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An overview of sentiment analysis using Azure Cognitive Services

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Abstract

Machine Learning (ML) and Artificial Intelligence (AI) are infiltrating each and every industry these days. Not just industries these fields have become a crucial part of all the technology prone human beings. Right from activity trackers to virtual assistants we have smoothly transitioned into the Artificial Intelligence era and all these small techno gadgets have become the crucial parts of our life. In the disruptive world of Artificial Intelligence the main focus is on understanding the patterns and processing it to solve the real world problems through designing and developing the smart or learned models. In this paper, we are going to look one of the interesting topics from Natural Language Processing (a subfield of Artificial intelligence) called sentiment analysis. The paper will also explain how we can use Azure Cognitive Services to solve real world problems and its applications.

Keywords:

Sentiment analysis;
Natural LanguageProcessing (NLP);
Azure Cognitive Services
Machine Learning;
Artificial Intelligence.

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1. Introduction

Natural language processing (NLP) is a subfield of various major fields such as linguistics, computer science and artificial intelligence. It is manly concerned with analyzing and processing the natural language data. To explain this in short and simple language you can think of scenario where machine is capable of understanding a text like we humans do. Natural Language Processing iscombining the power of artificial intelligence, computational linguistics and computer science, which allows a machine to understand the many task that was so far the exclusive privilege of humans.The various examples of Natural Language Processing are spell check, autocomplete, voice text messaging, spam filters, Siri, Alexa, Cortana or Google Assistant and Related keywords on search engines. Sentiement analysis is an important part of NLP which aidsunderstanding the opinion/connotation from the given language text.

There are various applications and use cases today where sentiment analysis is very useful. Be it social media analysis, marketing or product analysis, sentiment analysis is obvious choise to understand the future requirements and demand supply for the product. This technique allows companies to understand the current market trend for their product. Companies get to know if consumers are talking positively or negatively about their products or service which eventually helps big time to get key insights and automate business processes. The wild adoption is helping drive proactive business solution, measure RIO in company's business campaign, supports customer service and customer satisfaction.

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This paper reviews the concept of sentiment ananlysis, their advantages and use cases. The paper will provide the reader how sentiment analysis applications such as Azure Cognitive Services (Language- text analytics) are leveraging their natural language processing capabilities through pre-built models. These models can be used by companies directly to

2. Sentiment Analysis

Sentiment analysis is the automated process that allows machines to process and identify key information within text, such as tweets, emails, support tickets, product reviews, survey responses, etc.[1] By the analysis we mean there are some important attribute that machine learing model looks for in the input text and in return provides a result/opinion that contains the below important attributes:

1. Sentiment Score: if the speaker express a positive or negative opinion,
2. Subject/Linked entities: the thing that is being talked about
3. Language into consideration

2.1. Types of Sentiment Analysis

On granular level the sentiment analysis can be broken down into different types such as

- Negative
- Positive
- Neutral
- Very negative
- Very positive

The sentiment score for very positive stands at on the scale closer to 1 where as the vey negative is much further way from 1 and very close to 0 i.e. somewhere around 0.2 or may be evn lesser than that.

2.2 How Sentiment Analysis models are built

The actual process of building the sentiment analysis models is similar to building a machine learning model starts with training the model.

