AY 2024-25 **MINI PROJECT-1** **B-21**

Personalized Insulin Dose Prediction Using Ensemble Techniques

Abstract:

Precise insulin dosing is paramount in diabetes management, ensuring stable blood glucose levels and preventing debilitating complications. This research explores a deep learning-driven approach to automate insulin dose prediction, addressing the inherent complexities of personalized treatment. Utilizing a hybrid Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) model, the system aims to capture intricate temporal dependencies within patient data, thereby enhancing forecasting accuracy. The model's performance is evaluated using the AIM94 dataset, a rich repository containing critical patient information, including blood glucose measurements, meal ingestion, exercise activity, and special events. To optimize model input and improve predictive power, feature selection algorithms are employed. This process effectively reduces data dimensionality, eliminating redundant features while preserving essential predictive information. Recognizing the cyclical nature of time-dependent features, cyclic transformations are applied to represent these patterns accurately, enabling the model to better understand the impact of time on blood glucose levels. Integrating sequential modeling, optimized feature selection, and cyclic feature transformation, this methodology provides a robust and efficient solution for personalized insulin dose prediction. This innovation supports the development of sophisticated automated diabetes management systems, potentially alleviating the burden of manual insulin adjustments and significantly improving the quality of life for individuals living with diabetes.

1. Student signature

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Guide Signature