1. INTRODUCTION

Modern apps include options to support users in providing relevant, complete, and correct context information when reporting bugs or feature requests. For example, Facebook attaches more than 30 context items to bug reports submitted via their apps, including the app version installed and the device in use [2]. Despite the presence of such options, an increasing amount of users still report their issues via social media, such as Twitter. A possible reason might be to increase the pressure on software vendors through the public visibility of reported issues. Research has shown, that mining tweets allows additional features and bugs to be extracted, that are not reported in official channels as app stores [3]. Mezouar etal. found that one third of the bugs reported in issue trackers can be discovered earlier by analyzing tweets [4]. Many app vendors are aware of these benefits and have thus created Twitter support accounts as @Netflixhelps, @Snapchatsupport, or @SpotifyCares. Compared to structured reports in issue trackers that usually include context items [5], [6], feedback on Twitter is primarily provided by non-technical users in a less structured way [4]. Tweets that miss basic context items, such as the concerned platform, are likely to be non-actionable to developers. Hence, Fig. 1. Example of a Conversation between User and Support Team on Twitter to obtain Missing Basic Context Items (i.e., the Device and Platform). several support accounts prominently highlight the importance of this information in their Twitter bio. For instance, Spotify's profile includes "for tech queries, let us know your device/operating system", while Netflix states "for tech issues, please include device & error". However, tweets, such as "I can't open playlists shared via WhatsApp on my iPhone XR, iOS 12.1.4, Spotify 8.4.61" that include all basic context items, i.e., the concerned plat-form, device, app and system version, are rare. In contrast, support teams engage in recurring, effortful conversations with users to obtain missing information, as shown in Figure 1.1.

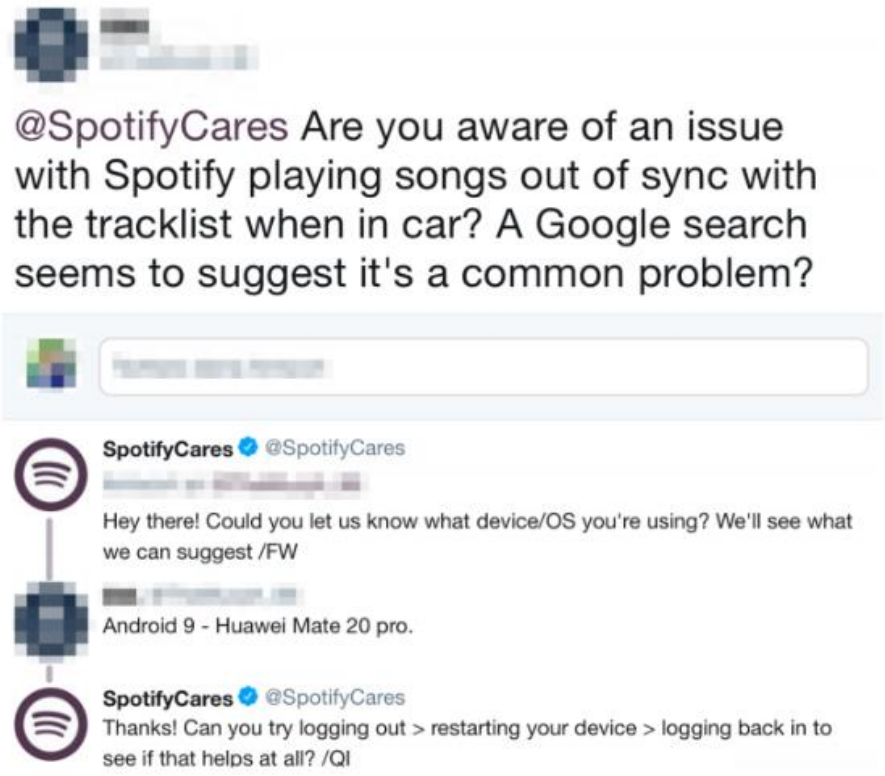

Figure 1.1: Example of a Conversation between User and Support Team on Twitter to obtain Missing Basic Context Items (i.e., the Device and Platform).

1.1 OBJECTIVE

The overall goal of our project is to support both users and developers in exchanging precise context information with the least possible effort. As a first step to this end, this project discusses the automatic identification of context items in informal user-support conversions, related to mobile apps. It is basically centred on the real time conversation and one-third of the bugs in issue trackers can be discovered by analysing the tweets which are tweeted by the users reporting about the problem they are facing with their respective apps. Around ~2.2 million tweets were about the problems on the usage of the apps which the users faced.

1.2 PROBLEM IN EXISTING SYSTEM

The reporting process in social media is unstructured and the feedback from the users often lacks basic context information, such as the app version or the device concerned information, when experiencing the issue. It always difficult to analyze the unstructured feedback for the app

developers. We see that most of the bugs which are fixed, tend to be some feedback from the customer. And it is always not necessary that the app works in the all types of systems (i.e., mobile phones, tablets, desktops) in the same way.[4]

In this model bug reports require the affected app version and Operating System being used, ie. Android or IOS. While feature requests require a description of the desired feature. Traditionally, reporters were technically experienced persons, such as software testers or the developers themselves.

1.3 SOLUTION

We introduce an unsupervised and a better approach, which uses pre-defined keyword lists, word vector representations, text patterns to extract context items from tweets, including the platform, device, app and system versions.

So, in the proposed system we aim to automatically extract basic context items from the respective mentioned tweets. Our approach is intended to be used in combination with a feedback classification and a chat-bot approach to auto-populate issue trackers with structured bug reports mined from user feedback.

1.4 FEATURES

As described in the solution, we will be using an unsupervised approach to understand the tweets. This Solution will be having 2 major features.

- Chat-bot:

  Usually, all the support accounts on the social media are handled by a person. It does have some potential safety issues, including the ability for users to misrepresent themselves, and the fact that it has no review process for tweets.

  Instead of human interaction we will be making use of a chat-bot. Through the chat-bot users can get instant feedback about the issue raise through the bot which automatically replies to the user regarding the problem mentioned by the user in the social media, like twitter. One of the big advantages of using a chat-bot is that it reduces the time of interaction and will forward only the required details for the report. It makes the users comfortable by forwarding their issues to the respective app support accounts which the are extracted and later analyzed thoroughly.

