

ABSTRACT

Maternal mortality remains high in rural areas due to limited access to maternal healthcare services and the lack of data-driven support in childbirth decision-making. This study aims to develop a delivery method prediction feature using the Random Forest algorithm with an Explainable Artificial Intelligence (XAI) approach, implemented in the SEHATI mobile application for pregnant women in rural areas of Bandung Regency. The feature was developed using the Extreme Programming (XP) methodology and trained on encoded medical record data through a process of validation and evaluation. The model evaluation using a Classification Report showed an accuracy of 95%, with a precision of 0.97 and recall of 0.95 for the normal delivery class, and a precision of 0.92 and recall of 0.96 for the caesarean class. In addition, the results of 5-Fold Cross-Validation indicated an accuracy range between 0.82 and 0.93, with an average accuracy of 0.91 and a standard deviation of ± 0.05 . These results demonstrate that the model performs consistently and reliably across various data splits. The prediction feature was implemented into a mobile application built with Flutter and Laravel and tested through User Acceptance Testing (UAT), achieving an acceptance rate of 93.56% from pregnant women and 99% from midwives. This study confirms that the use of explainable AI in clinical prediction systems can enhance maternal health literacy, support more accurate clinical decision-making, and assist healthcare providers in delivering timely and accountable medical services, especially in resource-limited rural areas.

Keywords: Childbirth Prediction, Explainable Artificial Intelligence, Machine learning, Maternal Health, Random Forest