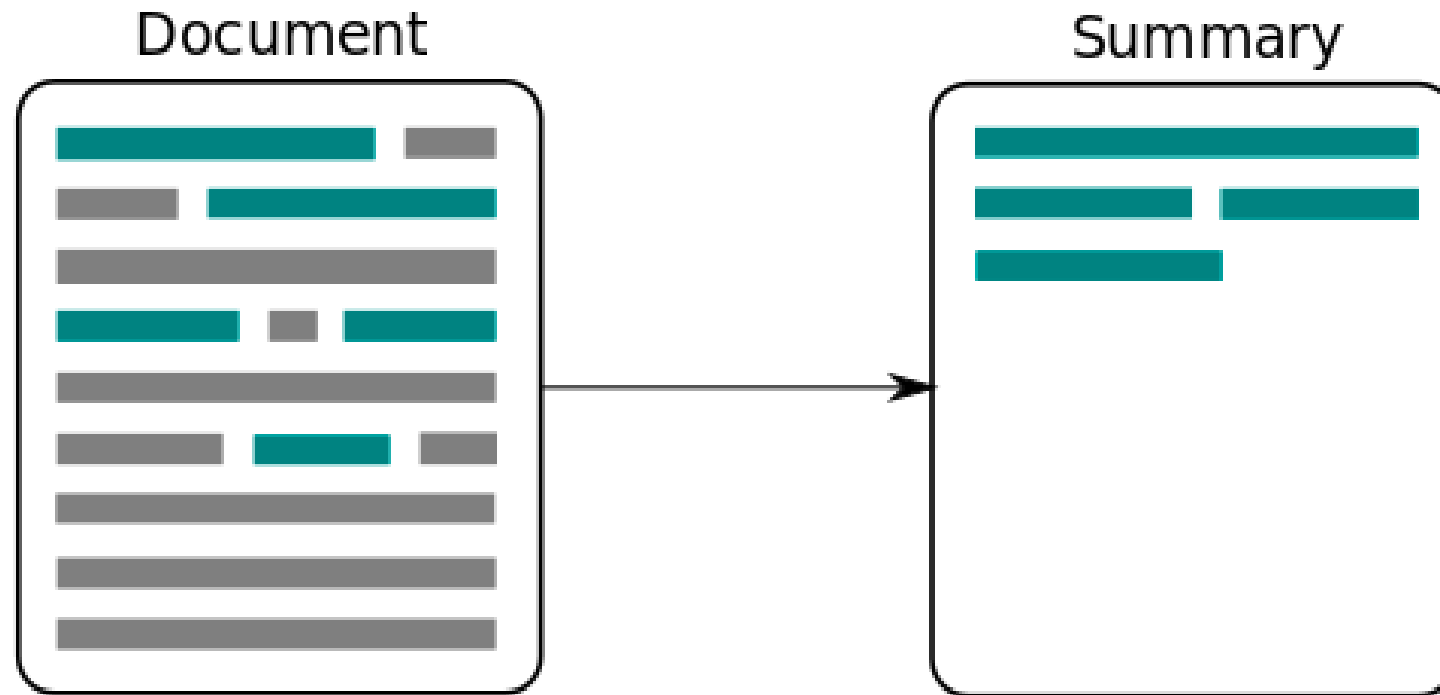


Natural Language Processing

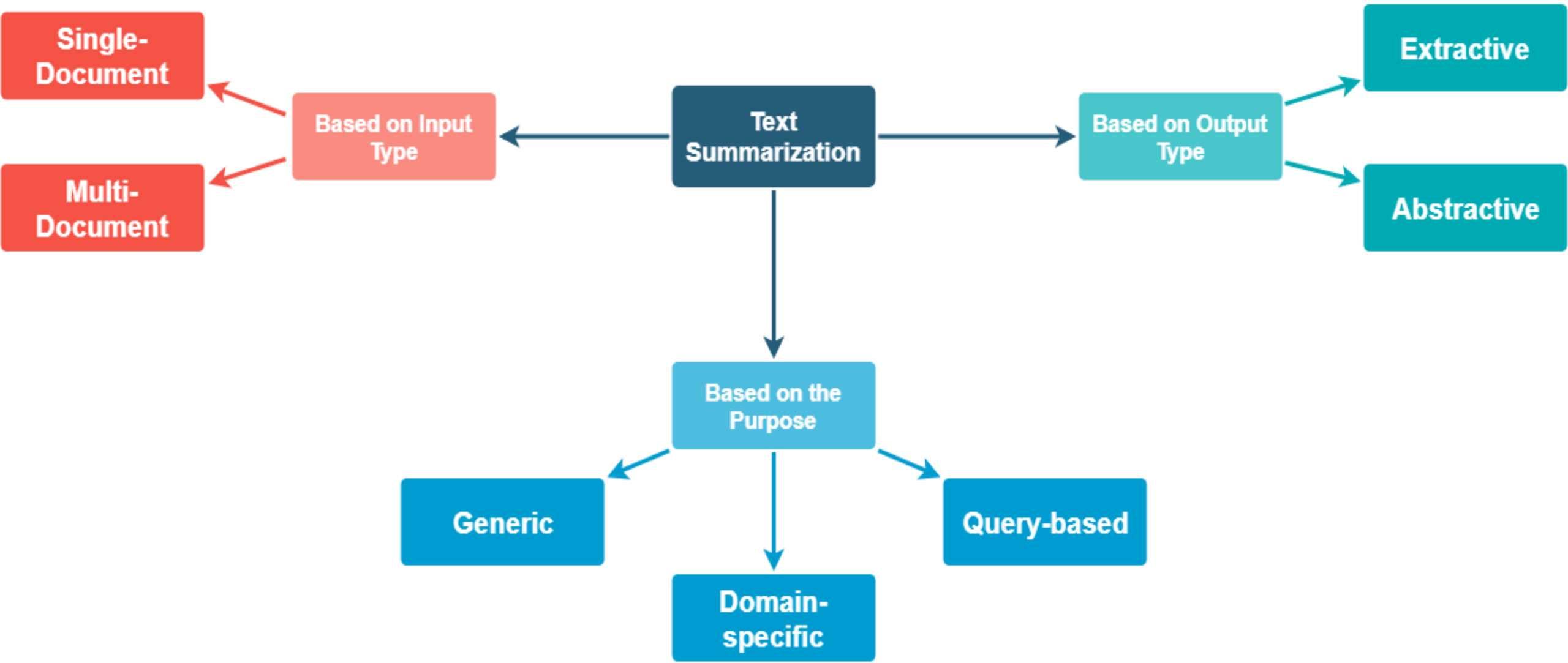
Text Summarization



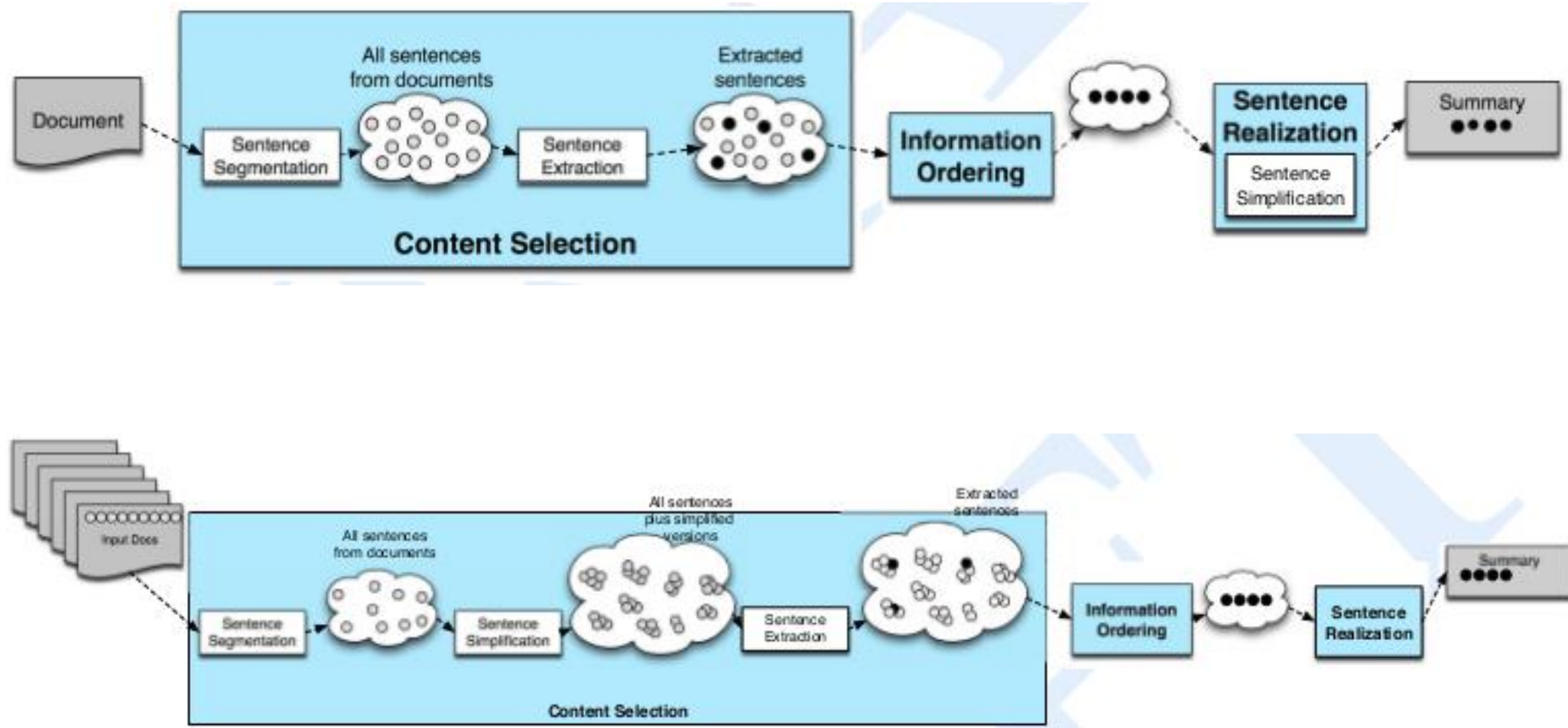
Text Summarization Applications

- Outlines of any document
- Abstracts of a scientific article
- Answers to complex questions, constructed by summarizing multiple documents
- Action items or other summaries of a (spoken) business meeting
- Snippets summarizing a web page on a search engine results page
- Compressed sentences for producing simplified or compressed text
- Headlines of a news article
- Summaries of email threads

