PRODUCT REVIEW SENTIMENT ANALYSIS WITH SMART BOT
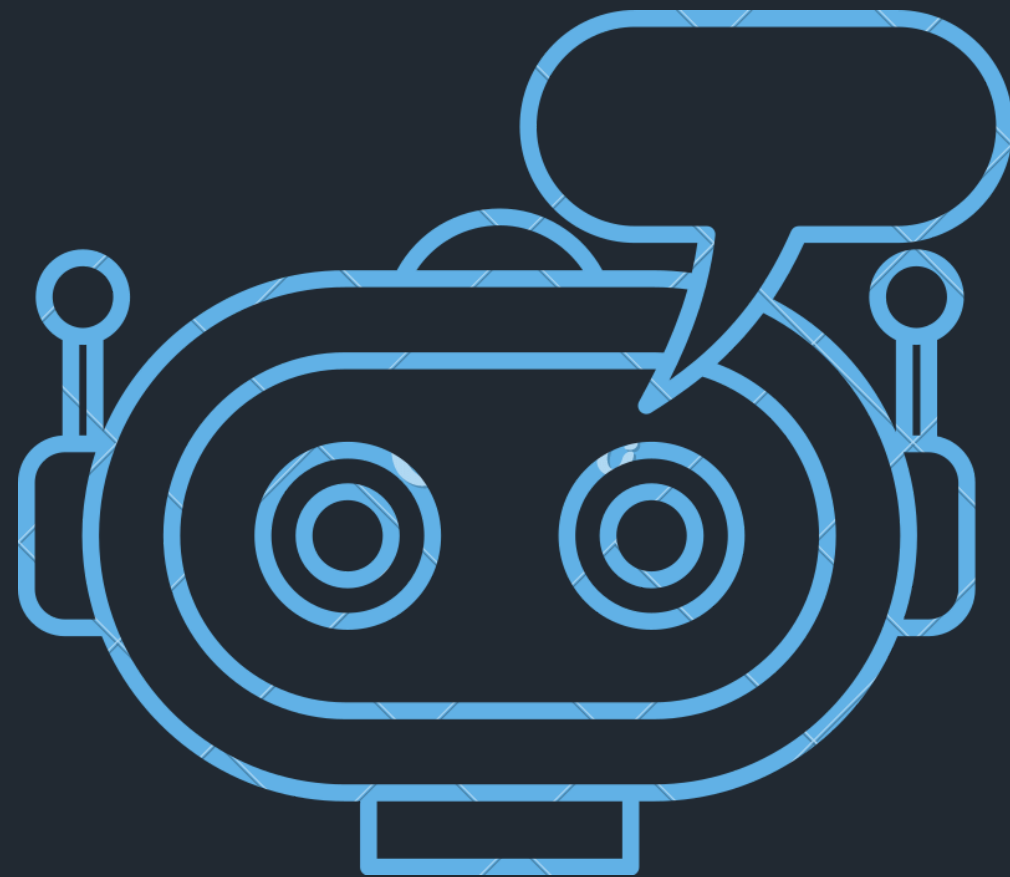
Team Members :

Prince Dalsaniya

Akshay Bhimani

Harsh Agola

INTRODUCTION

We are going to create a chatbot that will help users to have an opinion about the product and whether they should buy it or not..

The chatbot will use machine learning algorithm to determine how good the product actually is using sentiment analysis on the available product reviews.

LITERATURE REVIEW

- "Building Chatbots with Python: Using Natural Language Processing and Machine Learning" [1] -

    Described Types of chatbots

    Components of chatbot

    Libraries/ Frameworks we can used to chatbot

    Create Horoscope Bot

    Deployed on cloud

LITERATURE REVIEW

- **"Ticketing Chatbot Service using Serverless NLP Technology," [2]**

  Chatbot for booking

  POS Tagging

  Divided message into intent and Entity

  Wit.AI

  - used for combination of entity and intent recognition.

  show an F - measure score of 89.65%

LITERATURE REVIEW

" Improving the Sentiment classification " - [3]

- The SVM implements this idea:
  - It maps input vectors into some high dimensional feature space space Z through some non-linear mapping chosen a priori. In this space, a linear decision surface is constructed with special properties that ensure high generalisation ability of the network.
- In other words, the idea of the SVM is to convert data into a high-dimension map according to different features, and then find the best decision line, which leaves the largest margin to any data point in each feature category.
- This makes it to outperform other supervised learning sometimes in Sentiment Classification.

