

## ABSTRACT

*This study aims to develop a blood pressure monitoring system based on the Internet of Things (IoT) and Machine Learning (ML) designed to improve accuracy and efficiency in monitoring cardiovascular health. Blood pressure is a vital parameter that needs to be monitored regularly to prevent the risk of serious diseases such as stroke, heart disease, and kidney failure. In this study, a digital tensiometer is integrated with IoT technology, allowing real-time blood pressure measurements that can be accessed via a smartphone or website. The collected data is then analyzed using a Machine Learning algorithm, specifically Random Forest, to predict future blood pressure based on historical data and other related parameters such as age and gender.*

*The developed prediction model is trained using a blood pressure dataset that has been adjusted for various parameters. Testing is carried out by dividing the data into 80% for training and 20% for testing. The test results show that this system is able to produce predictions with a high level of accuracy, as evidenced by the Mean Squared Error (MSE) value of 38.46 and the Root Mean Squared Error (RMSE) of 6.2. In addition, the R-squared ( $R^2$ ) value reached 0.78, indicating that this model is able to explain 78% of the data variability, indicating that the system has a fairly high reliability in predicting blood pressure based on the data obtained.*

*Overall, this IoT and Machine Learning-based blood pressure monitoring system offers an innovative solution in managing cardiovascular health, both for patients and medical personnel. This system not only facilitates regular blood pressure monitoring more easily and accurately, but also provides predictive capabilities that can assist in medical decision making. Thus, the application of this technology is expected to make a significant contribution to improving the quality of health services and assisting in more effective prevention of cardiovascular disease.*

*Keywords: Internet of Things, Machine Learning, Blood Pressure, Random Forest, Monitoring, Mean Squared Error.*