- Report:

  Instead of searching for the related data in a huge pile of unstructured data it makes task easy for the app developers by providing only the relevant data. Generally, the data which is extracted from the any social media platform will be in either JSON format or raw data. If the extracted data is raw data then we must change the data to the JSON format for the better understanding of the data. This data can be then used for auto-populate the issue trackers which are related to the particular support account. This way reports can be very helpful to the developers in order to track a particular bug which is reported in social media.

2. LITERATURE SURVEY

2.1 APPROACH

Developers organize their work using issue trackers. An issue usually corresponds to a unit of work to accomplish an improvement in a software system. Issues can be of different types, such as bug reports or feature requests. When creating an issue of a specific type, issue trackers use structured templates that request specific context items to be provided by the reporter. Bug reports require the affected app version, while feature requests require a description of the desired feature. Traditionally, Research has shown that users include requirements-related information such as bug reports in about one third of their informal feedback. Recent studies specifically emphasized the benefits of mining tweets.

We aim to automatically extract basic context items from tweets. Our approach is intended to be used in combination with a feedback classification and a chatbot approach to auto-populate issue trackers with structured bug reports mined from user feedback. The overall setting can continuously be applied, e.g., to an app's Twitter support account. It can be separated into four phases.[1]

2.1.1 TWEET CLASSIFICATION PHASE

Tweets addressed to the app's support account are classified by their types of requirements-related information. Only tweets reporting bugs (i.e., issues that potentially require context items to be understandable and reproducible by developers), are passed to the next phase. Tweets including other types of information, such as praise (e.g.,''This is the greatest app I've ever used."), are excluded from further analysis. These do not require context items and a chatbot requesting such information would annoy app users.

2.1.2 CONTEXT EXTRACTION PHASE

Our context extraction approach is applied to single tweets or conversations consisting of multiple tweets that report bugs. Each tweet is mined to extract the four basic context items, including the platform, the device, the app version, and the system version. For example, the tweet: "The app widget has died and is now a rectangular black hole. Xperia xz3 running

Android", includes the device and platform. After processing a complete conversation, the approach verifies if all four items could be extracted.

2.1.3 CONTEXT CLARIFICATION PHASE

If the four basic context items could not be extracted, a chatbot requests the missing information. In case of the example above, the chatbot would request the app version and system version by replying to the tweet: "Hey, help's here! Can you let us know the app version you're running, as well as the system version installed? We'll see what we can suggest". The conversations are periodically analyzed to see if the user provided the missing context items.

2.1.4 ISSUE CREATION PHASE

Once all context items are present, they are used to create a structured bug report within the app's issue tracker. The comment section of the issue tracker remains connected with the conversation on Twitter, so that developers can directly communicate with the reporting user to ask for further clarification or inform the user once the issue is fixed.

2.2 INFORMATION GATHERING

The feed back mechanism which are trying to implement will help the developers in understanding the users and also meet their requirements, suggestions given by them in a short period of time.

2.2.1 TYPE OF BOT

Since, we are building a bot which is to be deployed on the social media platform such as twitter, there is always need to understand which type bot to implemented and also take necessary precaution in order to avoid spam messages and other problems. There are different types of bots on social media platform such as twitter. Twitter being a very popular platform for short blogposts it is easy to auto-populate the information on twitter. Below figure shows the taxonomy of different twitter bots.[13]

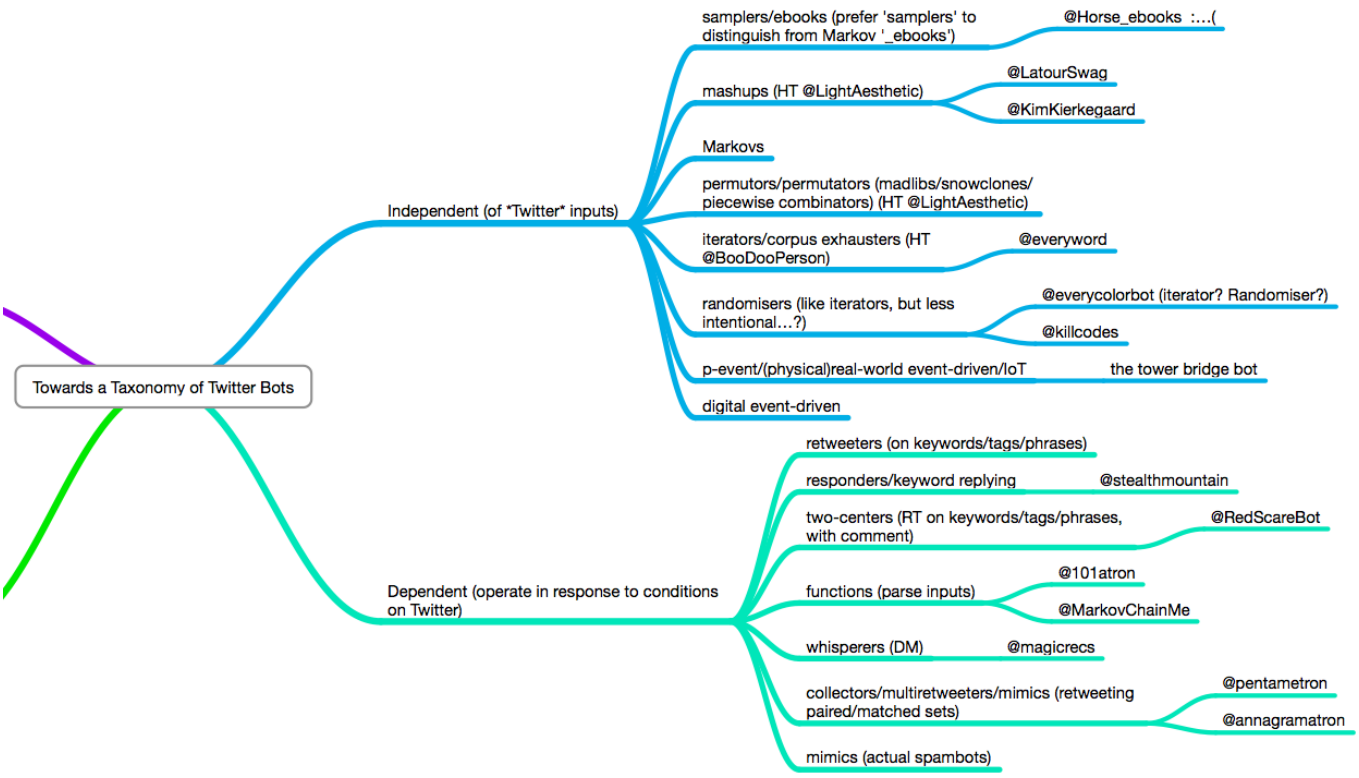

Figure 2.1: Taxonomy of twitter bots

So, we will be building a dependent (operate in response to conditions) responder/ keywording replying bot. This bot will be replying to the tweets of the users when users tag the support account or mention the support account in the hashtag.