LITERATURE REVIEW

" A Complete Sentiment Analysis Algorithm in Python with Amazon Product Review Data " - [4]

- Then divided the dataset in 2 parts containing Positive and Negative reviews with help of ratings given with the review. (Positive: 1,2, Negative: 4,5)
- Then given labels 0 to Negatives and 1 to Positives.
- Divided the dataset into 2 parts. Training and Testing.
- Extracted features using countvectorizer.
- Applied SVM, Multinomial NB with different Kernels and tested our own reviews.

DATATSET

Greeting intent

```
"intents": [
  {
    "tag": "greeting",
    "patterns": [
      "Hi",
      "Hey",
      "How are you",
      "Is anyone there?",
      "Hello",
      "Good day",
      "Greetings",
      "Hi, How is it going?",
      "How are you doing?"

    ],
    "responses": [
      "Hey :-)",
      "Hello, thanks for visiting",
      "Hi there, what can I do for you?",
      "Hi there, how can I help?"
    ]
  },
```

Ask Review

```
"tag": "ask_review",
"patterns":[
  "I want review for Samsung Galaxy S3",
  "What is review of Apple Iphone 11 pro?",
  " Should I buy Boat Basshead 100 wired earphone?",
  "Can you give me review for Ipad",
  "I want review for *",
  "I want to buy headphones",
  " Review * ",
  "should I buy this product ?",
  "Redmi note 5 is a good purchase?",
  "how good this product is" ,
  "give me reviews",
  "buy me that",
  "help me to buy this product",
  "Is this a good product?",
  "Is this a bad product?",
  "google this prodcut",
  "share me the reviews of this product",
  "help me with the reviews of the product",
  "how to buy ",
  "share me the details of the product",
  "product details",
  "give me product details"

],
"responses":[
  " Please write only product name below ",
  "Please give us the product name again",
  "can you spell the product name again "
]
```

DATATSET

- Kaggle : https://www.kaggle.com/nehasontakke/amazon-unlocked-mobilecsv
- Contains around 16000 reviews for 4410 products

Product Name	Brand Name	Price	Rating	Reviews	Review Votes	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SP	Samsung	199.99	5	I feel so LUCKY to have found this	1	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	4	nice phone, nice up grade from my p	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	Very pleased	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	4	It works good but it goes slow some	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	4	Great phone to replace my lost phon	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	1	I already had a phone with problems	1	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	2	The charging port was loose. I got th	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	2	Phone looks good but wouldn't stay	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	I originally was using the Samsung S	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	3	It's battery life is great. It's very	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	3	My fiance had this phone previously	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	This is a great product it came after	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	These guys are the best! I had a litt	2	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	1	I'm really disappointed about my pho	1	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	Ordered this phone as a replacement	1	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	2	Had this phone before and loved it b	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	I was able to get the phone I previou	6	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	5	I brought this phone as a replaceme	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	4	I love the phone. It does everything	1	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	3	unfortunately Sprint could not activa	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	4	The battery was old & had been ove	0	
"CLEAR CLEAN ESN" Sprint EPIC 4G Galaxy SPH-D7	Samsung	199.99	4	pros-beautiful screen capable of run	0	