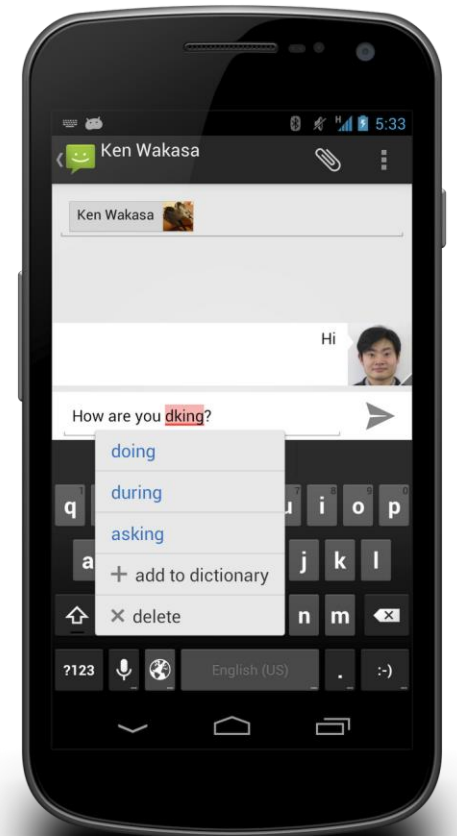
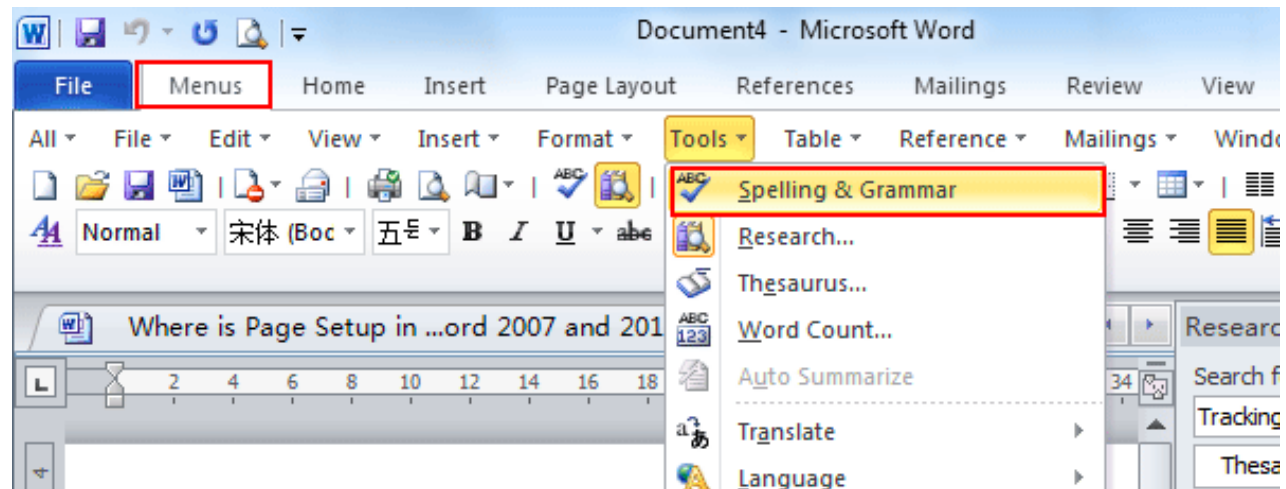
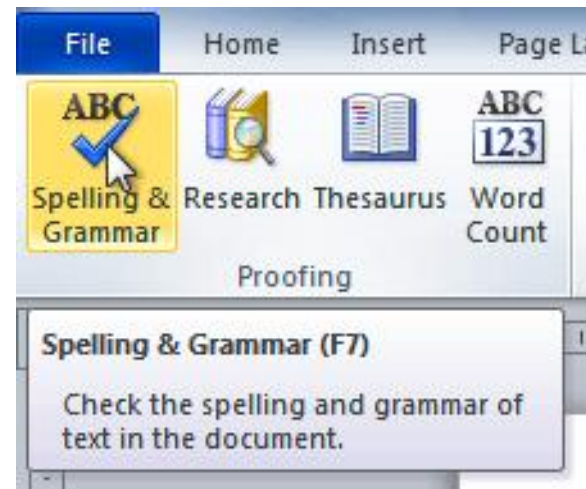
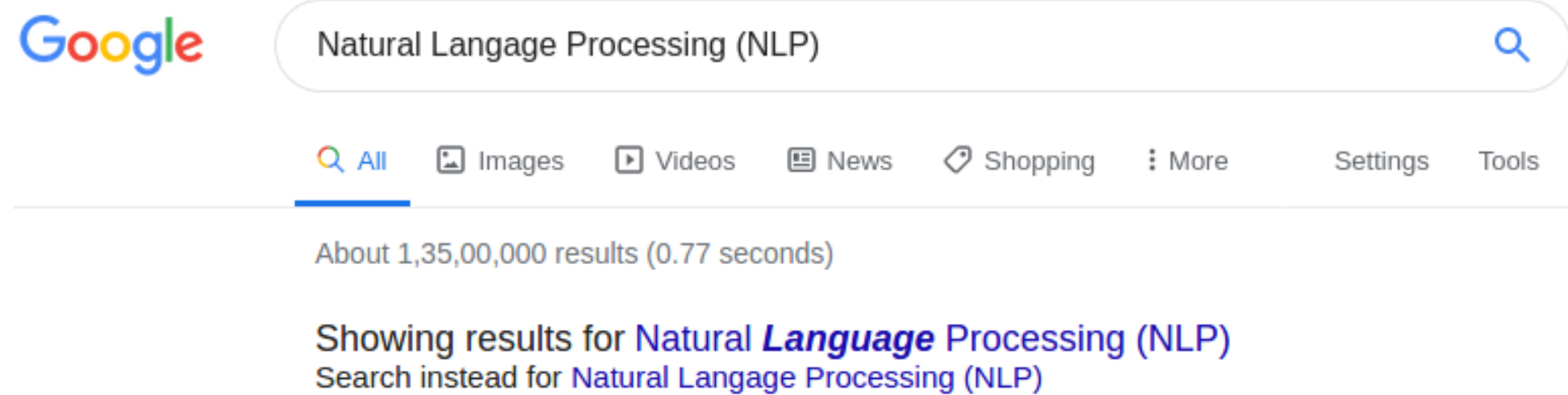
Types of Text Summarization