2.2.2 JSON Data

JavaScript Object Notation (JSON) is an open standard file format, and data interchange format, that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and array data types (or any other serializable value). It is a very common data format, with a diverse range of applications, such as serving as a replacement for XML in AJAX systems.

JSON is a language-independent data format. It was derived from JavaScript, but many modern programming languages include code to generate and parse JSON-format data. The official Internet media type for JSON is application/json. JSON filenames use the extension .json.

JSON is a syntax for storing and exchanging data. JSON is text, written with JavaScript object notation.

2.2.3 Twitter API

Twitter is what's happening in the world and what people are talking about right now. You can access Twitter via the web or your mobile device. To share information on Twitter as widely as possible, we also provide companies, developers, and users with programmatic access to Twitter data through our APIs. This article explains what Twitter's APIs are, what information is made available through them, and some of the protections Twitter has in place for their use. [7],[11]

At a high level, APIs are the way computer programs "talk" to each other so that they can request and deliver information. This is done by allowing a software application to call what's known as an endpoint: an address that corresponds with a specific type of information we provide (endpoints are generally unique like phone numbers). Twitter allows access to parts of our service via APIs to allow people to build software that integrates with Twitter, like a solution that helps a company respond to customer feedback on Twitter.

Twitter data is unique from data shared by most other social platforms because it reflects information that users choose to share publicly. Our API platform provides broad access to public Twitter data that users have chosen to share with the world. We also support APIs that allow users to manage their own non-public Twitter information (e.g., Direct Messages) and provide this information to developers whom they have authorized to do so.

3. REQUIREMENT SPECIFICATION

3.1 SOFTWARE REQUIREMENTS

The software requirements are description of features and functionalities of the target system. Requirements convey the expectations of users from the software product. The requirements can be obvious or hidden, known or unknown, expected or unexpected from client's point of view.

- **Python 3.6 / 3.5:** The default variant is 64-bit-only and works on macOS 10.9 (Mavericks) and later systems. We also continue to provide a 64-bit/32-bit variant that works on all versions of macOS from 10.6 (Snow Leopard) on.

- **Pycharm IDE:** PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python language. It is developed by the Czech company JetBrains. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCSes), and supports web development with Django as well as Data Science with Anaconda.

- **Twitter Developer account:** Any user can create their own developer account if they are having twitter account. If they are not having twitter account, it is easy to create one. To create a twitter account all you need is an email.

- **Capabilities for data preparation** : You need to make sure you've got the hardware and software necessary to collect, process, analyze, integrate, and store this data.

3.2 HARDWARE REQUIREMENTS

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware, A hardware requirements list is often accompanied by a hardware compatibility list (HCL), especially in case of operating systems. An HCL lists tested, compatible, and sometimes incompatible hardware devices for a particular operating system or application. The following sub-sections discuss the various aspects of hardware requirements.

- **Windows 8,10 - 64 bit** : Windows 10 receives new builds on an ongoing basis, which are available at no additional cost to users, in addition to additional test builds of Windows 10 which are available to Windows Insiders.

- **RAM 4GB**

- **Processor:** Minimum core i3 CPU and 2.50 GHz processor is needed. i7 processors seemed to have lesser cores compared to Xeon processors, but higher frequency. i7 processors are also very easy to overclock, which is not the case with Xeon. Xeon on the other hand, supported much higher RAM – i7 maxed out at 128 GB RAM (that too was available on a single model). Also, the power consumption of Xeon is lower compared to an i7.

- **Hard Drive** : Minimum 32 GB, Recommended 64 GB or more.

3.3 LIBRARIES

- **Tweepy**

  Tweepy is open-sourced, hosted on GitHub and enables Python to communicate with Twitter platform and use its API. It can be easily installed through pip. Tweepy is supported only by older versions of python3 and few versions of python2.

- **Pandas**

  Pandas is a popular Python library for data analysis. It is not directly related to Machine Learning. As we know that the dataset must be prepared before training. In this case, Pandas comes handy as it was developed specifically for data extraction and preparation. It provides high-level data structures and wide variety tools for data analysis. It provides many inbuilt methods for groping, combining and filtering data.

- **NumPy**

  NumPy is a very popular python library for large multi-dimensional array and matrix processing, with the help of a large collection of high-level mathematical functions. It is

very useful for fundamental scientific computations in Machine Learning. It is particularly useful for linear algebra, Fourier transform, and random number capabilities. High-end libraries like TensorFlow uses NumPy internally for manipulation of Tensors.

- **Matplotlib**

  Matpoltlib is a very popular Python library for data visualization. Like Pandas, it is not directly related to Machine Learning. It particularly comes in handy when a programmer wants to visualize the patterns in the data. It is a 2D plotting library used for creating 2D graphs and plots. A module named pyplot makes it easy for programmers for plotting as it provides features to control line styles, font properties, formatting axes, etc. It provides various kinds of graphs and plots for data visualization, viz., histogram, error charts, bar chats, etc.

4. DESIGN OF THE SYSTEM

The most important part of this system is to understand and reply to the users about the app and related queries. This may involve various different types of tweets. The tweets will be classified based on the content or the tweet which is given by the user. The below figures describe about the flow of the system and provide better understanding of the system.