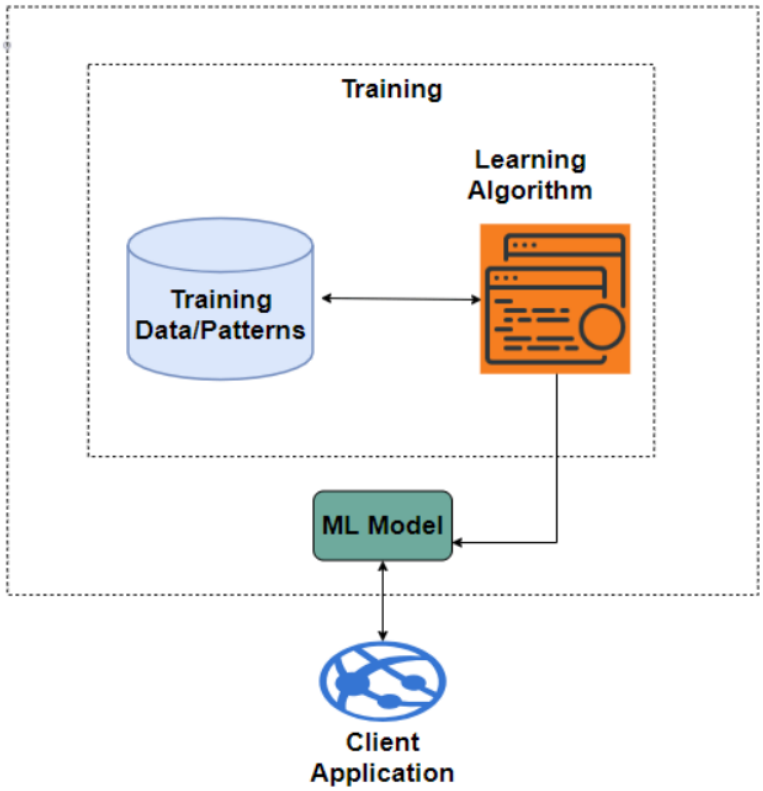

Figure 1. Building Machine Learning model.
Source:https://www.red-gate.com/simple-talk/sql/bi/creating-machine-learning-applications-using-azure-cognitive-services/

In the training process our model learns to associate a particular input (i.e. a text) to the corresponding output based on the test samples used for training. The trained algorithm maps the imput training data to their respective output (positive/ negative/ neutral) tags. This algorithm and training data then are use to create the model that can be used to work produce the results sample for our data.

3. Azure Cognitive Services:Text Analytics

The machine learning models can be used for sentiment analysis. There are various providers that provide the pre-built machine learning trained models that can be used through the Client applications. Azure provides such machine learning models by explosing the Azure Cognitive Services to client applications. These are the REST APIs that applications can just consume through the client applications.

3.1 Text Analytics API

It is one of the services present in Language Category of Azure Cognitive Services. The main functions included in Text Analytics APIs are sentiment analysis, key phrase extraction, language detection, and entity linking.

3.1.1 Features in Text Analytics API

- Sentiment Analysis: This feature is mainly used to analyze the positive or negative information from the text. Once the user sends the input text, the sentiment analysis returns a numeric value between 0 and 1 depending on the information/text provided.
- Key-Phrase Extraction: This lists the key words that are used to perform the sentiment analysis
- Language Detection: Out of 120 languages supported, it detects the language for the inout text.
- Entity Linking: Entity linking maps the entities from text to the solid entities and links them to their web content information. For example, in the example San Francisco is an entity which is linked to the Golden Gate entity.

