

Task 1

Categorise which type of NLP application applies for each of the following use-cases:

A model that allocates which mail folder an email should be sent to like Gmail's inbox tabs.

Text classification - First step to organising your mail would be using text classification to sort into predefined categories outlining where the user wishes to see certain emails.

Sentiment analysis - In conjunction with text classification, this could help to filter between professional/business content, personal emails and shopping or marketing by analysing the tone or sentiment thus helping us to correctly tag incoming mail.

Language translation - For instance, it might be relevant to translate an email to get an understanding of its content/context. Also in the case of spam detection, it could be unusual to suddenly receive emails in a language you have never used and an indication of spam.

A model that helps decide what grade to award to an essay question. This can be used by a university professor who grades a lot of classes or essay competitions.

Automatic summarisation - We can speed up the professor's job by using summarisation to condense answers to an essay question into the most relevant parts. In some cases it may also be useful to assess the general emotional content of the answer e.g. the essay asks a student to review a piece of poetry and we want to know if their emotive analysis matches.

Text classification - There may be a number of valid answers to the question but we want to stratify responses into clearly defined groups so the professor can work through them systematically. Alternatively Named Entity Recognition / Keyword Extraction can be used to pick out key figures, names, places, statistics etc. which are central to answering the essay question. Maybe the mark scheme demands reference to a case study and this can be quickly located with NER.

Parsing tools / Auto-correct - Where relevant this can check for correct grammar, spelling and syntax. Similarly, this could be used to check for plagiarism by measuring similarity to other works, ensuring it belongs to the student.

A model that provides assistive technology for doctors to provide their diagnosis. Remember, doctors ask questions, so the model will use the patients' answers to provide probable diagnosis for the doctor to weigh and make decisions.

Question Answering - The use of Chatbots or Virtual Assistants can allow doctors to collect information from many more patients than they can see in-person. They can both ask and answer questions to collect necessary information about a patient in both spoken (speech recognition) and written formats (optical character recognition).

Text classification - Can sort the responses gathered into different categories. For instance some symptoms may be much more urgent while others are benign. We can also pick out keywords matching diagnostic criteria and compare against known conditions offering the doctor the most likely diagnoses first.

Sentiment analysis - To correctly identify the intentions of a patient. For example if the treatment for a specific condition takes a long time you want to avoid attrition so it's useful to identify those with less severe symptoms. It also helps to infer from the language used how serious the patient believes their issues are.

Language Translation - It could also be useful to have translation capabilities. A patient may be a tourist on holiday who can't speak the same language as the doctor but we can use NLP systems to convey the key information to both parties despite the language barrier.