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“Diabetor”

Diabetes Predictor based on Federated Learning Approach

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Abstract

Diabetes mellitus is a chronic disease which has victimized millions of people around the world. Due to the significance and increasing number of diabetes patients over the past years, a classifier to detect diabetes with an optimal cost and an improved performance has become a need. Under this circumstance mHealth (mobile health) applications play a major role. Similarly, as to diagnose diabetes, nowadays many decision support systems are available which consume different techniques and approaches to detect diabetes. Although they claim to offer numerous personalized resolutions and cost-effective health promotion; it has been declared that they do pose an unseen and a dangerous risk towards the user by consuming user sensitive data.

Therefore, the author introduced the proposed solution ‘Diabetor’ - Cross-Platform Diabetes Predictor using Federated Learning Approach. For this, extensive research was conducted regarding privacy risks related to mHealth applications. As well as the utilization of privacy preservation deep learning techniques such as Federated Learning to optimize the privacy of user sensitive health data when predicting diabetes. A comprehensive literature search, technological analysis and a data flow process has been presented regarding this process. The process has been streamlined with the use of Feedforward ANN built with PyTorch library and SMC to encrypt the data on training and inference stages.

Finally, after the development and testing phases of the prototype, the author successfully had the solution evaluated by expert and non-expert evaluators that provided their feedback on the application and regarded it as a timely and useful solution.

Key words: Diabetes mellitus, Federated Learning, Prediction, Distributed Learning, predictive model, Privacy preservation, Machine Learning