IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 11, November 2020

DOI 10.17148/IJARCCE.2020.91107

Decision Strength Prediction using IBM Watson Natural Language Understanding.

Sarthak Doshi[1], Kalpesh Shah[2]

Software Developer, Raja Software Labs, Pune, India[1]

Assistant Manager, Jio Platforms, Mumbai, India[2]

Abstract: Decision strength is all about the supporting factors and Eigen values that create an impact when forming a decision considering the machine learning models while using the Natural language processing. This paper deals with the way of data collection and predicting the decision tree using the simple data. This paper supports decision strength prediction in the Android systems with the actual mobile application supporting the Watson Natural Language Understanding methodology.

Keywords: Natural Language Understanding, Android, Alchemy Language, Machine Learning, Watson API.

I. INTRODUCTION

Machine Learning is a vast field which derives the ability of the computing systems to replace the human learning methodology. This learning which is structured and used further to derive the outcomes can be termed as Artificial Intelligence. This research project deals with derivation of the in-depth outcomes of user likes and dislikes using the core statements at epicentre. Further the system triggers the questions analysing the previous outcomes which generates a consolidated data for the decision tree. Decision trees making the key component tracing the predictions are supported by many branches and relevant sub branches. On analysing the user data with respective to NLP weights predication percentage is displayed

II. LITERATURE SURVEY

1. A Simple Introduction to Maximum Entropy Models for Natural Language Processing [1]
In this paper the Sentiments are processed on the basis of the Entropy score. This paper introduces the flow of taking input user data and generating the relevant outputs. With reference to relevant research papers from Dr. Adwit Ratnaparkhi of Pennsylvania University on Maximum entropy models of NLP. The research suggests that Relative Entropy i.e Kullback Leibler Distance should be one of the basic steps which generates estimated parameters for Computation of the sentiment score. Here the parameter estimation is carried out by generalized iterative scaling.

2. A Maximum Entropy Approach to Natural Language Processing [2]
Similar to the above research Prof. Adam Berger published a research which introduced a new approach regarding calculation of maximum Entropy in NLP. This research associates sentiments with the appealing model to thereby generate required calculations.

Here we have our own approach to implement the decision strength prediction using IBM watson API.

III. PROPOSED METHODOLOGY

In this paper we are proposing the following method to predict the strong-ness of the decision that is taken by the user. Method has two main parts.

A. Take User input and Store it in proper Data structure.

Here, we are taking the user's decision and their respective reasons. Each reason has many sub-reasons and sub reasons can have their sub reasons. In our implemented model we are considering maximum 3 sub reasons and for each sub reason max 3 next pair of sub reasons. After getting the user's input, it will be arranged and stored into tree type data structure.

This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 9, Issue 11, November 2020
DOI 10.17148/IJARCCE.2020.91107

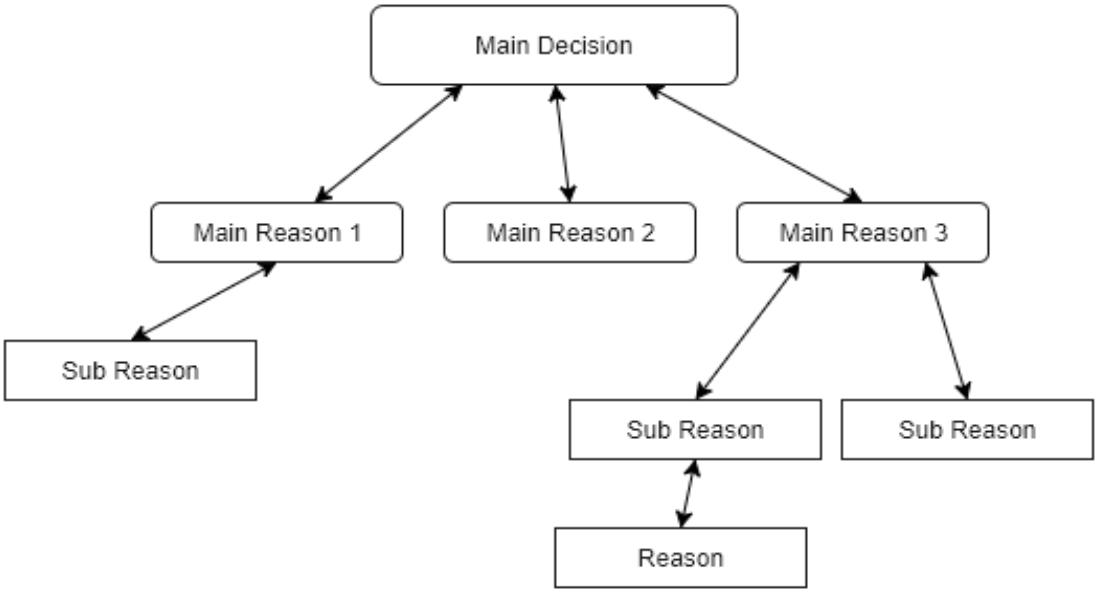


Fig. 1. Data Structure for storing user input

B. Calculate the values for the predication.

This calculation process takes place into three phases.