Single Document Vs Multiple Document Summarization



Spelling Correction

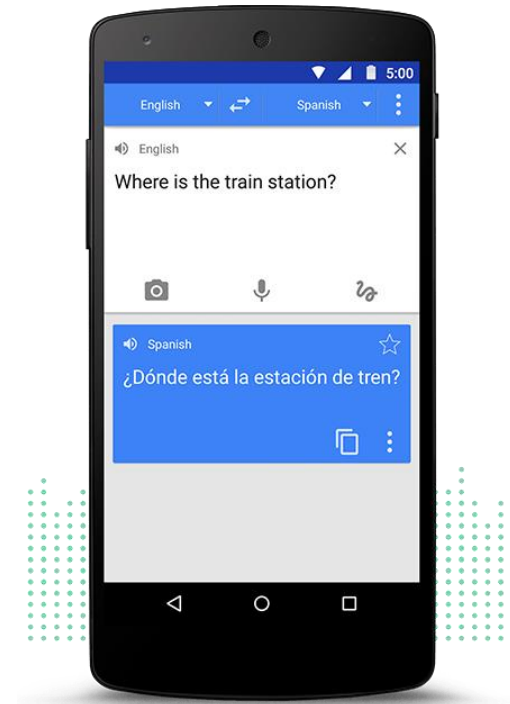


Grammar Correction

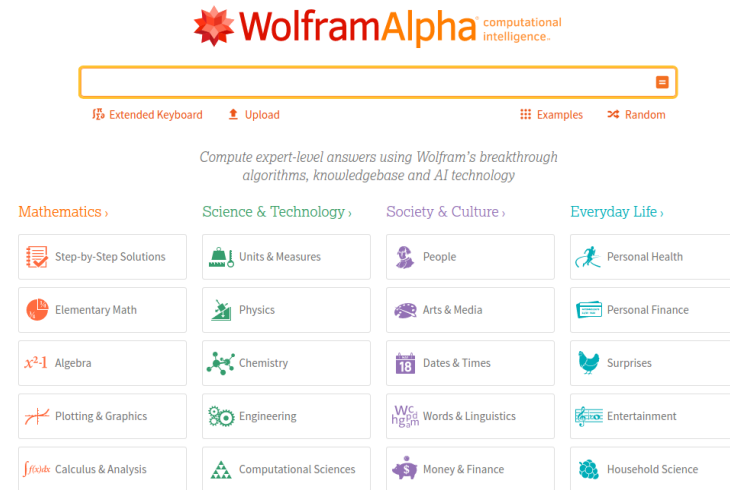


grammarly

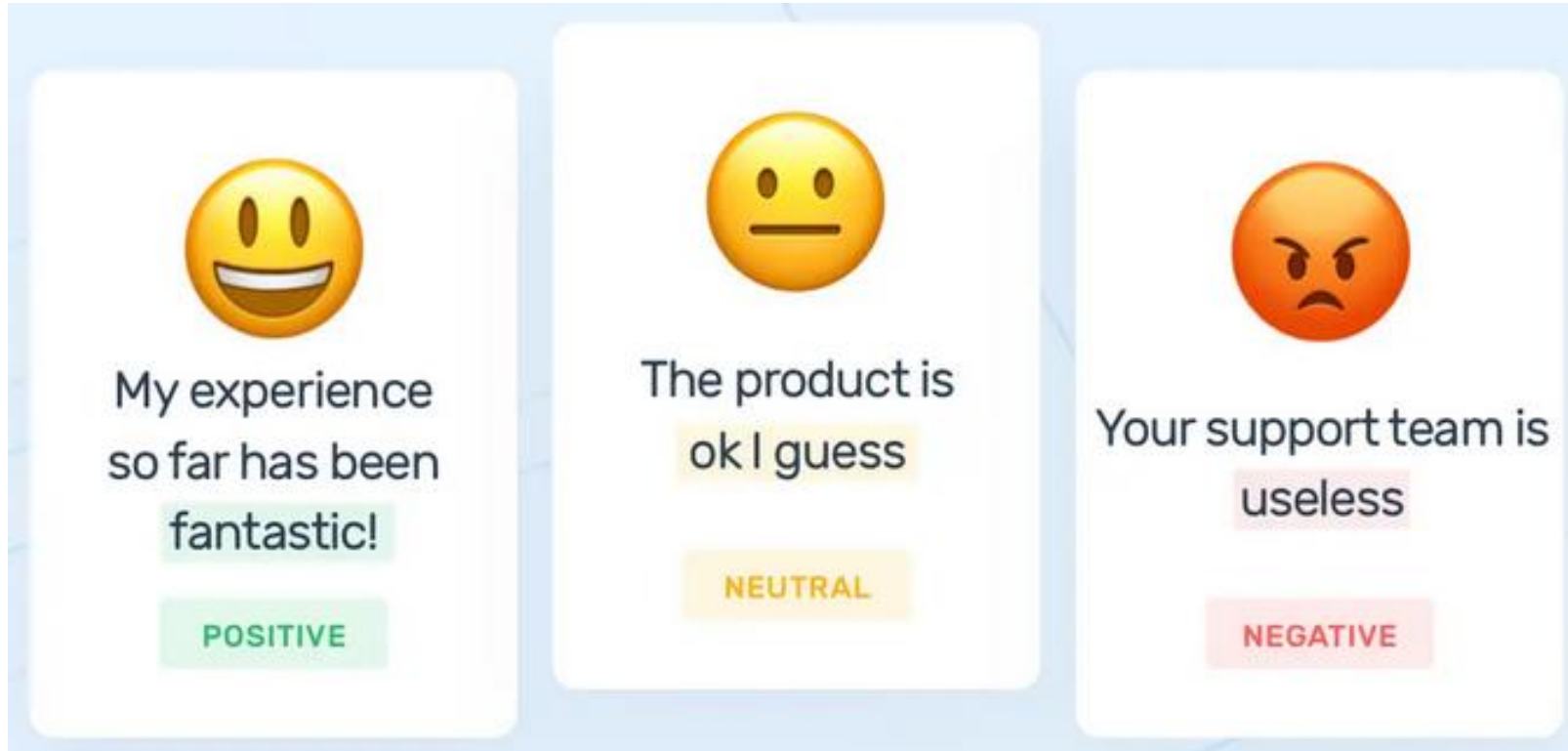
Machine Translation



Question Answering System



Sentiment Analysis



The diagram illustrates Sentiment Analysis through three distinct categories, each represented by a card with a corresponding emoji and text example.

- Positive:** Represented by a smiling face emoji (😊). The text example is "My experience so far has been fantastic!". The sentiment is labeled "POSITIVE" in a green box.
- Neutral:** Represented by a neutral face emoji (😐). The text example is "The product is ok I guess". The sentiment is labeled "NEUTRAL" in a yellow box.
- Negative:** Represented by an angry face emoji (😡). The text example is "Your support team is useless". The sentiment is labeled "NEGATIVE" in a red box.

Named Entity Recognition

- A very important sub-task: **find** and **classify** names in text, for example:
 - The decision by the independent MP **Andrew Wilkie** to withdraw his support for the minority **Labor** government sounded dramatic but it should not further threaten its stability. When, after the **2010** election, **Wilkie**, **Rob Oakeshott**, **Tony Windsor** and the **Greens** agreed to support **Labor**, they gave just two guarantees: confidence and supply.

Person
Date
Location
**Organi-
zation**

Named Entity Recognition

- The uses:
 - Named entities can be indexed, linked off, etc.
 - Sentiment can be attributed to companies or products
 - A lot of IE relations are associations between named entities
 - For question answering, answers are often named entities.
- Concretely:
 - Many web pages tag various entities, with links to bio or topic pages, etc.
 - Reuters' OpenCalais, Evri, AlchemyAPI, Yahoo's Term Extraction, ...
 - Apple/Google/Microsoft/... smart recognizers for document content