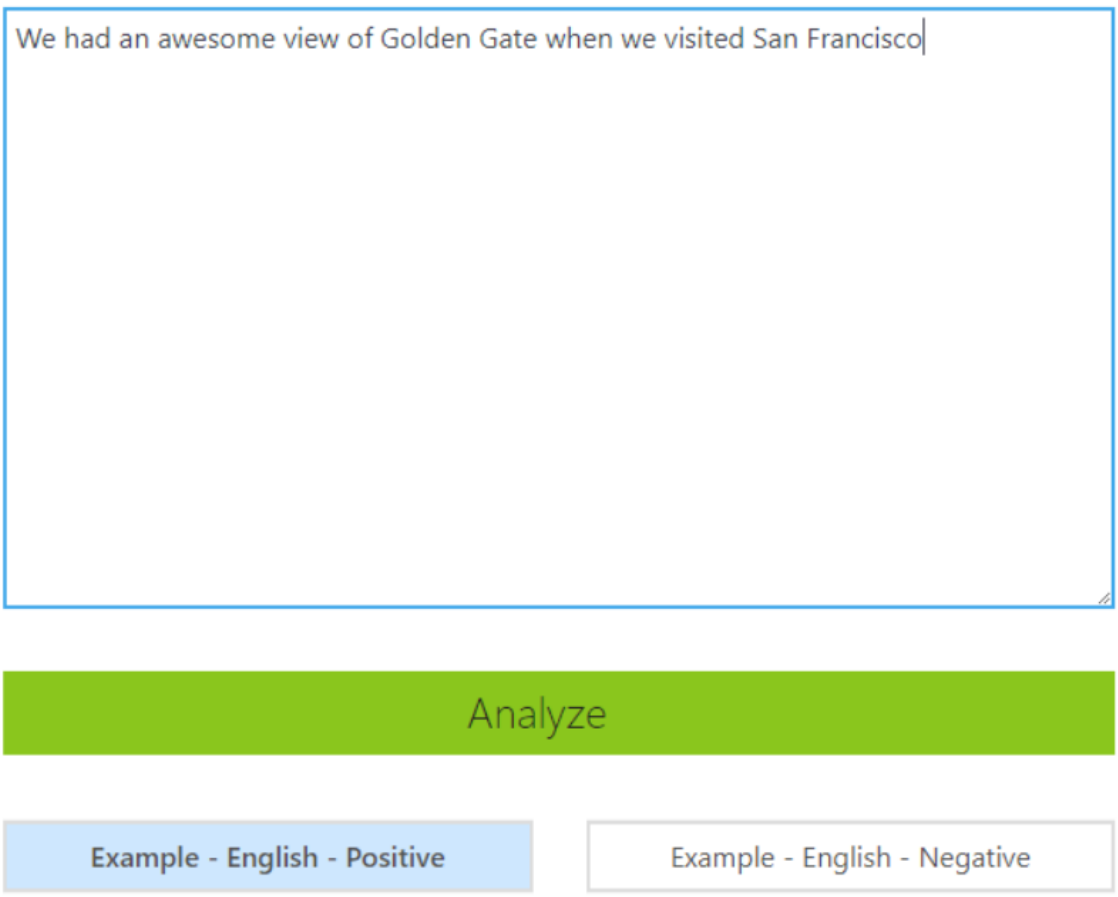

Figure 2: The Azure Cgnitive Services Text Analytics input

Figure 3: The output from Azure Cognitive Service after processing the results through Text Analytics

In the above example the Azure Text Analytics API produced the results with 95% accuracy for the sentiments. The 95% (0.95) sentment results shows that the opinion/connotation is positive as it is much closer to 1.

4.Real time applications of Sentiment analysis:

I. **Social Media feeds and tweets:** Sentiment analysis is huge help in analyzing product and services demands through social media feeds and comments. It can be used to analyze tweets and/or facebook posts to understand the demand, feedback and market trends for your product.

II. **Social Media Monitoring:** Build the application to understand the sentiments on a message and if urgent action is required to the psoted comment or social media tweets then forward mentions to team members best fit to respond.

III. **Survey Analytics:** Analyze the survey feedback form the customers and take proper action to provide better customer satistafication and services. It can also help to understand where exactly the company needs to focus their attention, so that they can improve upon marketing or customer service.

IV. **Customer Service Automation:**NLP and AI engines are used to design the bots for processing the customer service requests [1].

5. Conclusion

The paper presents an overview of sentiment analysis and applications to analyze and process the input data. The paper also provides information about the Azure Cognitive Text Analytics models that can be used to build intelligent solutions to process the consumer data and run the sentiment analysis on this data. The real time applications of sentiment analysis can use the prebuilt models or customized models can be built to address the demand and supply for product and services.

References

[1] 12 NLP Examples: How Natural Language Processing is Usedhttps://www.wonderflow.co/blog/natural-language-processing-examples

[2] 5 ways sentiment analysis can boost your businesshttps://thenextweb.com/contributors/2017/08/06/5-ways-sentiment-analysis-can-boost-business/

[3] Creating Machine Learning Applications using Azure Cognitive Serviceshttps://www.red-gate.com/simple-talk/sql/bi/creating-machine-learning-applications-using-azure-cognitive-services/