Patient-Centered Mobile Application for Comprehensive Diabetes Self-Management and Optimization

INTRODUCTION

This project introduces a patient-centered mobile app to support diabetes self-management through AI-driven insulin prediction, glycemic event forecasting, side effect alerts, and personalized meal plans. It aims to improve care by combining machine learning, real-time data, and user-friendly design for better health outcomes.

ACKNOWLEDGEMENT

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METHODOLOGY

The methodology involved collecting patient health profiles and dietary data under medical supervision, followed by data cleaning and preprocessing to ensure quality inputs for machine learning. Various models were trained for different components, including CatBoost for meal recommendations, LSTM for side effect prediction, and GRU for glycemic event forecasting. A mobile application was developed using React Native with Expo, and backend services were created using Flask or Node.js to connect the app with cloud-hosted ML models. The system was evaluated using classification reports, confusion matrices, and time-series validation to ensure accuracy. All components were integrated into a single mobile platform to support real-time, personalized diabetes self-management.

RESEARCH PROBLEM

Current diabetes apps lack real-time personalization and integration. They often provide generic advice without considering individual needs. This research aims to fill that gap by developing an AI-powered mobile app that combines insulin prediction, glycemic alerts, side effect monitoring, and personalized meal planning in one platform.

CONCLUSION

This research successfully developed a patient-centered mobile application to support comprehensive diabetes self-management through AI-powered features. By integrating machine learning models for insulin prediction, glycemic event forecasting, side effect alerts, and personalized meal planning, the system offers a holistic and adaptive solution for diabetic care. The app demonstrates how technology can empower patients with real-time, personalized guidance, ultimately aiming to improve health outcomes and reduce the burden on healthcare systems. Future enhancements will focus on wearable integration, user feedback features, and broader clinical validation.

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