

# Comparison of Google's Natural Language AI for NLP Cloud Processing and Microsoft's Cognitive Services

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## Introduction

Google Cloud Natural Language and Microsoft Azure Cognitive Service offer convenient APIs that help users build intelligent applications without a strong background in natural language processing. Google's Natural Language AI and Microsoft's Cognitive Service apply natural language understanding to apps, and obtain insightful text analysis with advanced machine learning techniques that extract, analyze and store text. This report focuses on reviewing the service similarity and difference between two providers.

There are 4 main functions: syntax analysis/ key phrase extraction, sentiment analysis, entity analysis and text classification. For each function, REST APIs are provided and easy to implement. Users can request trial access to all the related functions on their product pages. Google offers \$300 credit to spend over the next 90 days whereas Microsoft starts with \$200 credit and 30 days to use it. Users then use the authentication tokens to send the text they want to analyze in specific formats. The corresponding REST API endpoints can process the analysis and return the results.

## Syntax Analysis (Google) vs. Key Phrase Extraction (Microsoft)

For a given text, Google's syntax analysis returns a breakdown of all input words with a rich set of linguistic information for each token whereas Microsoft's key phrase extraction analyzes the text and extracts the main topic by removing the stop words. Both techniques support multiple languages. For example, for the input sentence "I like computers."

- Google: "I" (tag: NOUN), "like" (tag: VERB), "computers" (tag: NOUN number: PLURAL), "." (tag: PUNCT)
- Microsoft: computers

## Sentiment Analysis

The sentiment analysis APIs provide emotional feedback for any input sentence. Google returns two values: score and magnitude. The score represents the emotional prediction of the text from -1 to +1, with 0 being neutral. The closer to 1, the more positive sentiment.

The magnitude measures the confidence of the emotion prediction. On the other hand, Microsoft only returns a number between 0 and 1 for the emotional prediction. The closer to 0, the more negative sentiment. For example, the sentence “the fruit is delicious” outputs 0.99 sentiment score from Microsoft and 0.7 sentiment score from Google whereas “the news is bad” gives 0.05 sentiment score from Microsoft and 0.3 sentiment score from Google. In addition, Google generates magnitude scores. For both sentences, the magnitude scores is 0.7 meaning they are not expressed very strongly.

## **Entity Analysis**

The entity analysis APIs detect known entities like public figures, landmarks, organizations, phone numbers, addresses and many others from a given input. For example, “I like Toronto and Justin Trudeau.” would return the city Toronto and person Justin Trudeau from both Microsoft and Google. Google also provides wikipedia links ([https://en.wikipedia.org/wiki/Justin\\_Trudeau](https://en.wikipedia.org/wiki/Justin_Trudeau) and <https://en.wikipedia.org/wiki/Toronto>) and salience scores to demonstrate the importance level of the detected entity to the entire document text. Scores closer to 0 are less salient, whereas scores closer to 1 are highly salient.

## **Text Classification**

Microsoft’s text classification API can help to build an AI model to classify unstructured text into customer classes that users define whereas Google’s text classification API classifies the input document into a large set of predefined categories. Users do not need to create models to make the classification. The API not only returns the predicted category but also returns the confidence score.

## **Discussion and Conclusion**

By comparing the two APIs services, Google Natural Language AI for NLP will be considered for our project. We plan to generate relative information for users’ input and help them decide whether the input meets their interest. Google APIs are proven to provide more detailed information. We will leverage the 4 APIs discovered and integrate them into our project.

## Reference

<https://cloud.google.com/natural-language#section-6>

<https://azure.microsoft.com/en-us/services/cognitive-services/text-analytics/>