

## Enhance Maternal Health Outcomes with Personalized Pregnancy Management Systems: A Technology-Driven Approach

DHDP Thathsarani<sup>1#</sup>, DU Vidanagama<sup>2</sup>, and RPS Kathriarachchi<sup>3</sup>

<sup>1,2,3</sup>Department of Information Technology, Faculty of Computing, General Sir John Kotelawala Defence University

<sup>#</sup>39-bit-0010@kdu.ac.lk

### Abstract

Personalized Pregnancy Management Systems (PPMS) enhance maternal healthcare by leveraging wearable devices and Artificial Intelligence. However, a critical research gap exists due to the limited data availability from pregnant women using wearable devices, impacting system reliability. The study aims to evaluate the effectiveness of Personalized Pregnancy Management Systems (PPMS) in improving maternal health and explores enhancements through advanced technologies. Clinical Decision Support System (CDSS), which assist healthcare providers in decision-making, while Long Short-Term Memory (LSTM) networks, designed to analyse time-sequenced health data, form the core of the proposed approach. The project adopts a structured approach that integrates LSTM networks for time-series data prediction with CDSS for providing actionable insights. This hybrid approach enables PPMS on timely warnings for midwives based on wearable device data. The findings demonstrate that, while PPMS has significant potential for early danger detection and individualized care, the system's performance could be further enhanced by addressing the current limitations with more extensive wearable device datasets. In summary, the study underscores the need for more robust data techniques and flexible algorithms to optimize PPMS and ensuring reliable, individualized treatment to pregnant women across diverse settings.

**Keywords:** *Maternal health, Artificial Intelligence, Machine learning, Pregnancy Management System, mHealth application and wearable sensors*