

**FAST-NUCES**  
**Department of Computer Science**  
**BS-CS**



**What's Trending?**

**Project Proposal**  
**Project-1 CS 4091**

<b>Talha Ahmad</b>	<b>19F-0113</b>
<b>M. Talha Shehroze</b>	<b>19F-0171</b>
<b>Muhammad Farhan</b>	<b>19F-0254</b>

<b>Project Supervisor:</b>	<b>Mr. Rizwan ul Haq</b>
<b>Project Co-supervisor:</b>	<b>Mr. Sajid Anwer</b>



**National University of Computer and Emerging Sciences**  
**Chiniot–Faisalabad Campus**

## Anti-Plagiarism Declaration

This is to declare that the above publication produced under the:

**Title: What's Trending?** is the sole contribution of the author(s) and no part hereof has been reproduced on **as it is** basis (cut and paste) which can be considered as **Plagiarism**. All referenced parts have been used to argue the idea and have been cited properly. I/We will be responsible and liable for any consequence if violation of this declaration is determined.

Date: \_\_\_\_\_

### Student 1

Name: Talha Ahmad

Signature: \_\_\_\_\_

### Student 2

Name: M. Talha Shehroze

Signature: \_\_\_\_\_

### Student 3

Name: Muhammad Farhan

Signature: \_\_\_\_\_

## **Intellectual Property Right Declaration**

This is to declare that the work under the

### **Title: What's Trending?**

Conducted in partial fulfillment of the requirements of:

o Course Project o BS FYP o MS Thesis

This is the sole property of the National University of Computer and Emerging Sciences and is protected under the intellectual property high laws and conventions. It can only be considered/used for purposes like an extension for further enhancement, product development, adoption for commercial/organizational usage, etc., with the permission of the University. The above statement applies to all students and faculty.

Date: \_\_\_\_\_

### **Student 1**

Name: Talha Ahmad

Signature: \_\_\_\_\_

### **Student 2**

Name: M. Talha Shehroze

Signature: \_\_\_\_\_

### **Student 3**

Name: Muhammad Farhan

Signature: \_\_\_\_\_

### **Supervisor (Faculty)**

Name: Mr. Rizwan ul Haq

Signature: \_\_\_\_\_

## **Acknowledgment**

Firstly, we would like to pay our all gratitude and thanks to Almighty ALLAH for giving us the courage to undertake this task. We would also like to thank the Department of Computer Science of FAST-NUCES, Chiniot-Faisalabad Campus, for providing us with the opportunity to be a part of this reputed organization, gain some experience and groom ourselves for future professional responsibilities.

We are very grateful to Mr Rizwan ul Haq our respectable Supervisor and Mr Sajid Anwer our respectable Co-supervisor for their continuous help, support, and time.

# Table of Contents

1. Introduction .....	1
2. Vision Document .....	1
2.1. Problem Statement .....	1
2.2. Business Opportunity .....	2
2.3. Objectives .....	2
2.4. Scope .....	2
2.5. Constraints .....	3
2.6. Stakeholder and User Description .....	3
2.6.1. Market Demographics .....	3
2.6.2. Stakeholder Summary .....	3
2.6.3. User Summary .....	4
2.6.4. User Environment .....	5
2.6.5. Stakeholder Profiles .....	5
3. System Requirement Specification .....	6
3.1. System Features .....	6
3.2. Functional Requirements .....	7
3.2.1. User Authentication .....	7
3.2.2. Trend Quality .....	7
3.2.3. Trend Analysis .....	7
3.2.4. Bot Account recognition .....	7
3.2.5. Statistical analysis of Twitter account .....	7
3.2.6. Data Visualization .....	7
3.2.7. Developer API Portal .....	8
3.3. Non functional requirement .....	8
3.3.1. Performance .....	8
3.3.2. Availability .....	8
3.3.3. Robustness .....	8
3.3.4. Security .....	8
3.3.5. Maintainability .....	8
3.3.6. Capacity .....	9