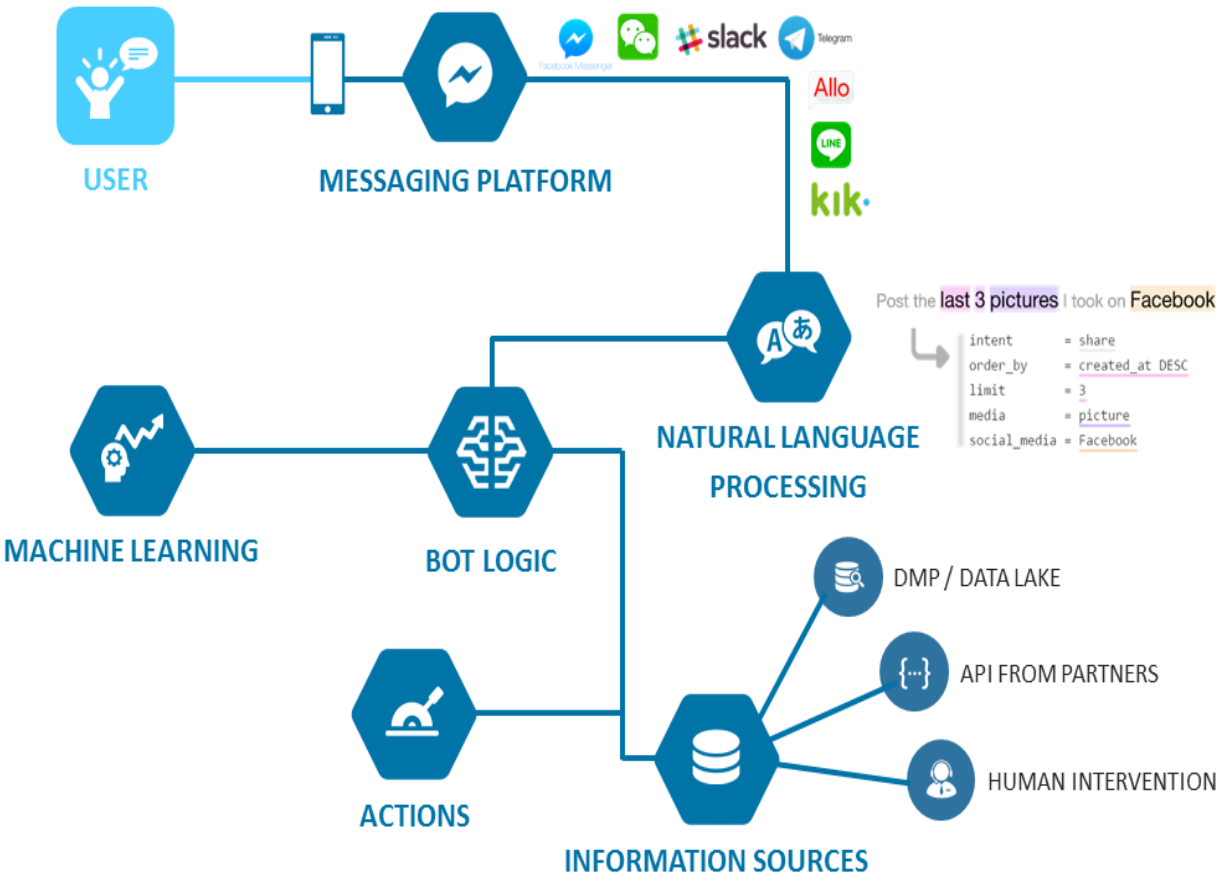

Figure 4.1: Architecture diagram

The architecture diagram describes the flow of the data throughout the system. The messaging platform can be any social media platform. But, for this project we are concerned only with twitter platform. We are use twitter because on twitter people can only write limited number of

words for a particular tweet. As a very first trail we feel that twitter would be a good platform for better understanding of the users taste and problems.

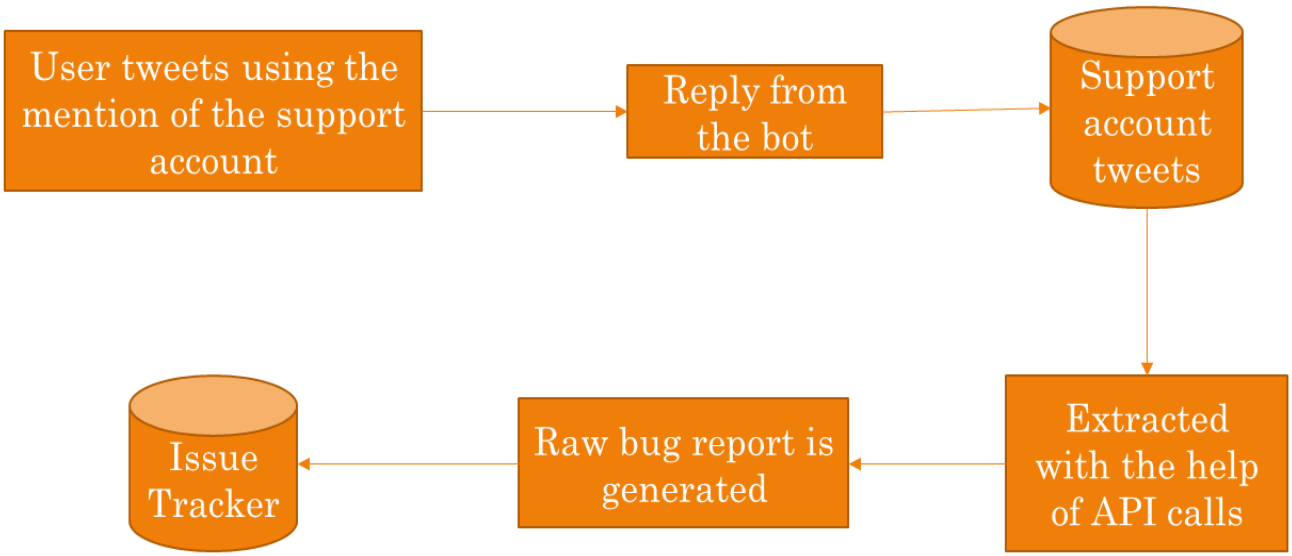

Figure 4.2: Block Diagram

5. MODULES

The designs of different tasks for the implementation of the process are categorized into different modules or phases which help us to make the further processes. All these phases help us to trace or figure out the issues mentioned by the users and resolve their problems. The different phases involved in the process are data set collection, understanding the tweet structure, bot creation and final report generation.

5.1 DATASET COLLECTION

First and foremost, we require a dataset to start up the process. In this module, we collect the dataset which is required for analyzing the tweets from the twitter. To test we can make use of various available support accounts [8],[9],[10]. So, in this process we extract the crawled dataset from the twitter as the first step which is nothing but extracting the raw data from the twitter as tweets. In this step we also convert our gathered raw data set into the json format and intents are created for the tweets.

