

University of Derby
Discipline of Computing and Mathematics

7CS997 Independent Studies Supervision Agreement Form 2024/25 Academic Year

By submitting this form, I select the project

Working Title:

Early Prediction of Diabetic Complications Using Multi-Modal Deep Learning

(Student Name: James Oluwafemi Adeshina; Student ID: 100752659)

Brief description

This study aims to investigate the application of large artificial intelligence models in identifying patients at higher risk of diabetes-related complications at an earlier stage. It will leverage features from large-scale datasets—such as age, BMI, blood pressure, and glucose levels—to predict individual risk levels. The system will utilize TabTransformer and dense neural network models for analysing tabular data, while recurrent neural networks (e.g., LSTMs) will be applied to capture temporal patterns. The integration of language models will support natural language generation to enhance understanding and visualization of key risk factors for human interpretation. Additionally, explainability will be explored using the SHAP technique. The system will be developed through an interactive Streamlit interface, with a design that enables the seamless integration of unstructured data modalities such as clinical notes, medical imaging, and conversational interfaces.

I confirm that I have discussed the project with my supervisor and that I understand the general focus and activity required which will be refined over the next few weeks in terms of concrete focus and aims and objectives. My supervisor has agreed to supervise me on this project.

James Oluwafemi Adeshina

Oluwarotimi W. Samuel

Student Name

Supervisor Name



Student Signature

Supervisor Signature

8th April 2025

8th April 2025

Date

Date