additionally, this uses GPS data to provide location-based contexts, which aids in providing senior location-based info in an emergency. Additionally, a mobile application that uses the Flask API to retrieve the processed data and predictions from the machine learning model is used to offer real-time notifications and location-based alerts when any possible health risks are identified.

In addition to improving safety and response capabilities in healthcare and elder personality monitoring applications, this project intends to showcase the possibilities of IoT and machine learning in real-time assistance and environmental monitoring.

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TABLE OF CONTENTS

List of Figures

List of Tables