We can live stream the data for better performance. For liv streaming the tweets we can use twitter API. To get the twitter API one should have a twitter developer account which can be created if the user is having a twitter account. Once we are creating the developer account, we need to generate API keys which are required for the retrieving, creating and extracting data from the twitter. This process involves steps which are mentioned below.

5.1.1 Register Your App

In order to have access to Twitter data programmatically, we need to create an app that interacts with the Twitter API.

The first step is the registration of your app. In particular, you need to point your browser to http://apps.twitter.com, log-in to Twitter (if you're not already logged in) and register a new application. You can now choose a name and a description for your app (for example "Mining Demo" or similar). You will receive a *consumer key* and a *consumer secret*: these are application settings that should always be kept private. From the configuration page of your app, you can also require an access token and an access token secret. Similarly, to the consumer keys, these strings must also be kept private: they provide the application access to Twitter on behalf of your

account. The default permissions are read-only, which is all we need in our case, but if you decide to change your permission to provide writing features in your app, you must negotiate a new access token.

Important Note: there are rate limits in the use of the Twitter API, as well as limitations in case you want to provide a downloadable data-set, see:

- https://dev.twitter.com/overview/terms/agreement-and-policy
- https://dev.twitter.com/rest/public/rate-limiting

5.1.2 Accessing the Data

Twitter provides REST APIs you can use to interact with their service. There is also a bunch of Python-based clients out there that we can use without re-inventing the wheel. In particular, Tweepy in one of the most interesting and straightforward to use, so let's install it:

Pip install tweepy==3.3.0

Update: the release 3.4.0 of Tweepy has introduced a problem with Python 3, currently fixed on github but not yet available with pip, for this reason we're using version 3.3.0 until a new release is available.

More Updates: the release 3.5.0 of Tweepy, already available via pip, seems to solve the problem with Python 3 mentioned above.

In order to authorise our app to access Twitter on our behalf, we need to use the OAuth interface [12] :

```
import tweepy
from tweepy import OAuthHandler
 consumer_key = 'YOUR-CONSUMER-KEY'
consumer_secret = 'YOUR-CONSUMER-SECRET'
access_token = 'YOUR-ACCESS-TOKEN'
```

```
access_secret = 'YOUR-ACCESS-SECRET'

auth = OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_secret)
 api = tweepy.API(auth)
```

The api variable is now our entry point for most of the operations we can perform with Twitter.For example, we can read our own timeline (i.e. our Twitter homepage) with:

```
for status in tweepy.Cursor(api.home_timeline).items(10):
    # Process a single status
    print(status.text)
```

Tweepy provides the convenient Cursor interface to iterate through different types of objects. In the example above we're using *10* to limit the number of tweets we're reading, but we can of course access more. The status variable is an instance of the Status() class, a nice wrapper to access the data. The JSON response from the Twitter API is available in the attribute _json (with a leading underscore), which is not the raw JSON string, but a dictionary. So, the code above can be re-written to process/store the JSON:

```
for status in tweepy.Cursor(api.home_timeline).items(10):
    # Process a single status
    process_or_store(status._json)
```

In this way we can easily collect tweets (and more) and store them in the original JSON format, fairly easy to convert into different data models depending on our storage (many NoSQL technologies provide some bulk import feature).

The function process_or_store() is a place-holder for your custom implementation. In the simplest form, you could just print out the JSON, one tweet per line:

```
def process_or_store(tweet):
    print(json.dumps(tweet))
```

5.1.3 Streaming

In case we want to “keep the connection open”, and gather all the upcoming tweets about a particular event, the streaming API is what we need. We need to extend the StreamListener() to customise the way we process the incoming data. A working example that gathers all the new tweets with the #python hashtag:

```
from tweepy import Stream
from tweepy.streaming import StreamListener
class MyListener(StreamListener):
    def on_data(self, data):
        try:
            with open('python.json', 'a') as f:
                f.write(data)
                return True
        except BaseException as e:
            print("Error on_data: %s" % str(e))
        return True
    def on_error(self, status):
        print(status)
        return True
twitter_stream = Stream(auth, MyListener())
twitter_stream.filter(track=['#python'])
```

Depending on the search term, we can gather tons of tweets within a few minutes. This is especially true for live events with a world-wide coverage (World Cups, Super Bowls, Academy Awards, you name it), so keep an eye on the JSON file to understand how fast it grows and consider how many tweets you might need for your tests.

5.2 ANATOMY OF THE TWEET

It is very simple and easy step to proceed. In this phase, we generally understand the structure of the tweet, which is nothing but it tells us what the tweet is about. In our dataset we will be having different tweets addressing different issues of users.

All the tweets may not be the problem or an issue mentioned by the user. It may be about different issue. Our main concentration in this phase is to identify the tweets which are about the problems or issues facing by the user and classifying the tweets which we require for our process.

Figure 5.1: Display of a tweet


```
{
  "created_at" : "Thu Apr 06 15:24:15 +0000 2017" ,
  "id_str" : "850006245121695744" ,
  "text" : "1\/ Today we\u2019re sharing our vision for the future of the Twitter API platform!\nhttps:\/\/t.co\/Xw
  "user" : {
    "id" : 2244994945 ,
    "name" : "Twitter Dev" ,
    "screen_name" : "TwitterDev" ,
    "location" : "Internet" ,
    "url" : "https:\/\/dev.twitter.com\/" ,
    "description" : "Your official source for Twitter Platform news, updates & events. Need technical help? Visit ht
  } ,
  "place" : {
  } ,
  "entities" : {
    "hashtags" : [
    ] ,
    "urls" : [
      {
        "url" : "https:\/\/t.co\/XweGngmxlP" ,
        "unwound" : {
          "url" : "https:\/\/cards.twitter.com\/cards\/18ce53wgo4h\/3xo1c" ,
          "title" : "Building the Future of the Twitter API Platform"
        }
      }
    ] ,
    "user_mentions" : [
    ]
  }
}
```


Figure 5.2: JSON format of the tweet

The key attributes are the following:

- text: the text of the tweet itself
- created_at: the date of creation
- favorite_count, retweet_count: the number of favourites and retweets
- favorited, retweeted: boolean stating whether the authenticated user (you) have favourited or retweeted this tweet
- lang: acronym for the language (e.g. “en” for english)
- id: the tweet identifier
- place, coordinates, geo: geo-location information if available
- user: the author’s full profile
- entities: list of entities like URLs, @-mentions, hashtags and symbols
- in_reply_to_user_id: user identifier if the tweet is a reply to a specific user
- in_reply_to_status_id: status identifier id the tweet is a reply to a specific status

As you can see there’s a lot of information we can play with. All the *_id fields also have a *_id_str counterpart, where the same information is stored as a string rather than a big int (to avoid overflow problems). We can imagine how these data already allow for some interesting analysis: we can check who is most favourited/retweeted, who’s discussing with who, what are the most popular hashtags and so on. Most of the goodness we’re looking for, i.e. the content of a tweet, is anyway embedded in the text, and that’s where we’re starting our analysis.

