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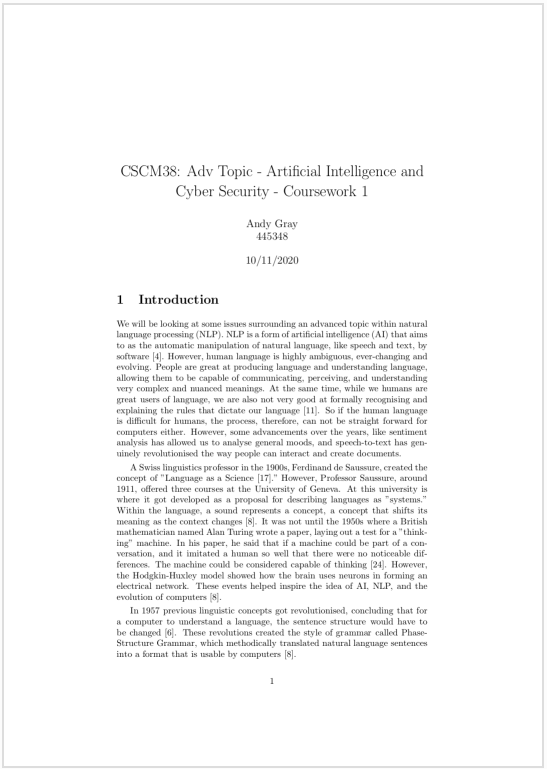

CSCM38: Adv Topic - Artificial Intelligence and Cyber Security - Coursework 1

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1 Introduction

We will be looking at some issues surrounding an advanced topic within natural language processing (NLP). NLP is a form of artificial intelligence (AI) that aims to as the automatic manipulation of natural language, like speech and text, by software [4]. However, human language is highly ambiguous, ever-changing and evolving. People are great at producing language and understanding language, allowing them to be capable of communicating, perceiving, and understanding very complex and nuanced meanings. At the same time, while we humans are great users of language, we are also not very good at formally recognising and explaining the rules that dictate our language [11]. So if the human language is difficult for humans, the process, therefore, can not be straight forward for computers either. However, some advancements over the years, like sentiment analysis has allowed us to analyse general moods, and speech-to-text has genuinely revolutionised the way people can interact and create documents.

A Swiss linguistics professor in the 1900s, Ferdinand de Saussure, created the concept of "Language as a Science [17]." However, Professor Saussure, around 1911, offered three courses at the University of Geneva. At this university is where it got developed as a proposal for describing languages as "systems." Within the language, a sound represents a concept, a concept that shifts its meaning as the context changes [8]. It was not until the 1950s where a British mathematician named Alan Turing wrote a paper, laying out a test for a "thinking" machine. In his paper, he said that if a machine could be part of a conversation, and it imitated a human so well that there were no noticeable differences. The machine could be considered capable of thinking [24]. However, the Hodgkin-Huxley model showed how the brain uses neurons in forming an electrical network. These events helped inspire the idea of AI, NLP, and the evolution of computers [8].

In 1957 previous linguistic concepts got revolutionised, concluding that for a computer to understand a language, the sentence structure would have to be changed [6]. These revolutions created the style of grammar called Phase-Structure Grammar, which methodically translated natural language sentences into a format that is usable by computers [8].

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