HEALTH STATUS ASSESSMENT IN REMOTE PATIENT MONITORING SYSTEMS USING HYBRID MACHINE LEARNING

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ABSTRACT

In the healthcare sector, the field of remote patient monitoring and telemedicine is expanding and being developed quickly, giving healthcare professionals a tool to remotely monitor patient health data however most machine learning models utilized to generate patient status warnings are inefficient and have issues with performance, which are two drawbacks of the existing approaches used for assessing patient health status in remote patient monitoring systems.

In the past, remote patient monitoring systems that monitor vital signs have not used hybrid machine learning models for health status assessments. The author has decided to implement a novel hybrid machine learning model to perform health status assessments on the patient's vital signs because hybrid models have an excellent track record of handling similar challenges. The author also implements a vital sign forecasting model in order to use the forecasted vitals on the hybrid model to forecast the future health status of the patient as well.

The author was able to experiment and develop a hybrid health status assessment model where the evaluation metric results were a classification **accuracy** of **94%** gained utilizing the prototype model for hybrid health status assessment. The **precision** and **recall scores**, which are **96%** and **97%** respectively with an **F1 score** of **96%**. **Cohen's kappa score** was also generated showcasing a result of **91.3%** for the hybrid model. For the vital sign forecasting model developed, the author received results of an **MAE score** of **0.11%** and an **RMSE score** of **0.03%** when tested on the dataset which showcased satisfactory improvement gained.

Keywords: Remote Patient Monitoring, Hybrid Machine Learning, Health Status Assessments, Vital Signs, Telehealth, Vital Sign Forecasting

Subject Descriptors:

- Computing methodologies — Machine learning
- Applied computing — Life and medical sciences — Health informatics.
- Computing methodologies — Machine learning — Machine learning algorithms
- Applied computing — Life and medical sciences — Consumer health.