EÖTVÖS LORÁND UNIVERSITY
FACULTY OF INFORMATICS

Thesis Topic Registration Form

Student's Data:
    Student's Name: Alfarizy Alfarizy
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Educational Information:
    Training programme: Computer Science BSc

I have an internal supervisor

Internal Supervisor's Name: *Gregory Morse*
    Supervisor's Home Institution: **Department of Programming Languages and Compilers**
    Address of Supervisor's Home Institution: **1117, Budapest, Pázmány Péter sétány 1/C.**
    Supervisor's Position and Degree: *Teaching Assistant, MSc in Computer Science*

Thesis Title: Gender Bias Mitigation in Resume and Job Description Matching Systems Using Explainable AI

Topic of the Thesis:
(Upon consulting with your supervisor, give a 150-300-word-long synopsis os your planned thesis.)

The use of automated systems in recruitment has raised concerns about any potential biases the system might carry as companies seek efficiency, particularly in resume or CV screening. This thesis aims to develop an AI-driven system that addresses gender bias in automated recruitment processes, focusing on technical solutions that enhance fairness and transparency.

The system will include a user-friendly frontend interface for uploading resumes and job descriptions in multiple formats. The backend will leverage a fine-tuned NLP model on a custom dataset based on the Transformer architecture, designed to understand a word's context to process and match resumes with job descriptions. The model will perform text parsing, tokenization, and vectorization, transforming the input into structured data, which will be optimized to accurately assess candidate suitability based on skills, qualifications, and experience. A scalable NoSQL database will securely store candidates' data, resumes, job descriptions, and match scores.

The bias detection module will use AI fairness tools employing pre-processing (adjusting the input data), in-processing (modifying the model's learning), and post-processing (adjusting the model outputs) techniques to identify and mitigate gender bias in the candidate selection process. An explainability tool will be integrated to provide detailed insights into the model's decision-making process, highlighting which factors influenced the recommendations. The dashboard will display these results interactively, allowing users to filter and explore bias detection outcomes and match strength, ensuring transparency.

The system will also feature custom application forms that companies can share with candidates. The resumes submitted via these forms will automatically be sent to the dashboard for screening and bias detection.

The thesis will explore how explainable AI (XAI) can enhance transparency in recruitment while ensuring ethical and unbiased candidate evaluation and how such systems can contribute to building fairer hiring practices across industries.

Budapest, 2024. 10. 15.