1. **Phase 1:** As we have stored our data into the tree type data structure, we can easily Travers it and find the value. At start we are going to the leaf that does not contain the data and retrieve it. Then that data will be sent to the Watson API. To get the sentiment value. After getting the sentiment value we will calculate the value based on the sentiment value and assign it to that particular node. We apply the same method of calculation for all the nodes so we have a particular assigned value for all the nodes.

2. **Phase 2:** In this phase, we update the assigned value of each parent node. Parent node has its own value, we take the average of values of the child nodes and add it to the parent node. This phase works recursively in bottom to top pattern except for the root node. No don't have any need to calculate the value for the root as it is the main decision given by the user.

3. **Phase 3:** This phase has first level nodes with their final values, depending upon the values we got we decide the strong reason behind the user's decision.

IV. SYSTEM ARCHITECTURE

The following figure give the information about the system architecture.

We are using the IBM Watsons API [3] for calculating the sentiment value of the text inserted by the user. API works in following way

- Keyword Extraction
- Entity Extraction
- Sentiment Analysis
- Emotion Analysis

API provides many features but we are concerned with only the sentiment value of the text which we pass to the system. Pre-processing unit refines the data given by the user and stores it in standard data structure. We are using trees as a data structure for storing the user's data. Then we travers over the tree to get text from each node and pass it to the server through API.

This API will return the sentiment value for the particular text. We store the value returned by the API and make a recursive call to API with next node data. This will continue for all nodes except the root node as the root node contains the main decision or stamen given by the user.

After getting all values the system will calculate the entropy value (a unique value based on sentiment value and some other calculations) for a particular node. Post processing unit will decide the strong reason behind the user's decision or statement.

This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 9, Issue 11, November 2020
DOI 10.17148/IJARCCE.2020.91107

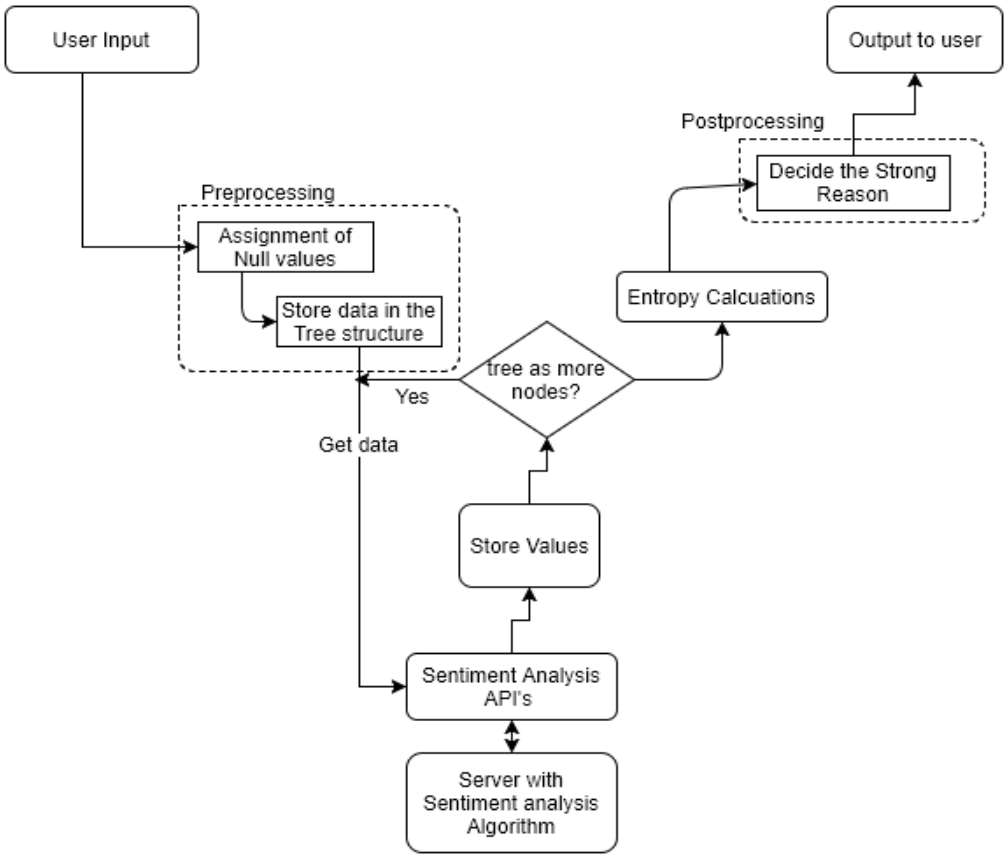


Fig. 2. System Architecture

V. IMPLEMENTATION

To demonstrate our approach, we have developed an android application. This application gives detailed information about how the system will work in real time scenario.

