INFORMATICS INSTITUTE OF TECHNOLOGY

In Collaboration with

UNIVERSITY OF WESTMINSTER

Advancing Resume Grading Systems with NLP and Explainable AI

A Dissertation by

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Submitted in partial fulfilment of the requirements for the BEng (Hons) Software Engineering degree at the University of Westminster.

1st April 2025

ABSTRACT

Traditional resume analysing systems rely heavily on keyword matching and rigid formats, which can lead to qualified candidates being overlooked if they don't conform to the system's format. Additionally, these systems often function as "black boxes," providing a final score without any transparency in the decision-making process. This lack of explainability can lead to biases in candidate evaluations, raising concerns about fairness and accuracy. To address these issues, this project introduces a more transparent, section-based resume scoring system.

A hybrid model which integrates Named Entity Recognition, transformer neural networks, and a point-based scoring system was developed. It provides granular evaluations of each resume section. Using Explainable AI (XAI) techniques, the system provides insight into how each section's score is calculated, promoting trust and accountability. The approach also allows recruiters to adjust evaluation criteria, enhancing flexibility

The initial Named Entity Recognition (NER) model showed significant results, with an F1 score of 86.84%, a recall of 88.24%, and a precision of 85.48%. Similarly, the transformer regression model demonstrated strong performance, with an R-squared value of 0.896428, a Mean Squared Error (MSE) of 0.194837 and a Mean Absolute Error (MAE) of 0.312830. These results indicate the effectiveness of the models and their potential for further improvement

Subject descriptors:

- Information systems -> Information retrieval -> Document representation -> Content analysis and feature selection
- Computing methodologies -> Machine learning -> Machine learning approach -> Classification and regression trees
- Computing methodologies -> Machine learning -> Machine learning approach -> Neural networks

Keywords: Resume scoring, Explainable AI, Named Entity Recognition (NER), Neural Networks, Regression, Transformers, Granular scoring, Point-based system, Machine learning, Recruitment, Human resources.