WEB SCRAPING & REVIEW

Extract 50 review of that product with title of review and ratings

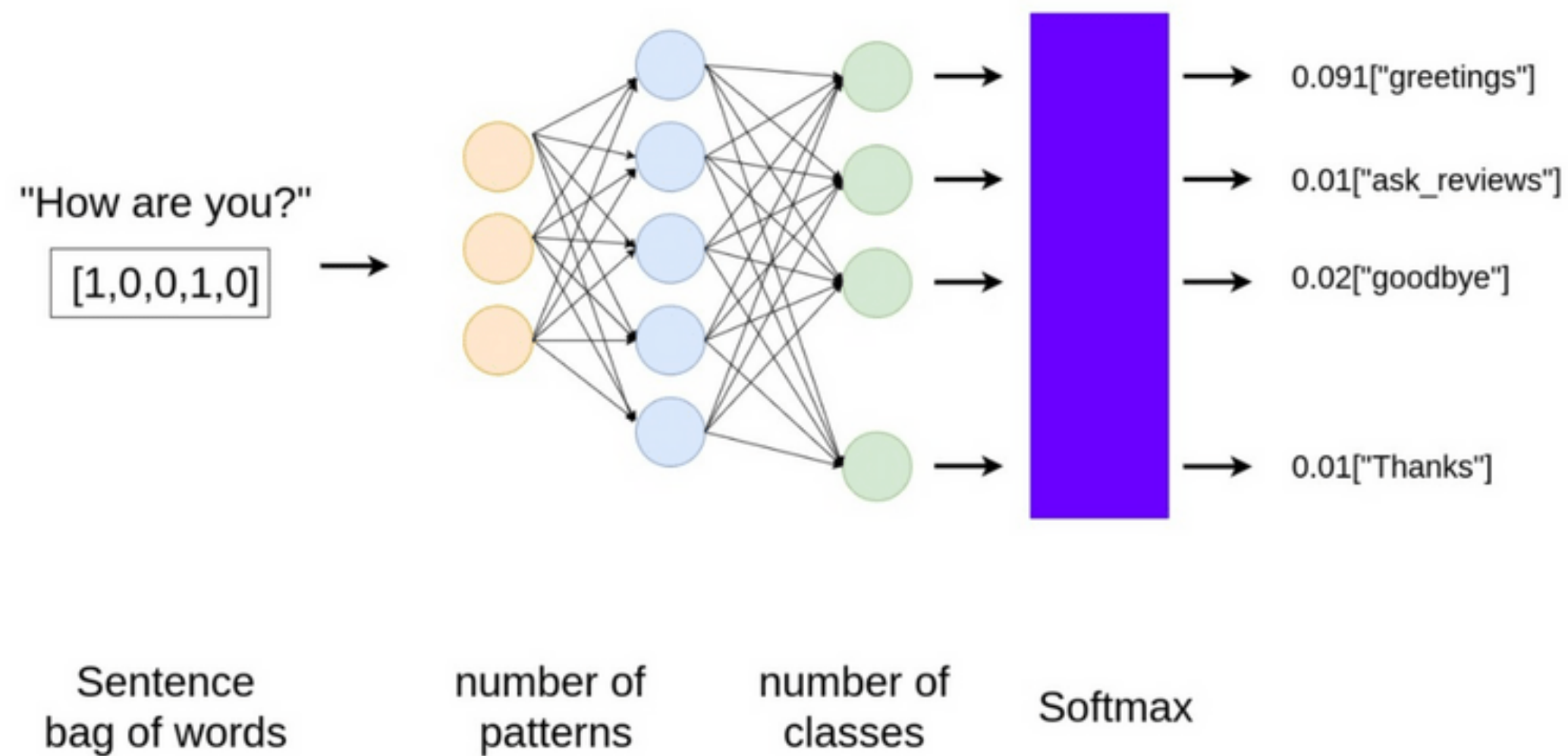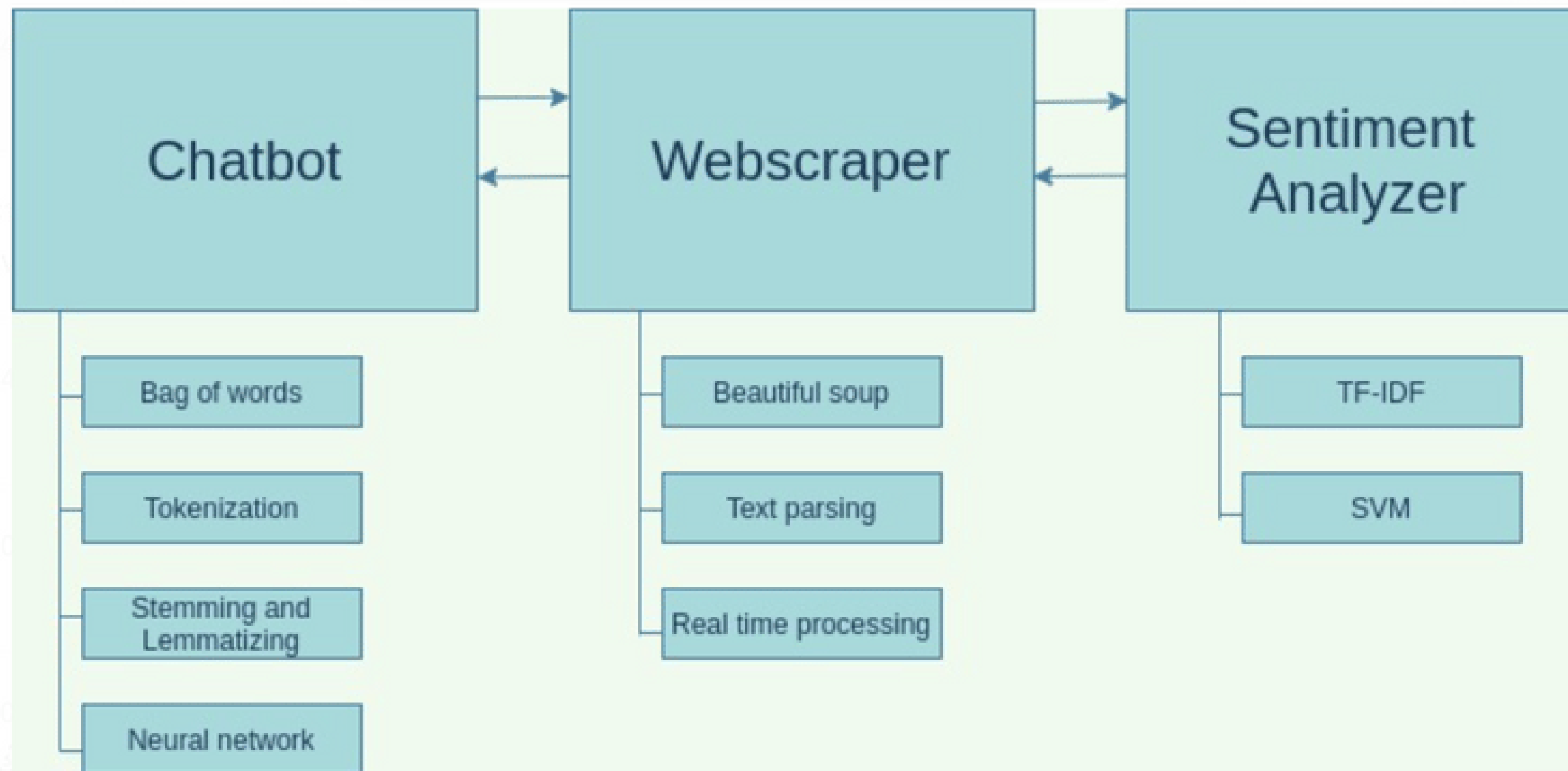|			
Amazon.in:Custom...	Loved 😍😍	5	What a grt phone... superfast speed... camera quality is grt...
Amazon.in:Custom...	It's the Best on class	5	It's Just Mind BlowingThe feel of real old iphone with modren Features
Amazon.in:Custom...	Good	4	Your browser does not support HTML5 video. Good
Amazon.in:Custom...	Great phone	5	Great phone. Got the Pacific Blue during pre order. Its a little big to hold with one hand and heavy.
Amazon.in:Custom...	Upgradable... don't think too much	5	Extremely ultimate product from Apple ... feeling outstanding 😊
Amazon.in:Custom...	The Best Smartphone	5	The charm of iPhone to it's fullest. Camera is great and this build quality feels so premium.
Amazon.in:Custom...	Bad service	1	Phone came seal opened
Amazon.in:Custom...	Good but not value for money	3	It's price is too high
Amazon.in:Custom...	YO YO	5	its a good phone by Apple
Amazon.in:Custom...	Best	5	Like
Amazon.in:Custom...	Iphone	5	Great product and very timely delivery
Amazon.in:Custom...	Nothing	5	IPhone 12 Pro max is looking so Beautiful
Amazon.in:Custom...	Great battery life	5	Best iphone ever
Amazon.in:Custom...	★★★★★	5	Just AWASOME
Amazon.in:Custom...	Overall Performance	5	Owsm Phone but bit costly
Amazon.in:Custom...	Magical device	5	Excellent phone