4. Use Case Diagram .....	9
5. High Level Use Case .....	10
5.1. Sign Up User .....	10
5.2. Authenticate User .....	10
5.3. Trend Quality.....	10
5.4. Trend Analysis .....	10
5.5. Bot Account Recognition.....	11
5.6. Statistical Analysis of Profile .....	11
5.7. Data Visualize .....	11
5.8. Developer API.....	11
6. Expanded Use Case.....	12
6.1. Sign Up User .....	12
6.2. Authenticate User .....	12
6.3. Trend Quality.....	13
6.4. Trend Analysis .....	13
6.5. Bot Account Recognition.....	14
6.6. Statistical Analysis of Profile .....	15
6.7. Data Visualize .....	15
6.8. Developer API.....	16
7. Component Diagram .....	17
8. Data Flow Diagram .....	18
9. Package Diagram .....	19
10. State Machine Diagram .....	21
11. Swim Lane Diagram.....	23
11.1. Swim Lane Diagram of User Interface .....	24
11.2. Swim Lane Diagram of Developer API .....	25
12. System Sequence Diagram .....	26
12.1. Sign up .....	26
12.2. Login.....	27
12.3. Trend Analysis.....	28
12.4. Trend Quality .....	29
12.5. Bot Account Recognition .....	30

12.6.	Statistical Analysis of Profile.....	31
12.7.	Developer API .....	32
13.	Sequence Diagram .....	33
13.1.	UI Interface .....	33
13.2.	Developer API Interface.....	34
14.	Architecture Diagram.....	35

## Tabular Contents

Table 1: Problem Statement .....	1
Table 2: Stakeholder Summary .....	3
Table 3: User Summary .....	4
Table 4: Stakeholder Profiles .....	5
Table 5: High Level Use Case of Sign Up User .....	10
Table 6: High Level Use Case of Authenticate User .....	10
Table 7: High Level Use Case of Trend Quality .....	10
Table 8: High Level Use Case of Trend Analysis .....	10
Table 9: High Level Use Case of Bot Account Recognition .....	11
Table 10: High Level Use Case of Statistical Analysis of Profile .....	11
Table 11: High Level Use Case of Data Visualize .....	11
Table 12: High Level Use Case of Developer API .....	11
Table 13: Expanded Use Case of Sign Up User .....	12
Table 14: Expanded Use Case of Authenticate User .....	12
Table 15: Expanded Use Case of Trend Quality .....	13
Table 16: Expanded Use Case of Trend Analysis .....	13
Table 17: Expanded Use Case of Bot Account Recognition .....	14
Table 18: Expanded Use Case of Statistical Analysis of Profile .....	15
Table 19: Expanded Use Case of Data Visualize .....	15
Table 20: Expanded Use Case of Developer API .....	16



## Table of Figures

Figure 1: Use Case Diagram .....	9
Figure 2: Component Diagram .....	17
Figure 3: Classic DFD in Gane-Sarson notation .....	18
Figure 4: Package Diagram .....	20
Figure 5: State Machine Diagram .....	22
Figure 6: Swim Lane Diagram of UI Interface .....	24
Figure 7: Swim Lane Diagram of Developer API Interface .....	25
Figure 8: SSD of Sign Up .....	26
Figure 9: SSD of Login .....	27
Figure 10: SSD of Trend Analysis .....	28
Figure 11: SSD of Trend Quality .....	29
Figure 12: SSD of Bot Account Recognition .....	30
Figure 13: SSD of Statistical Analysis of Profile .....	31
Figure 14: SSD of Developer API .....	32
Figure 15: Sequence Diagram of User Interface .....	33
Figure 16: Sequence Diagram of Developer Interface .....	34
Figure 17: Architecture Diagram .....	35



## 1. Introduction

What's Trending? is to educate and assist users in distinguishing between what they consume on Twitter. The web platform deals with trending keywords. Users will be able to identify organic trends from the forced or paid trends before they form an opinion. The Application will provide the user with an interface to view trending keywords, further he can manually add any keyword and check on them if the data is available for that specific word. Also, The user will also have an option to view statistical analysis on some Twitter account or on the trending keyword.

In this document, we will briefly explain the features of What's Trending? The document also explains the software requirement specifications. We will deal with all the design related issues as well as the requirements together with the scope of this project. This document will be continuously updated and on completion will be referred throughout the software development.

## 2. Vision Document

In this section, we discuss project vision in detail.

### 2.1. Problem Statement

*Table 1: Problem Statement*

Problem of	distinguishing right and wrong, real and fake, authentic and spam, unique, and bot tweets and thus the trends in real time.
Affects	both businesses and general public.
Impact of which	there is no product that can be used to distinguish between genuine and spam tweets, making it impossible to distinguish between genuine trends and spammy ones.

