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**

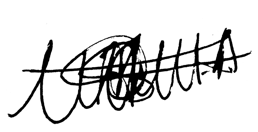
This study aims to investigate the application of large artificial intelligence models in identifying patients at higher risk of diabetes-related problems at an earlier stage. It takes advantage of the features of large-scale data sets with age, BMI, blood pressure, and glucose levels to predict the risk of each individual. The system uses the TabTransformer and dense neural network model for the analysis of tabular data, and recurrent neural networks such as LSTMs are applied to the temporal dimension. The incorporation of language models helps in producing natural language, to best understand, and visualizing factors for human interpretation. Furthermore, understanding comes from attributions that are based on SHAP. The system is delivered through an interactive Streamlit interface. It is containerized with Docker, and MLflow which is a monitoring tool is also implemented. The design of the system is for the subsequent integration of unstructured modalities like 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 XXXXXXXXXXXXXXXX

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Student Name Supervisor Name



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Student Signature Supervisor Signature

8th April 2025 XXXXXXXXXXXXXXX

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Date Date