Master Research Proposal

Topic: Enhancing Recruitment Processes through AI-Powered chatbots: A Study on User Experience, Skill Validation, and Process Efficiency

One of the main challenges for companies is finding enough skilled workers [1]. For this reason, well-designed application processes are needed [2]. It is important for the recruiter to be able to assess the soft and hard skills of the candidate, so a recruitment process should provide as much information as possible to assess this. The most important documents in the recruitment process are the Curriculum Vitae (CV) and cover letters, as they give a good first impression of the candidate's skills and motivation. Recruiters screen potential candidates and invite the most promising to either a first interview or some tests [3]. When and how these tests are integrated into the recruitment process is determined by the recruitment strategy of the hiring company.

Some companies are trying to integrate online assessment centres into their application process in order to get more information about the candidate before the first interview. These online assessment centres can, for example, include personality tests or skills tests. According to a study by Jansson, Millennials have certain expectations of the recruitment process and online assessments. In addition to continuous and efficient communication with the candidate, candidates value feedback on their performance in online assessments [4]. In particular, Millennials prefer online assessments where they feel they can influence the outcome of the recruitment process [4].

In recent years, chatbots have experienced a huge rise in popularity for various applications. Since the advance of generative Artificial Intelligence (AI) and Large-Language Models (LLM), the quality of chatbots has improved drastically, and so have their possible applications. Before this major improvement, the capabilities and use-cases of chatbots were quite limited, as they struggled to understand the user and could only answer pre-trained questions [5]. These question-answer patterns have to be generated manually and fed into the chatbot dialogue system, which is a time-consuming process. With the implementation of LLMs, chatbots can now understand the user better and provide human-like responses, as LLMs are trained only for the task of generating human-like output based on human input, such as chat [6]. Many applications of chatbots are currently being explored, for recruitment purposes chatbots can be interesting as they provide an easy communication channel between candidates and recruiters. A conversation with a chatbot is a very easy way of engaging with the applicant as the applicant can conduct the chat basically everywhere and at any time. Other online assessment solutions like asynchronous video interviews or logic tests might need a quiet environment or mental focus over extended periods of time. For that reason, the convenience of chatbots in the application process should be evaluated.

The proposed thesis will explore the potential use of AI and LLM-powered chatbots to solve major challenges in recruitment. A new application process will be proposed that combines chatbots with AI-powered CV screening. This process will be implemented to validate the skills and knowledge of the applicant. In the new application process, applicants' documents will be screened by an AI. Personalised background questions are then generated. These questions will either validate the skills listed in the CV and required for the job. They can also aim to find out how the candidate will fit into the team. These questions are then posed to the candidate via an LLM-powered chatbot. Once all the questions have been answered, all the information from the chat and the initial sources is made available to the recruiters for further screening.

The research questions that should be answered during this thesis are:

- What is the current state of the art in chatbot technology and its applications, including the use of LLMs and the usage of chatbots for recruiting purposes?

- What (measurable) effects do online assessments have on the the quality of hires?

- How can chatbots affect the user experience and efficiency in an application process

In the light of that objective, this work consists of the following parts:

- Literature research about the technological background of chatbots, assessment centres and online assessment tools, the application of AI in recruiting and an overview over different application processes

- Development of a chatbot to investigate how the user-experience changes within the newly proposed application process. The chatbot should be able to ask questions related to the applied thesis topics.

- Conduct a user study in an application process using the developed chatbot. The user study will be carried out among students who apply for thesis topics at the MaD-Lab. In addition, the impact on the people who evaluate the applications will be investigated. The study should include 50 individual applicants. The study will be evaluating the acceptance of chatbots for the applicants in the MaD-Lab recruiting process compared to the old process. In addition, other forms of online assessments like asynchronous video interviews or questionnaires may be included in the study as control groups.

The thesis must contain a detailed description of all developed and used algorithms as well as a profound result evaluation and discussion. The implemented code has to be documented and provided. An extended research on literature, existing patents and related work in the corresponding areas has to be performed.

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Start − End:	01.01.2024 – 1.07.2024

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[4] Kaisu Jansson. Online Recruitment and Millenials: Recruitment communication and online assessment.

[5] Jasper Feine, Stefan Morana, and Alexander Maedche. Designing Interactive Chatbot Development Systems. 2020.

[6] Muhammad Usman Hadi, Qasem Al Tashi, Rizwan Qureshi, Abbas Shah, Amgad Muneer, Muhammad Irfan, Anas Zafar, Muhammad Bilal Shaikh, Naveed Akhtar, Jia Wu, and Seyedali Mirjalili. Large Language Models: A Comprehensive Survey of its Applications, Challenges, Limitations, and Future Prospects, September 2023.