



SHIELD



Team Members

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Team Leader

Hicran Temel

A second-year student in the Computer Programming Department at Ondokuz Mayıs University. Responsible for managing the project and the team, as well as preparing reports and presentations.

Assistant Team Leader

Lecturer Mustafa Kaya

Working as a Lecturer in the Computer Technologies Department at Ondokuz Mayıs University, Bafra Vocational School. Provides guidance in literature review during the project development process and is also responsible for optimizing the artificial intelligence model.

Team Member

Dilvin Bayraktar

A second-year student in the Computer Programming Department at Ondokuz Mayıs University. Responsible for creating the model interface and integrating it with the email system in the project.

Team Member

Ahmet Anıl Sarıgüzel

A second-year student in the Computer Programming Department at Ondokuz Mayıs University. Responsible for creating, normalizing, and organizing the dataset during the literature review within the team.

Project Introduction

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Main Theme

The main theme of our project is to enhance email filtering and classification processes using an artificial intelligence model, offering users a personalized experience. Our desktop application, integrated with the Thunderbird email client, filters emails based on predefined categories and types, preventing unnecessary and unwanted content from reaching the user interface. This ensures a more organized and efficient email management system.

The Problem Addressed

Promotional, advertising, or other unwanted emails clutter users' inboxes and distract their attention. Additionally, the lack of category-based customization in existing spam filters forces users to manually review and categorize emails, leading to significant time loss.

Solution Provided by the Project

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- 1** Our application organizes emails through category-based filtering, sorting them into predefined or custom categories such as social media, promotions, and business.
- 2** AI-powered spam detection blocks unwanted emails with high accuracy, while customizable filters allow users to create their own filters based on criteria such as sender address, subject line, or keywords.
- 3** Efficient email management saves time and enhances focus by displaying only the emails that are needed.
- 4** With Thunderbird integration, the filtering process is carried out automatically and seamlessly.

Project Target Audience

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Professionals with Heavy Email Traffic

Individuals who require efficient email management for business and project coordination.

Businesses Handling Customer Relations via Email

Organizations that wish to automatically filter unnecessary emails in their inbox.

Personal Users

Individuals who want to avoid dealing with promotional or spam emails in their daily lives.

In short, it is a universal solution that caters to a wide range of user groups, including students, freelancers, business owners, office workers, and many more.



☐ Category (?)

- ↳ ☐ Education (?)
- ↳ ☐ Work (?)
- ↳ ☐ Health (?)
- ↳ ☐ Entertainment (?)
- ↳ ☐ Gambling (?)
- ↳ ☐ Transportation (?)

↳ ☐ Finance (?)

↳ ☐ Personal (?)

↳ ☐ Sports (?)

↳ ☐ Social Media (?)

↳ ☐ Shopping (?)

☐ Type (?)

- ↳ ☐ Promotion (?)
- ↳ ☐ Information (?)
- ↳ ☐ Verification (?)
- ↳ ☐ Personal (?)
- ↳ ☐ Survey (?)

Dataset

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We created the dataset for the model from the mails of people around us. Our dataset consists of 6 columns; “sender”, “mail_topic”, “mail_content”, “type”, “spam_status”, and “category”:

