MSc eng. Katarzyna Baraniak   Warsaw, 16.06.2023
Department of Fundamentals of Artificial Intelligence

Summary of the doctoral dissertation

This doctoral dissertation presents machine learning techniques supporting the analysis of textual bias in online news media. Due to the amount of information that is created by online news portals, it may be difficult to follow current events. The ordinary reader is exposed to many intentional or unintentional forms of manipulation. Therefore, it is necessary to create such tools that would support the distinction between objective and biased content.

The work consists of 3 parts and 6 chapters. The first part contains 3 chapters. The first chapter is the introduction describing the aim, motivation, content of the work, main achievements and tools. The second chapter provides a review of the literature. Chapter 3 describes the most important machine learning algorithms that can be used to analyze text in the context of media bias.

The second part contains experiments. This part contains 3 chapters. Chapter 4 describes auxiliary experiments for visibility and agenda bias detection. The first section of chapter 4 refers to the detection of entity occurrences over time and their association with events. The second section refers to the detection of articles that cover the same topic. In addition, article source detection is presented.

Chapter 5 presents the main experiments of the thesis for detecting an entity's sentiment in news articles. A bilingual dataset SEN was created for detecting the sentiment of entities in the headlines of news articles. Multiple experiments and models of neural networks based on large language models were described. Other datasets were also used in the experiments for comparison. The created models of neural networks were compared with other state-of-the-art neural networks. It has been shown that in most cases, i.e. variants of data sets, our models achieve better results, and in other cases, comparable results.
In addition, it was discovered that the models, learning to detect sentiment, become biased towards some entities. Several solutions to the problem were proposed, some of which have improved the network's performance.

Chapter 6 contains additional experiments for detecting manipulation techniques in news article paragraphs. A multi-task hierarchical neural network based on large language models was created. The network was tested on several languages and it performed better than the baseline model. The solution took part in the prestigious Semeval23 competition.

The third part of the work is a summary of the dissertation.