A Successful solution would be	A platform that can authenticate users, retrieve tweets from Twitter based on keywords, display results graphically, compare data, and statistically differentiate spam from legitimate tweets will be a successful solution.
--------------------------------	---

## 2.2. Business Opportunity

People in the present period use social media, particularly Twitter, to find out what other people are thinking and talking about so they may quickly gain knowledge, comprehend, defend, and create opinions. People can learn more about what's going on in their area thanks to this.

There are some products out there that somewhat relates to what we do, but they have relatively few features. The product that is currently on the market has several restrictions. Firstly, none of them carry out our features exactly. Additionally, they do not classify and evaluate Twitter trends and rate them based on actual/spam content. Although some software offers one or two of the features, there isn't a single solution that offers all of them. This creates a significant issue for businesses and the general public who lack access to a specific platform that can be used to complete all the stated activities.

## 2.3. Objectives

The main Objective of What's Trending? Is to provide people a quick and accurate overview of trends, so that they can analyse trends just at glance rather than spending time to manually analyse.

## 2.4. Scope

What's Trending? Is web application. The main problem we are currently facing is that there is no platform available where people can check quality of trend, analyse trend. The impact of it is that people participate in fake/low quality trend. They consider information to be legit which was spreading through these

trends. WhatsTrending? will provide an environment through which be able to analyse these trends before taking any action.

## 2.5. Constraints

Firstly, we assume that internet will work fine all the time to load web page. The website does not require any hardware development or procurement.

## 2.6. Stakeholder and User Description

As there are projects which are analysing people profiles, but they are not providing analysis of trend. The differentiating edge of this product is that application will be in real-time. The potential users of this application will be all the literate people who know the usage of web-based application and twitter.

### 2.6.1. Market Demographics

Our target market includes the general public, businesses, and all English-speaking Twitter users. In order to give them a better platform for unique and valid content and enable them to absorb just the real information.

Everyone is turning away from traditional sources of information and migrating toward social media, particularly Twitter.

It can be used by PTA and possibly Twitter to cut down on spam and teach users on how to make better decisions, but for this project, the intended audience is the general public.

### 2.6.2. Stakeholder Summary

*Table 2: Stakeholder Summary*

Name	Description	Responsibilities
Developer	The developer who are developing the system.	Design the flow of system development Monitor progress of development

Tester	Testing system	Removing bugs from system
Trainer	Train system on data	Check and increase accuracy of system on result
Maintainer	Provide maintenance of system	Adding, removing, or modifying feature of system.

### 2.6.3. User Summary

Table 3: User Summary

Name	Description	Responsibilities	Stakeholder
Actor	Person Registered	For first time user need to register on system. Otherwise, login. Can interact with application interface	Development team, User
Secondary Actor	System	Acquired data from twitter through API, Trend analysis	The end user who are getting result about trend

#### 2.6.4. User Environment

As this is a one-year project, we are developing a web-based application which will analyse trend and will predict quality of trend. There are 3 members in our group who are working on this project.

The project has been divided into 5 different stages. In September, October we are doing Requirement Specifications, October and November are for Design and Analysis, November to February is for Implementation, February and March are for Testing, March and April are for Deployment.

#### 2.6.5. Stakeholder Profiles

Table 4: Stakeholder Profiles

Representative	We are three members working on this project. The stakeholder of system include developer, tester, trainer, maintainer.
Description	Developer is managing requirement, planning thing according to it and writing code for application. Developer is managing requirement, planning thing according to it and writing code for application. Tester will test system and make sure that system is bug free. Trainer will train system on dataset and will make sure its accuracy of result. Maintainer will maintain the product after its development and will add or remove feature.

Type	Our group of three members are working on this project. We have divided work into small task and task was done by all of us.
Responsibilities	Develop a system which help people to analyse trend. Providing easily understandable interface to user.
Success Criteria	Firstly, system will acquire data related to trend using Twitter API, then according to option selected by user system will provide accurate result on real time data.
Involvement	All stakeholder is participating in development of system.
Deliverables	Project deliverable will be same as mentioned.
Issues	We have to face issue of identification of bot account while system training.

### 3. System Requirement Specification

In this section, features and requirements of the system are explained.