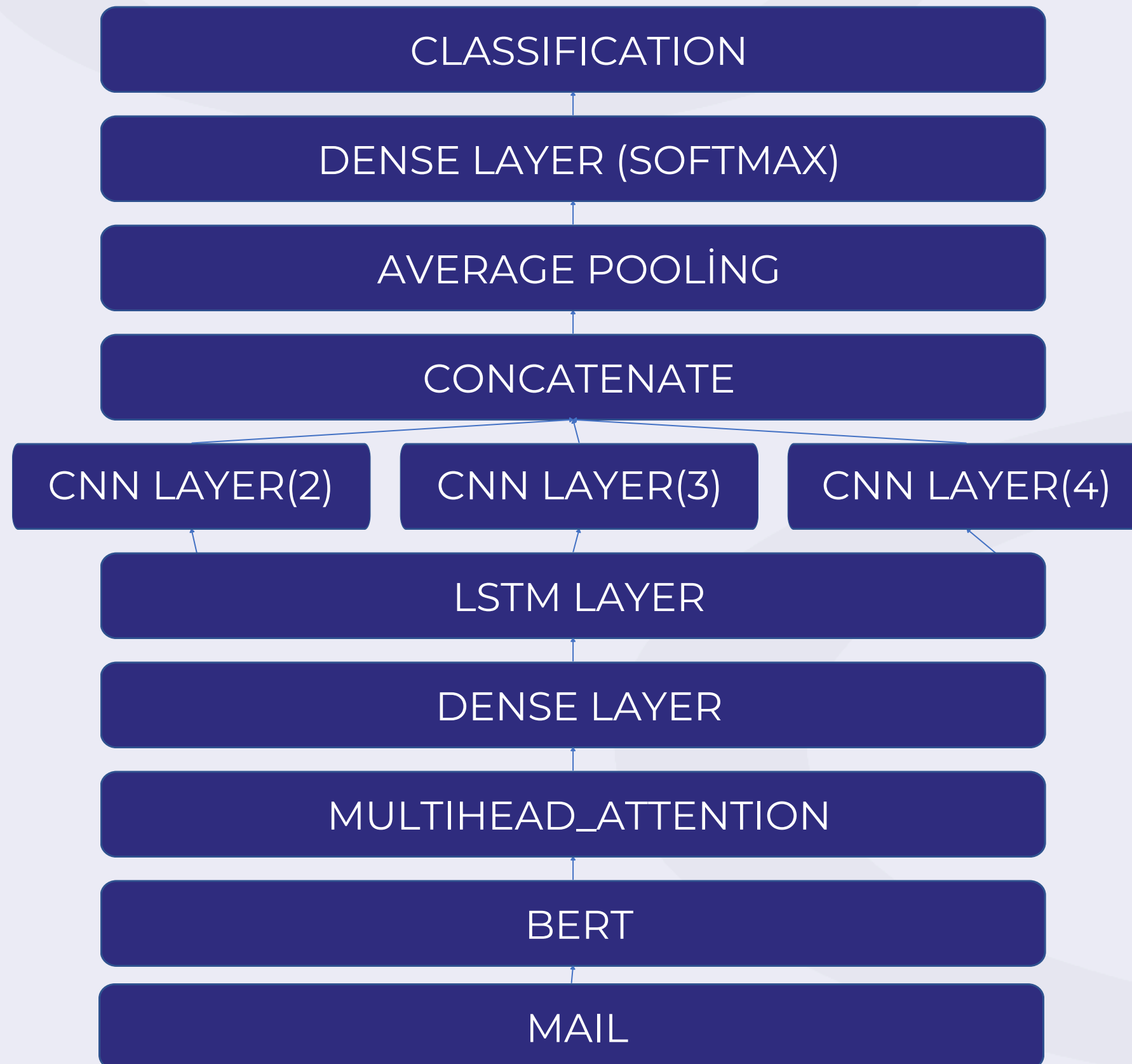
- The “sender” tag indicates who the mail came from.
- The “mail_topic” tag holds the subject of the mail. It helps to determine the category and type of mails whose content is an image.
- The “mail_content” tag holds all the text in the mail.
- The “type” tag indicates the type of the mail.
- The “spam_status” tag indicates whether the content is spam or not. This tag provides a general spam evaluation regardless of the content type or category.
- The “category” tag indicates which category the mail is in.

Example record in the dataset:

sender	mail_topic	mail_content	type	spam_status	category
sample@gmail.com	sample topic	sample content	information	0	health
sample2@gmail.com	sample topic	image	personal	0	personal

Methods and Techniques

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BERT is a language model developed by Google that is pre-trained to understand words in text. It reads and makes sense of text in both directions (left to right and right to left). This allows it to better understand the context.

The LSTM (Long Short-Term Memory) layer is a type of recurrent neural network (RNN) layer specifically designed to process sequential data. LSTM has the ability to learn and remember distant dependencies in long sequential data.

Self-Attention is a mechanism for learning how each element in a data array relates to all other elements.

CNN is a type of neural network that is widely used in image processing and classification tasks, but it also makes a significant contribution to natural language processing. It creates feature maps by applying filters to the input data. In this way, it can extract important features from the data.

Methods and Techniques

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Multi-Head Attention (MHA) is an attention mechanism commonly used in modern natural language processing models such as Transformers, allowing the model to focus on different pieces of information simultaneously. This mechanism learns the relationships and context between words in a text, creating a richer representation. MHA employs multiple independent attention heads, with each head learning different types of relationships between words in parallel. This enables the model to analyze the semantic and grammatical relationships of a word with other words from various perspectives simultaneously. In our email filtering model, Multi-Head Attention plays a critical role in understanding the context between words and distinguishing different types of emails. For instance, it emphasizes products or services in "shopping" emails, while highlighting formal and meaningful structures in "business" emails. This mechanism enhances the classification accuracy of the model and enables it to interpret the meaning of texts more effectively, leading to robust learning.



**THANK YOU FOR
LISTENING.**