Thesis Project Portfolio

Using Graph-Based Learning to Create Conversational Intelligence Platforms

(Technical Report)

Social Influences on Deepfake Advancement and Regulation in the Political Sphere

(STS Research Paper)

An Undergraduate Thesis

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Executive Summary

Technology has had a large impact on the way we communicate, and the way information is spread. Oftentimes, this information can be too complex to understand, hard to access or unimportant and unengaging. One approach to mitigate this includes supplemental technology, such as ChatBots. The technical research report touches on the use of ChatBots to allow employees to better access company information on projects or other peers to facilitate their work. Another approach is through easily digestible and curated social media content. This approach can be tainted by malicious users who can deploy fake information - DeepFakes - which the STS research paper details. While these are two very different approaches to processing information, both provide users with easily digestible information.

The technical research report delves into creating a Conversational Intelligence Platform, or ChatBot, for the purpose of connecting employees in a company to other sources of help internally, hindering the leveraging of existing frameworks or projects. The lack of advanced search systems and overflow of information can make it difficult to find the right resource or an available coworker. To facilitate this inter team collaboration, a ChatBot will be created to simulate conversation with coworkers. The data was collected via employee project surveys and project and employee information on the internal database site. The Chatbot was made using Azure Bot Framework, NLP techniques, and a graph-based relational database of employee data.

While trained on relatively low data, the Chatbot surpassed expectations and was able to deliver promising results in recommending employee information, previous projects, and other data scraped from the company's internal news site. Coworkers express positive remarks about the recommendation and ease at finding an expert in the queried area. In the cases where the query returns non-optimal connections, such as someone who has co-authored a paper but is not the queried domain expert or misunderstanding the topic, the user is able to request other

answers, serving to train and improve the model for future iterations. There are limitations to consider, such as the use of privacy and classified information, a lack of participation in data collection and cursory/unstandardized project information.

The STS research paper deals with Deepfakes, synthetic pieces of media, and their impact on the political sphere in the wake of the 2024 United States Presidential Election. There are rising concerns in public mistrust in visual social media, rapidly growing accuracies in Deepfakes, governmental corruption, and upheaval of national democracy. This paper will analyze real-world examples of Deepfakes in the political field, potential risks of their rising concern in society and current and proposed. regulatory responses. Through this, we can propose strategies for mitigating the harmful effects of Deepfakes while preserving the integrity of democratic processes and public trust.

Studies find that the less political knowledge and digital literacy a person has, the less likely they are to be able to identify a DeepFake and other sources of misinformation. Other studies call attention to the rapid growth of DeepFake accuracies, and their increasing prevalence in social media. Another study touches on impacts of DeepFakes at critical moments, and the judgment of a candidate's character. Regulations in DeepFake navigate a narrow boundary. Anti-regulators bring up infringement of public speech rights and difficulty of accountability. Pro-regulators argue about illegal impersonation of a candidate or using private data to create the technologies. Ultimately, Deepfakes have, and will continue, to play a huge role in political elections from a variety of factors.