SCOPE OF THE CHATBOT

- Should be able to understand greeting and reply with greeting.

- Able to understand if user is asking for reviews

- Able to ask for product name if user don't provide it

- Able to extract product name from chat

- return review of that product

- Able to learn from existing responses to formulate new response.

CHATBOT

Working of neural network

"How are you?" [1,0,0,1,0] → → 0.091["greetings"]
→ 0.01["ask_reviews"]
→ 0.02["goodbye"]
→ 0.01["Thanks"]

Sentence bag of words | number of patterns | number of classes | Softmax

CHATBOT

SCOPE OF THE SENTIMENT ANALYSIS

- Give a review, returns Sentiment. (Positive, Negative)

- Give a review, returns Sentiment. (5 types)

- Try different model and try improving accuracy.

- Cover Edge cases.

SENTIMENT ANALYSIS APPROACH

- Divided the dataset into 2 parts Positive and Negative and gave label as 0(Negative) and 1(Positive).
- Made count vectors of training and testing Reviews.
- Made TFIDF vectors of training and testing Reviews.
- Then Implemented SVM with rbf kernel with count vectors and TF-IDF vectors.
- Then Implemented SVM with linear kernel with count vectors and TF-IDF vectors.
- Then Implemented MNB with count vectors.

INTIAL RESULTS

```
You: Hello
SmartBot: Hi there, how can I help?
You: I want to buy apple phone
SmartBot:  Please write product name below
Product Name :Apple Iphone 12 Max
Product is :  Apple Iphone 12 Max
We are processing reviews
You: Thank you
SmartBot: My pleasure
```

INTIAL RESULTS

POSITIVE REVIEWS

```
Review :
With Samsung SuperAmoled display you can truly trust the amazing view angle.
Now in M31s feature of Widevine L Certification you can enjoy all those global Dolby theatre experience.
I found it reliable for my 1920p to 4k level of movie watching without any distraction due to
Infinite O display which gives Full Screen Ratio.
Fingerprint on side is much faster than I expected.
It doesn't takes a second also to open.
Even FaceUnlock is faster.
Sentiment :
Positive review
```

NEGATIVE REVIEWS

```
Review :
This is to share my horrible experience with Amazon and Samsung.
The phone arrived dead and I have to make multiple calls, emails to team to get it replaced.
After technician report confirming that phone is dead they now asking me to go for a refund as product is no longer in stock.
Sentiment :
Negative review
```

INTIAL RESULTS

SVM-RBF-COUNTVEC.

```
accuracy: 0.97125
precision: 0.9712749254045526
recall: 0.97125
F-measure: 0.9712499914149304
```

SVM-LINEAR-COUNTVEC.

```
accuracy: 0.9513333333333334
precision: 0.951346862062715
recall: 0.9513333333333334
F-measure: 0.9513324600020068
```

SVM-RBF-TFIDF

```
accuracy: 0.9803333333333333
precision: 0.98034836857819
recall: 0.9803333333333333
F-measure: 0.98033298041177
```

SVM-LINEAR-TFIDF

```
accuracy: 0.9569166666666666
precision: 0.9569824845481519
recall: 0.9569166666666666
F-measure: 0.9569141547374751
```