#### 3.1. System Features

- User authentication
- Analyze trends
- Developer Portal
- Data visualization
- Bot account recognition in trend
- Statistical analysis of account



## **3.2. Functional Requirements**

The functional requirements of the system are listed below.

### **3.2.1. User Authentication**

A graphical interface will be provided to the user for login. New users will sign up for an account. Each user will be provided with a recommendation according to his added keyword.

### **3.2.2. Trend Quality**

The Keywords provided by the user system will predict Trend quality based on factors i.e., unique account participation, unique message, analyzing trend starter accounts, checking bot accounts participation, and some other factors by using AI, and ML techniques.

### **3.2.3. Trend Analysis**

The keyword entered by the user for statistical analysis will predict the trend timeline, growth rate, growth region, activity graph, popular tweet, and popular retweet.

### **3.2.4. Bot Account recognition**

The username will be provided by the user; The system will identify whether the participating account was operated by a fake, bot, or authentic account.

### **3.2.5. Statistical analysis of Twitter account**

The username will be provided by the user; the system will provide a detailed overview of that Twitter account.

### **3.2.6. Data Visualization**

The system will provide frequency analysis and visualize data. It will include the frequency of total account participating, real account, bot account, total tweets made, unique tweets, unique accounts participating in the keyword,

number of times the keyword is used, same message retweet, gender ratio, age ratio, and platform ratio.

### **3.2.7. Developer API Portal**

System will provide a portal to developer where they provide query to system and system show result in JSON format.

## **3.3. Non functional requirement**

The functional requirements of the system are listed below.

### **3.3.1. Performance**

The basic functionality of What's Trending? is its performance, how system will perform, its throughput, accuracy, response time. It's crashing or failure chance will be very low. It should quickly respond to the user.

### **3.3.2. Availability**

The system should be available 24/7. Every time authenticated user made request service will be provided to him.

### **3.3.3. Robustness**

What's Trending? should allow user to achieve their desired result.

### **3.3.4. Security**

There will be no issue of data security. The username and password would be required for authentication. The user who has register on website would be given permission to access made request.

### **3.3.5. Maintainability**

The software should be maintainable. This means that the proper Object oriented principle should be applied so that in future, if there is any need to

update a particular module than the developer needs to modify only specific classes.

### 3.3.6. Capacity

What's Trending? Will be able to support multiple users at a time.

## 4. Use Case Diagram

A use case diagram is a graphical depiction of a user's possible interactions with a system. Use case diagrams specify how the system interacts with actors without worrying about the details of how that functionality is implemented.

Below uses case diagram show user interaction with functionalities that will be provided by what's trending.