We start our analysis by breaking the text down into words. Tokenisation is one of the most basic, yet most important, steps in text analysis. The purpose of tokenisation is to split a stream of text into smaller units called tokens, usually words or phrases. While this is a well understood problem with several out-of-the-box solutions from popular libraries, Twitter data pose some challenges because of the nature of the language.

If we are able to understand the structure of the data then it will be easy to understand which attributes should be used and important. This has a vital role to play in the building of the bug report which is used to auto-populate the issue trackers.

5.3 BOT CREATION

When the user raises a problem or an issue facing with the respective app, he generally addresses the issue in the twitter. So, when this happens there should be some process to reply about the problem to the user from the twitter so that the user knows that there will be some action taken regarding the problem. To make this happen we have to create a twitter bot which replies to the tweet in which the tweet is mentioned. The main libraries which are used for this bot are twit and chatterbot which are used to build the bot. With the help of the intents in json format and Lancaster stemmer module in the NLTK library they will try to understand the data given by the user.

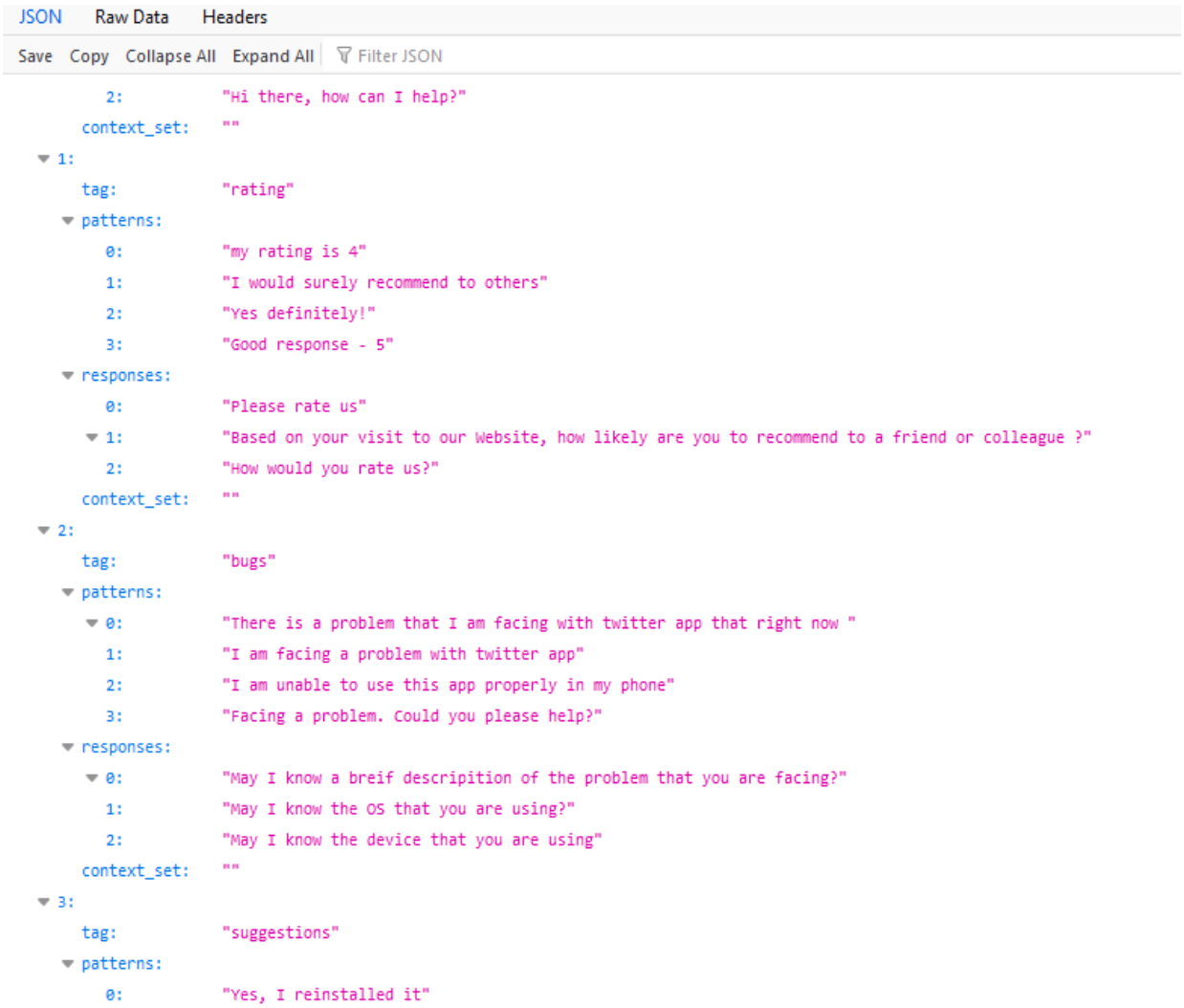

Figure 5.3: Some of the intents for the chatbot

5.4 FINAL GENERATION OF THE REPORT

This is phase we will be extracting the tweets for the twitter with the help of the API from the respective support account. These tweets will then be classified into different categories like rating, feature recommendation and bug reports. The tweets which are extracted will be considered as the raw bug report. With the help of the spacy library we will tokenize the user feedback and retrieve the context items from the text and build the final report with context items and the text from the tweets to the issue tracker.

The report can also have various other representation of the tweets in the form of the graph. For example, many users are finding it difficult to understand and facing issues with one particular update. With the help of graph representation, developers can understand how many numbers of people or users having the same issue and what is the spike of the tweets in the support account and many other different aspects which are related to the app. This report will provide a brief description about the support account present in twitter. For this we will be using mathplotlib library for the graph plotting and other visualization of the timeline of the support account.