MNB

```
accuracy: 0.9336666666666666
precision: 0.9342696231679335
recall: 0.9336666666666666
F-measure: 0.933648255240471
```
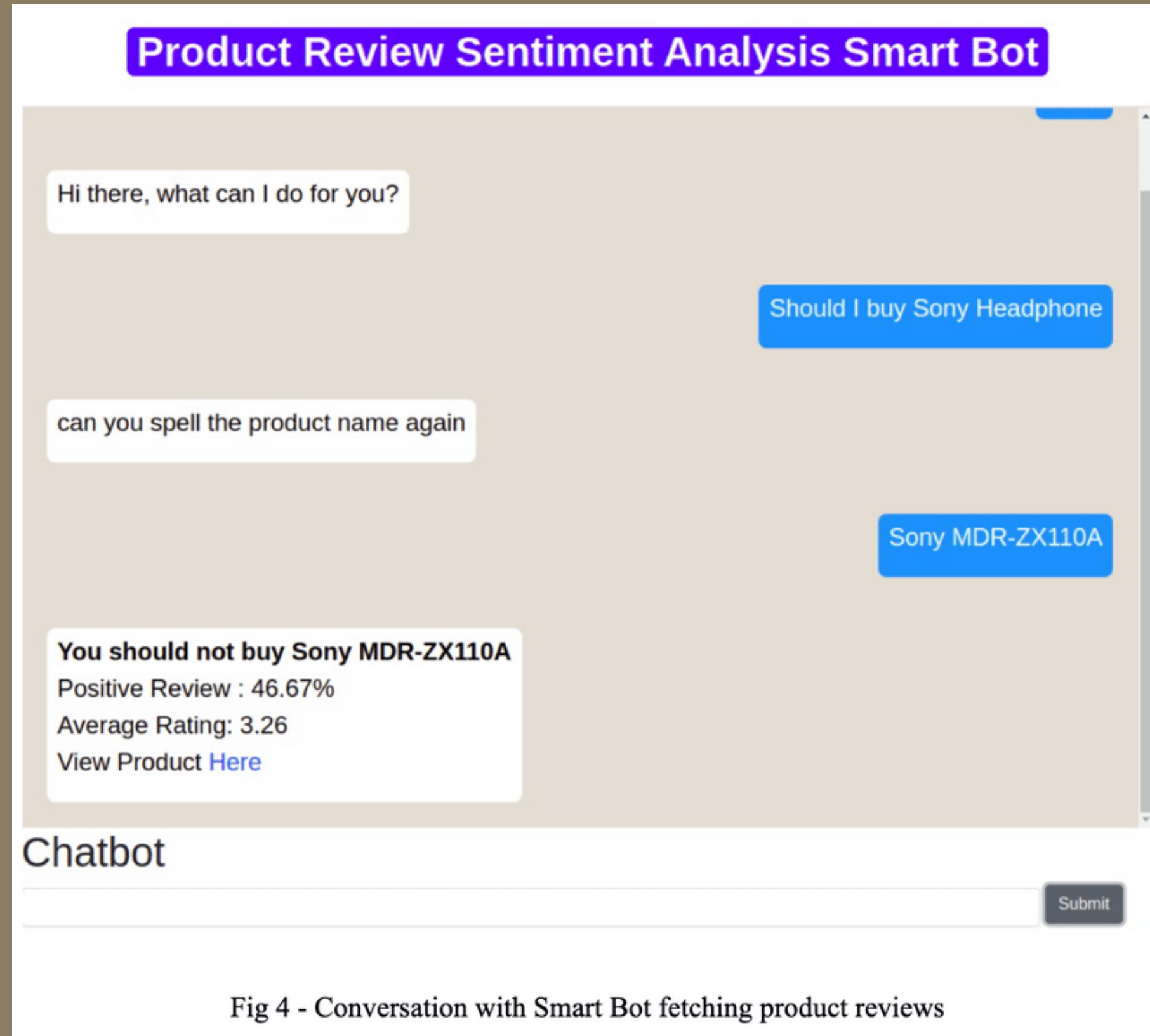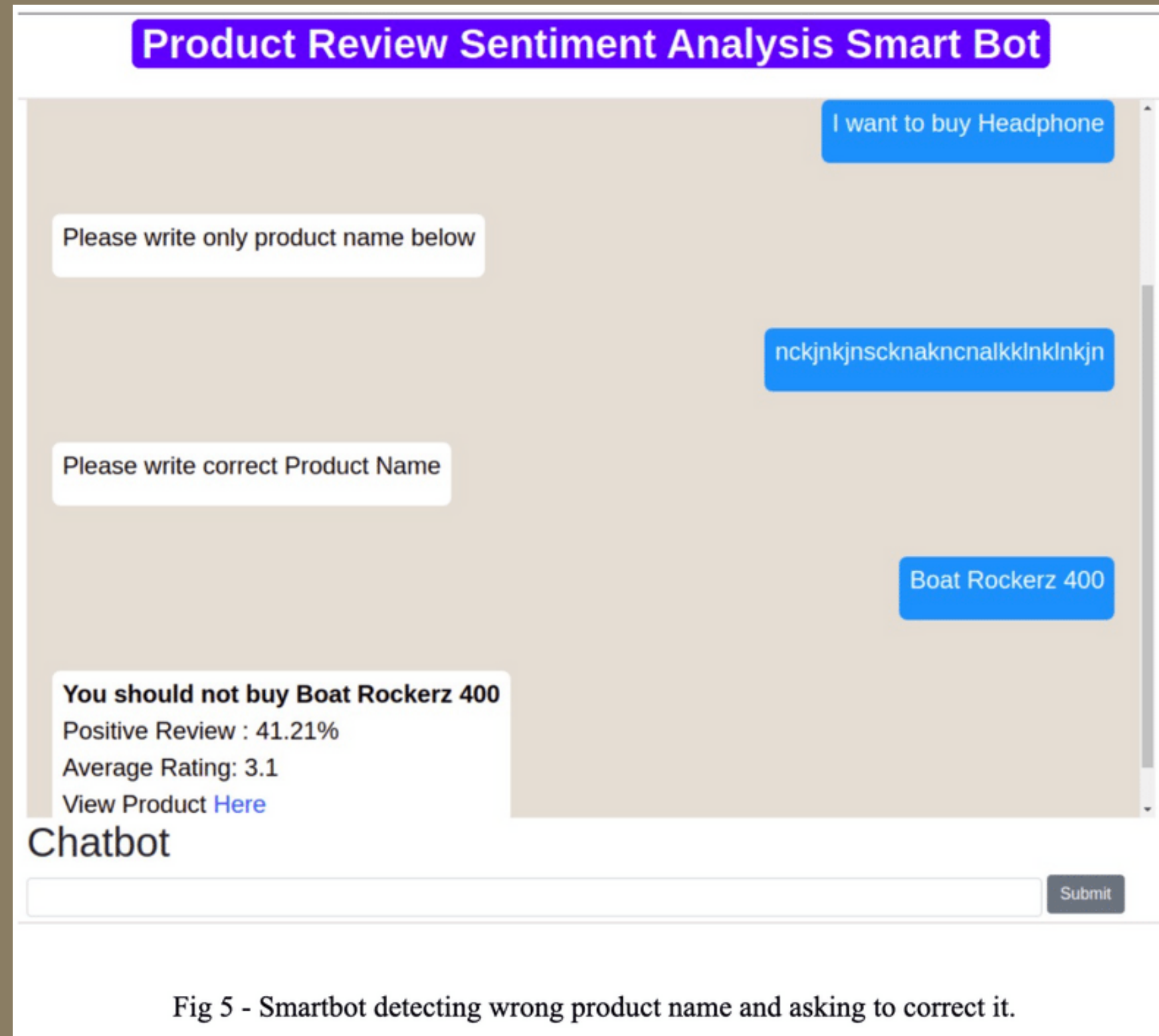
FINAL RESULT