Fig. 3. Take User Input

This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 9, Issue 11, November 2020
DOI 10.17148/IJARCCE.2020.91107

In the android app, we have Input activity. This activity is responsible for providing the interface for taking the user input and store in proper format. Here the user has the option to add reason and their respective sub reasons. After the final submit button clicks all data will be pre-processed and store into standard data structure like tree.

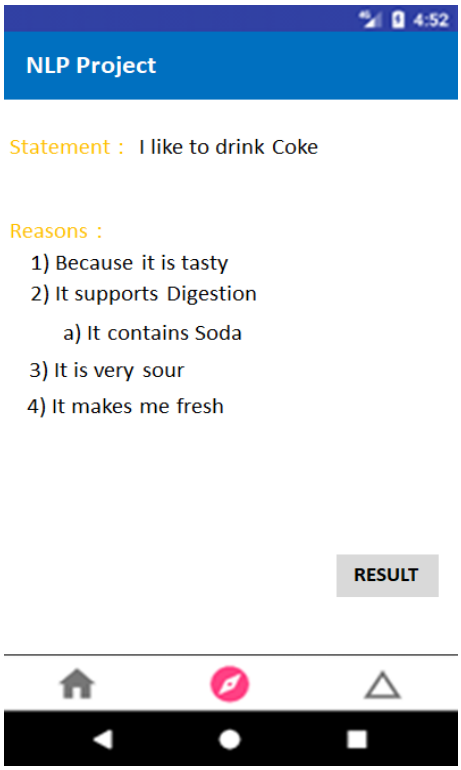
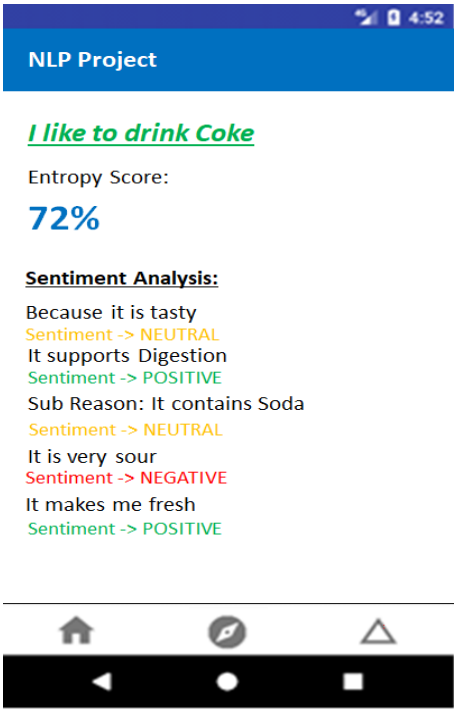


Fig. 4. Show data to user

This is the second screen of our android app. This is used to show previews of data that is entered by the user. Users can always modify input data by going back to previous activity but once data submitted from the preview screen it can't be changed. After the data submission from this screen, the Sentiment analysis phase starts.



This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 11, November 2020

DOI 10.17148/IJARCCE.2020.91107

Fig. 5. Display Result

This is an activity to display results to the user. This consists of basic preview of the user input data with its calculated entropy values. This show activity will show the strong-ness of each reason given by the user. This is the working of the android app which is built to demonstrate our approach.

VI. CONCLUSION AND FUTURE SCOPE

In this paper, we introduce the android application to find the strong-ness of reasons for particular user decisions using Natural Language Processing. For this purpose, IBM Watson API for android is used. Method to calculate entropy based on the sentiment value is self-developed.

Here we got info about the strong reason behind the user's decision so using this we can suggest a different solution for the particular decision. Like if user decision is related to the demotivation and strong reason is Job then by using various API we can suggest the Jobs from particular location. So this type of system can be added to the existing system in future. So that this will help the community.

REFERENCES

[1] Ratnaparkhi, Adwait, "A Simple Introduction to Maximum Entropy Models for Natural Language Processing" (1997). IRCS Technical Reports Series. 81.

[2] A d a m L. Berger, Vincent J. Della Pietra, Stephen A. Della Pietra, A Maximum Entropy Approach to Natural Language Processing, Computational Linguistics, Volume 22, Number 1

[3] IBM Watson | URL https://www.ibm.com/in-en/cloud/watson-natural-language-understanding

This work is licensed under a Creative Commons Attribution 4.0 International License