# Chapter 4
# A Comparative Study on the Evaluation of ChatGPT and BERT in the Development of Text Classification Systems

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## ABSTRACT

*A lot of progress has been made in Natural Language Processing (NLP) recently. With the release of powerful new models like BERT and GPT-4, it is now feasible to build high-level applications that could understand and interact with languages. Text classification is one of the ground-level operations of NLP. There are a plethora of uses for this field, such as sentiment analysis and creating chatbots to respond to user inquiries. In Natural Language Processing (NLP), transformer-based models have recently become the de facto norm due to their outstanding performance on various benchmarks. Using a battery of categorical text classification tasks, this study probes the architecture and behavior of the GPT-4 and BERT language models in different contexts. Examining the GPT-4 and BERT language models in different contexts, this study tests them on various categorical concerns to learn about their architecture and performance.*

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## I. INTRODUCTION

Among the earliest challenges in NLP is text categorization. Assigning predetermined labels to a body of literature is the end objective. Research into text classification has recently seen a rise in interest due to the proliferation of online academic libraries, social media, blogging, and discussion groups. Text classification is heavily utilized in information retrieval systems and search engine applications. Text classification could also help with spam filtering for email and text messages. The majority of text classification methods involve extracting text features, reducing data, selecting a deep learning model, and evaluating the model. On top of that, text classification algorithms could sort content at several levels depending on its size, such as document, paragraph, phrase, and clause (Minaee et al., 2021).Text classification is a common task in the domain of Natural Language Processing. Among its many potential uses are text classification and the identification of customer communication languages. As an example, text classification is probably used by the email provider's spam filter to remove a large number of unwanted messages. Another popular application of text categorization is sentiment analysis, a method in natural language processing (NLP) that seeks to identify the feelings, opinions, and thoughts conveyed in written material. It is possible to deduce the underlying positive, negative, or neutral emotional tone or disposition from the words employed. One of the many applications that rely on comprehending and organizing textual input is Natural Language Processing (NLP), which includes text categorization as an integral component. The art of automatically grouping text documents into predefined categories according to their content is known as text classification. The features and machine learning techniques used for categorization in traditional NLP have a very hard time capturing the subtleties and complexity of language in big, unstructured datasets.

Using a multi-layer bidirectional transformer encoder, BERT might create a high-dimensional representation of the input text. If it could consider the full sentence context of each word, it might help the reader better understand the text. There are a lot of cool things about BERT as a pre-trained model. This paves the way for downstream Natural Language Processing tasks like text categorization, which may be fine-tuned after training on large volumes of text like books, articles, and webpages. One of the best tools for Natural Language Processing (NLP) work, BERT learns input and output language by pre-training on a big text data corpus. The fine-tuning of BERT following pre-training to comprehend the subtleties of individual tasks could enhance its performance on those activities. Two distinct versions of BERT exist: BERT basic and BERT huge. In what follows, we'll use the BERT base model, a condensed version of BERT that nonetheless does an excellent job of understanding language and context. The BERT base allows for the