6. IMPLEMENTATION

Source Code:

This code includes all the twitter API keys which may be change accordingly.

File 1: my_bot.py

```
import tweepy

import time

print('This is my twitter bot')

CONSUMER_KEY = 'dY3EFmDvP5LSFnXVyuJ0lC7zc'

CONSUMER_SECRET = '89XcinAWIGqjb5WJxczJXWg7974vdLfpYhKgKxxsVbjuicwYDq'

ACCESS_KEY = '1234094606381268993-8T1KuTIDVDu1HK9usfZ0azXO7TAjD4'

ACCESS_SECRET = 'u2KjJBmUVivgqCH3a5lM1lR3n5RT8dLTxPZLka5q5u3kL'

auth = tweepy.OAuthHandler(CONSUMER_KEY, CONSUMER_SECRET)

auth.set_access_token(ACCESS_KEY, ACCESS_SECRET)

api = tweepy.API(auth)

FILE_NAME = 'last_seen_id.txt'

def retrieve_last_seen_id(file_name):

    f_read = open(file_name, 'r')

    last_seen_id = int(f_read.read().strip())

    f_read.close()
```

```
    return last_seen_id

def store_last_seen_id(last_seen_id, file_name):

    f_write = open(file_name, 'w')

    f_write.write(str(last_seen_id))

    f_write.close()

    return

def reply_to_tweets():

    print('retrieving and replying to tweets...')

    last_seen_id = retrieve_last_seen_id(FILE_NAME)

    mentions = api.mentions_timeline(

                last_seen_id,

                tweet_mode='extended')

    for mention in reversed(mentions):

        print(str(mention.id) + ' - ' + mention.full_text)

        last_seen_id = mention.id

        store_last_seen_id(last_seen_id, FILE_NAME)

        if 'bug' in mention.full_text.lower():

            print('found keyword bug')

            print('responding back...')
```

```
        if 'android' in mention.full_text.lower():
            print('found the context item')
            print('responding back.....')
            api.update_status('@' + mention.user.screen_name + '  We will look into your it, Thnx for reporting..!!', mention.id)
        elif 'ios' in mention.full_text.lower():
            print('found the context item')
            print('responding back......')
            api.update_status('@'+mention.user.screen_name+ '  We will look into your it, Thnx for reporting..!!', mention.id)
        elif 'windows' in mention.full_text.lower():
            print('found the context item')
            print('responding back......')
            api.update_status('@'+mention.user.screen_name+ '  We will look into your it, Thnx for reporting..!!', mention.id)
        else:
            print('responding back.....')
            api.update_status('@' + mention.user.screen_name + '  can u provide the device details with #bug or #problem and tag us again ??', mention.id)
       elif 'problem' in mention.full_text.lower():
```

```
        print('found keyword problem')

        if 'android' in mention.full_text.lower():

            print('found the context item')

            print('responding back.....')

            api.update_status('@' + mention.user.screen_name + '  We will look into your it, Thnx for reporting..!!', mention.id)

        elif 'ios' in mention.full_text.lower():

            print('found the context item')

            print('responding back......')

            api.update_status('@'+mention.user.screen_name+ '  We will look into your it, Thnx for reporting..!!', mention.id)

        elif 'windows' in mention.full_text.lower():

            print('found the context item')

            print('responding back......')

            api.update_status('@'+mention.user.screen_name+ '  We will look into your it, Thnx for reporting..!!', mention.id)

        else:

            print('responding back.....')

            api.update_status('@' + mention.user.screen_name + '  can u provide the device details with #bug or #problem and tag us again ??', mention.id)
```

```
    elif 'rating' in mention.full_text.lower():
        print('reponding back....')
        api.update_status('@' + mention.user.screen_name + '  Thnx for rating us. Also rate us in the playstore', mention.id)
    elif 'rate' in mention.full_text.lower():
        print('reponding back....')
        api.update_status('@' + mention.user.screen_name + '  Thnx for rating us. Also rate us in the playstore', mention.id)
    elif 'bad' in mention.full_text.lower():
        print('reponding back....')
        api.update_status('@' + mention.user.screen_name + '  sorry for you inconvience we will look into it', mention.id)
    elif 'slow' in mention.full_text.lower():
        print('reponding back....')
        api.update_status('@' + mention.user.screen_name + '  we have fixed some bugs. Pls try upadating.', mention.id)
    elif 'Goodbye' in mention.full_text.lower():
        print('reponding back....')
        api.update_status('@' + mention.user.screen_name + '  Pls rate us in the playstore.', mention.id)
    else:
```

```
        print('responding back....')

        api.update_status('@' + mention.user.screen_name + 'If any issues pls post ur queries and tag us @BootsMajor and a hashtag', mention.id)

while True:

    reply_to_tweets()

    time.sleep(15)
```

File 2: Streamer.py

```
from tweepy.streaming import StreamListener

from tweepy import OAuthHandler

from tweepy import Stream

import twitter_credentials

class TwitterStreamer():

    def __init__(self):

        pass

    def stream_tweets(self, fetched_tweets_filename, hash_tag_list):

        listener = StdOutListener(fetched_tweets_filename)

        auth = OAuthHandler(twitter_credentials.CONSUMER_KEY, twitter_credentials.CONSUMER_SECRET)
```

```
        auth.set_access_token(twitter_credentials.ACCESS_TOKEN,
twitter_credentials.ACCESS_TOKEN_SECRET)

        stream = Stream(auth, listener)

        stream.filter(track=hash_tag_list)

class StdOutListener(StreamListener):

    def __init__(self, fetched_tweets_filename):

        self.fetched_tweets_filename = fetched_tweets_filename

    def on_data(self, data):

        try:

            file = open("twitter.json", "a")

            file.write(data + '\n')

            file.close()

            print('Record Saved')

        except BaseException as e:

            print("Error on_data %s" % str(e))

        return True

    def on_error(self, status):

        print(status)

if __name__ == '__main__':
```

```
hash_tag_list = ["#BootsMajor"]

fetched_tweets_filename = "tweets.txt"

twitter_streamer = TwitterStreamer()

twitter_streamer.stream_tweets(fetched_tweets_filename, hash_tag_list)
```

JSON Data which is considered to the report:

{"created_at":"Fri Mar 27 08:05:37 +0000 2020","id":1243449078752505856,"id_str":"1243449078752505856","text":"I am facing problems in using ur app. @BootsMajor #BootsMajor","source":"\u003ca href=\"http:\/\/twitter.com\/download\/android\" rel=\"nofollow\"\u003eTwitter for Android\u003c\/a\u003e","truncated":false,"in_reply_to_status_id":null,"in_reply_to_status_id_str":null,"in_reply_to_user_id":null,"in_reply_to_user_id_str":null,"in_reply_to_screen_name":null,"user":{"id":1021751122824818690,"id_str":"1021751122824818690","name":"Charitha","screen_name":"Charith99879854","location":"Hyderabad, India","url":null,"description":"Student at BVRIT Hyd","translator_type":"none","protected":false,"verified":false,"followers_count":3,"friends_count":91,"listed_count":0,"favourites_count":58,"statuses_count":48,"created_at":"Tue Jul 24 13:37:05 +0000 2018","utc_offset":null,"time_zone":null,"geo_enabled":false,"lang":null,"contributors_enabled":false,"is_translator":false,"profile_background_color":"F5F8FA","profile_background_image_url":"","profile_background_image_url_https":"","profile_background_tile":false,"profile_link_color":"1DA1F2","profile_sidebar_border_color":"C0DEED","profile_sidebar_fill_color":"DDEEF6","profile_text_color":"333333","profile_use_background_image":true,"profile_image_url":"http:\/\/abs.twimg.com\/sticky\/default_profile_images\/default_profile_normal.png","profile_image_url_https":"https:\/\/abs.twimg.com\/sticky\/default_profile_images\/default_profile_normal.png","default_profile":true,"default_profile_image":false,"following":null,"follow_request_sent":null,"notifications":null},"geo":null,"coordinates":null,"place":null,"contributors":null,"is_quote_status":false,"quote_count":0,"reply_count":0,"retweet_count":0,"favorite_count":0,"entities":{"hashtags":[{"text":"BootsMajor","indices":[50,61]}],"urls":[],"user_mentions":[{"screen_name":"BootsMajor","name":"Major_Boots_rescue","id":1234094606381268993,"id_str":"1234094606381268993","indices":[38,49]}],"symbols":[]},"favorited":false,"retweeted":false,"filter_level":"low","lang":"en","timestamp_ms":"1585296337198"}

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7. TESTING

Outputs:

The final output is the interactive bot on twitter. If anyone wants to access it then the respective person must tweet by using of the tag @BootsMajor and #BootsMajor.

The entire code is pushed to a cloud – Python anywhere which helps us to keep the bot always running. The major reason of pushing the code to the cloud is that the even when the code crashes there is a minimal chance of bot not running in the background.

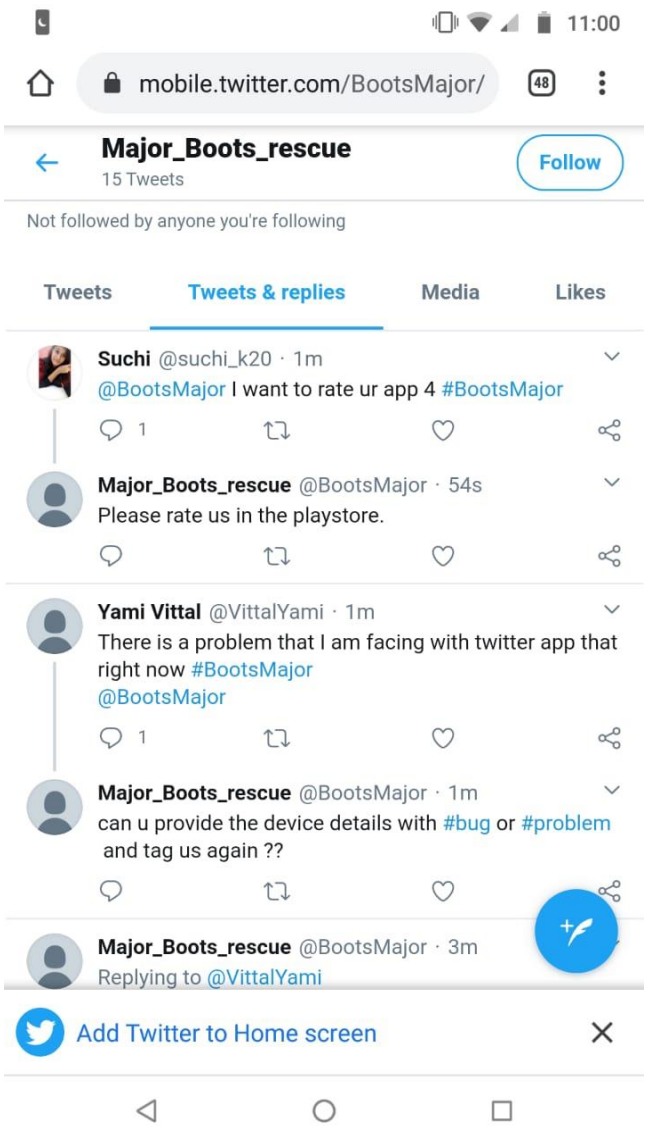

Figure 7.1: Major_boots_rescue is the chat-bot replying to the user

8. CONCLUSION AND FUTURE SCOPE

8.1 CONCLUSION

Despite built-in options to report issues in a structured manner, users continue to share a large amount of unstructured, informal feedback on software products via social media. This feedback contains information of relevance to development teams, such as bug reports or feature requests. Support teams engage in effortful conversations with users to clarify missing context. We introduced a simple approach that accurately extracts basic context information from unstructured, informal user feedback on mobile apps, including the platform, device, app version, and system version. For the extraction of the data we have used the tweets from twitter which contains little information about the problem. Combined with a chat-bot, this system automatically requests missing context items from reporting users. The data which is being extracted from the user accounts are then analysed which is used for developing bug reports

8.2 FUTURE SCOPE

In future, we will try to identify and separate reported issues into actionable or non-actionable category. Actionable issues can be used to auto-populate issue trackers with structured information. Non-actionable issues can be automatically clarified, e.g., by chatbots requesting the missing context items from users. The overall performance could also be improved and customized with the help of tweets tweeted by the users. We will also try processing the images and videos through various machine learning algorithms. Also we will resolve the problems related to the platform and other compatibility issues in the use of tweepy.

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