

COMP47250 - TEAM SOFTWARE PROJECT
PITCHES



UCD SCHOOL OF COMPUTER SCIENCE

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Authors:

1 Sentiment Analysis For Fake News Detection (Choice 1)

Motivation Misinformation and disinformation are pervasive in the modern digital era. Fake news deceives people at an ever increasing rate[1]. For example, people often fall victim to scammers who spread fake information, causing panic among the public. As a result, individuals may lose money or suffer negative mental health consequences. Therefore, it is crucial to combat disinformation and assist individuals in distinguishing between genuine news and fake news. Knowledge empowers people, and information serves as the gateway to knowledge. Without accurate information, individuals may feel paralyzed, unsure of what to believe and what not to believe. This can be disruptive during normal times and have severe consequences in situations where urgent action is necessary. Our team is eager to develop a user friendly sentiment based news detection system that identifies the credibility of a news article or tweet. This system has the ability to aid in the fight against propaganda or bias of a news article. Our motive is for information to be freely and widely available to all, while maintaining the integrity of said information.

Objective The objective of a fake news detection system is to identify and classify information as either genuine or fake. We will do this by availing of sentiment analysis. Sentiment analysis entails extracting emotions, opinions, and attitudes from a piece of text to determine its overall sentiment. By applying sentiment analysis techniques on news articles, it is possible to tell whether a news article is authentic or fabricated. The underlying assumption is that fake news articles often employ emotional cues that differ from genuine news [2]. Sometimes news can be real yet still have extreme emotion in it. This can be used to identify behavioral patterns and emotional responses [3].

Developmental Approach The Frontend developers will create a user-friendly interface which gets integrated to the backend process, while our NLP analyst and ML engineer will design the sentiment analysis model architecture . Our development plan is to leverage pre-defined models like BERT. Including BERT in our approach strengthens our sentiment analysis capabilities, allowing us to detect fake news more accurately and effectively.

About Our Team: We will make use of AGILE software development methodologies. This will allow us to adapt and refine requirements dynamically as necessary . The team comprises of two front-end developers, a Machine Learning (ML) engineer/ NLP analyst, a data analyst, backend developer and a tester. The front-end engineers will build a seamless user interface. This will allow users to interact with our fake news detection system. The ML engineers will create a sentiment based fake news detection model. They will test and train multiple models and analyse each model's performance. The backend developer will develop the necessary APIs and infrastructure to integrate the frontend with the sentiment analysis model. Our team has a dedicated tester to ensure the quality and reliability of our system. The data analyst collects data from a reliable source and pre-processes said data performs the transformation and scaling of the data for modelling.

With the diverse expertise of our team, we are confident in our ability to successfully tackle the challenge of fake news detection using sentiment analysis.

2 Generative AI and Large Language Models (Choice 2)

Generative Artificial intelligence systems have rapidly increased in popularity. ChatGPT currently has the fastest growing user base of any application [1]. Large language models have the ability to enhance our lives and increase productivity [2].

Motivation Our motivation is to contribute to the advancement of generative AI and ultimately improve the lives of those who avail of it as well as those who don't. Our group has witnessed first hand how AI models can increase productivity and aid in learning. We admire the vision of OpenAI, to develop artificial general intelligence in a controlled and responsible manner, where it is available to all [3]. Generative AI is a rapidly growing and innovative field. Our group is eager to learn more about generative AI. We plan to create a small scale generative neural language model in a specialised domain. This model has a higher chance to outperform a no specialised generative AI [4].

Objective Our goal is to create an AI system in a controlled manner with as little bias in the training set as possible. It is paramount that large language models are built in a responsible manner so that they avoid becoming biased and or insensitive. The benefits of generative AI are vast. We will put emphasis on testing the various stages of the development cycle. We will refine the product based on the tester's feedback. By iteratively evaluating and retraining the model using a semi-supervised learning approach, the fine tuned model will fulfill our goals.

Developmental Approach Our developmental approach is focused on the principles of responsible AI development. We understand the importance of creating a model that is sensitive to the nuances of human interaction and are determined to ensure that our AI system is developed in a controlled, responsible, and universally accessible manner. By continuously assessing and refining our model, we aim to ensure that its performance aligns with our objectives and contributes to the advancement of generative AI.

About Our Team: We will make use of AGILE software development methodologies. This will allow us to adapt and refine requirements dynamically as necessary. The team comprises of two front-end developers, two Machine Learning (ML) engineers, a data analyst and a tester. The creation of an appealing and simple user interface for our system using generative AI and large language models will be greatly aided by the front-end developers. They will guarantee smooth user-generated content engagement. The ML engineers will focus on creating complex models for producing AI-driven content. They will rigorously evaluate each model's performance once they have been trained and tested extensively in order to improve the accuracy and coherence of the output. Our data analyst will be accountable for gathering and preparing pertinent data from dependable sources. They will guarantee that the models have access to reliable and high-quality data for training and fine-tuning. Our devoted tester will carefully evaluate the system's usability, reliability, and performance to uphold the highest standards.

3 Exploring Quantum Machine Learning (Choice 3)

Motivation Our motivation is to contribute to the advancement of Quantum Machine Learning. It is a new and rapidly advancing field, and it has enormous potential to solve complex problems and unlock unprecedented opportunities across various industries.

Objective The end application aims to compare the potential of quantum computers for machine learning tasks, benchmarking quantum models against classical Machine Learning algorithms. The infrastructure will facilitate meaningful comparisons among classical, simulated quantum, and deployed quantum approaches across different architectures. The end application will develop an interactive user interface or dashboard to visualize and present findings, and automate training and testing of different machine learning models. The results will be stored persistently, enabling efficient analysis and comparison. By achieving these objectives, the end application contributes to advancing the field of quantum machine learning and provides a foundation for further exploration and research in this domain. By iteratively evaluating and retraining the model using a semi-supervised learning approach, the fine tuned model will fulfill our goals.

Developmental Approach We plan to implement a divide and conquer strategy, where one part of the team will create the model using traditional machine learning techniques, while the other part will utilize quantum machine learning techniques. Simultaneously, the front-end developers, the back-end developers, the Data Scientist, Machine Learning Engineer and tester will do their respective parts throughout the software development life cycle.

About Our Team: We will make use of AGILE software development methodologies. This will allow us to adapt and refine requirements dynamically as necessary. The team comprises of two front-end developers, two Machine Learning (ML) engineers, a data analyst and a tester. The creation of an appealing and simple user interface for our system using generative AI and large language models will be greatly aided by the front-end developers. They will guarantee smooth user-generated content engagement. The ML engineers will focus on creating complex models for producing AI-driven content. They will rigorously evaluate each model's performance once they have been trained and tested extensively in order to improve the accuracy and coherence of the output. Our data analyst will be accountable for gathering and preparing pertinent data from dependable sources. They will guarantee that the models have access to reliable and high-quality data for training and fine-tuning. Our devoted tester will carefully evaluate the system's usability, reliability, and performance to uphold the highest standards.

References for Choice 1

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References for Choice 2

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