Fig 4 - Conversation with Smart Bot fetching product reviews

FINAL RESULT

Fig 5 - Smartbot detecting wrong product name and asking to correct it.

FUTURE WORK

- Name Entity Recognition (NER)
- Learn from existing results
- Deployment

REFERENCES

[1] S. Raj, Building chatbots with Python: using natural language processing and machine learning. Berkeley, CA: Apress, 2019.

[2] E. Handoyo, M. Arfan, Y. A. Soetrisno, M. Somantri, A. Sofwan, and E. W. Sinuraya, "Ticketing Chatbot Service using Serverless NLP Technology," 2018 5th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE), 2018.

[3] [4]"A Complete Sentiment Analysis Algorithm in Python with Amazon Product Review Data: Step by Step", Medium, 2021. [Online]. Available: https://towardsdatascience.com/a-complete-sentiment-analysis-algorithm-in-python-with-amazon-product-review-data-step-by-step-2680d2e2c23b.

REFERENCES

[4] [3]S. Li, "IMPROVING THE SENTIMENT CLASSIFICATION OF STOCK TWEETS", Etheses.bham.ac.uk, 2014. [Online]. Available: https://etheses.bham.ac.uk/id/eprint/5521/1/Li14PhD.pdf.

[5]Jiao, A., 2020. An Intelligent Chatbot System Based on Entity Extraction Using RASA NLU and Neural Network. Journal of Physics: Conference Series, 1487, p.012014.

[6] Design and implementation of a chatbot for e-commerce , Amir-reza Asadi, Reza Hemadi

THANK YOU