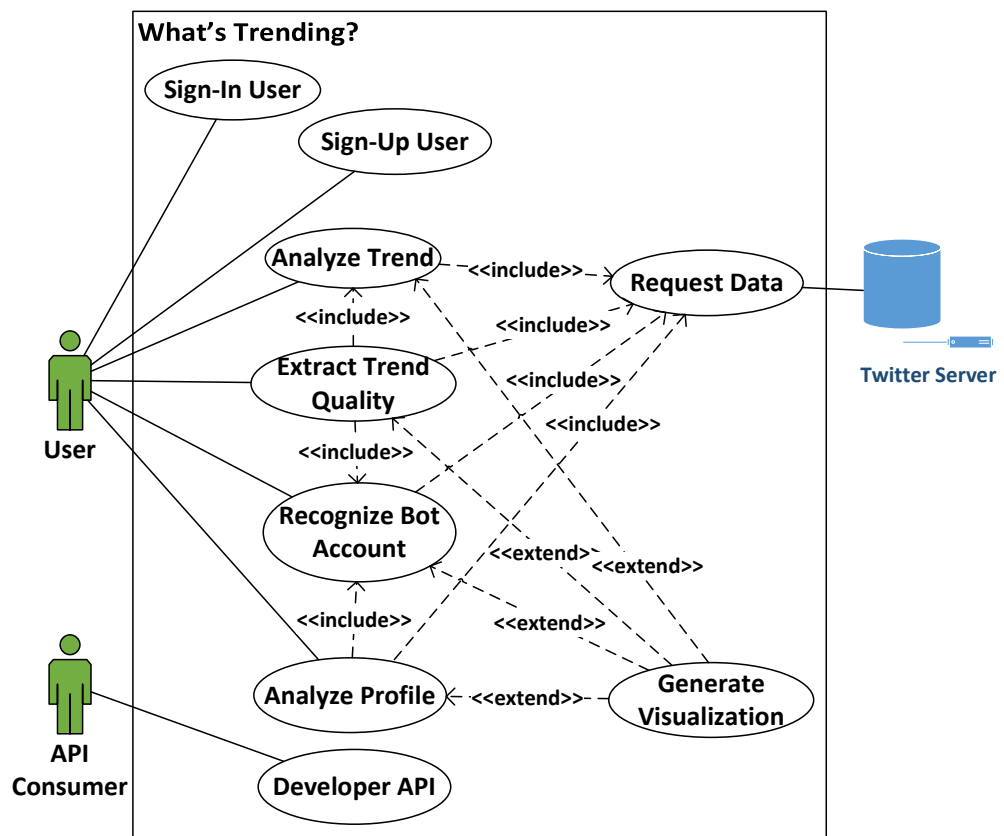


Figure 1: Use Case Diagram

## 5. High Level Use Case

In early stages of software development, when no detailed decisions have been made about the design of the system then we use high level use case. These descriptions need only purpose of the use case, the actors involved and give a general overview of what happens.

### 5.1. Sign Up User

*Table 5: High Level Use Case of Sign Up User*

Use Case Name	Sign Up User
Actor	User
Type	Primary
Description	The user needs to be registered on system to continue using system.

### 5.2. Authenticate User

*Table 6: High Level Use Case of Authenticate User*

Use Case Name	Authenticate User
Actor	User
Type	Primary
Description	The user needs to be authenticated to continue using system

### 5.3. Trend Quality

*Table 7: High Level Use Case of Trend Quality*

Use Case Name	Trend Quality
Actor	User
Type	Primary
Description	The Keywords provided by the user, the system will predict Trend quality in terms of Authentic, Fabricated, or intermediate.

### 5.4. Trend Analysis

*Table 8: High Level Use Case of Trend Analysis*

Use Case Name	Trend Analysis
Actor	User
Type	Primary

Description	The Statistical method will be applied on trend to extract information. The system will show the result in graphical form.
-------------	--

## 5.5. Bot Account Recognition

Table 9: High Level Use Case of Bot Account Recognition

Use Case Name	Bot Account Recognition
Actor	System, User
Type	Secondary, Primary
Description	The System would recognize and identify the Bot accounts.

## 5.6. Statistical Analysis of Profile

Table 10: High Level Use Case of Statistical Analysis of Profile

Use Case Name	Statistical Analysis of Profile
Actor	User
Type	Primary
Description	The system would perform statistical analysis.

## 5.7. Data Visualize

Table 11: High Level Use Case of Data Visualize

Use Case Name	Data Visualize
Actor	User
Type	Primary
Description	After Analysing trend, system will show result in graphical form.

## 5.8. Developer API

Table 12: High Level Use Case of Developer API

Use Case Name	Developer API
Actor	Programmer
Type	Primary
Description	The third-party user will request the System to perform one of provided the use-case.

## 6. Expanded Use Case

This description is more detailed and structured than the high-level use case description. It includes what happens to initiate the use case, actors involved, what data has to be input, use case output and alternate flow.

### 6.1. Sign Up User

Following is brief description of Signup use case, that describe step user should do to sign up on system and alternate flow if he faces problem.

*Table 13: Expanded Use Case of Sign Up User*

Use Case Name	Sign Up User
Actor	User
Description	The user needs to be registered on system to continue using system.
Pre-condition	The User has access system through web portal.
Post-condition	The User has successfully created account on system.
Normal flow	<ol style="list-style-type: none"> <li>1. User access system through web portal.</li> <li>2. User will enter email address, username, password and confirm password.</li> <li>3. User will be redirect to login page.</li> </ol>
Alternate flow	<ol style="list-style-type: none"> <li>1.a Make sure to have internet connection and try again.</li> <li>3.a User is unable to login Re-enter password and confirm password they don't match.</li> </ol>
Frequency of Use	Normal
Assumption	The user knows how to sign up

### 6.2. Authenticate User

Following is brief description of Login use case, that describe step user should do to sign in on system and alternate flow if he faces problem.

*Table 14: Expanded Use Case of Authenticate User*

Use Case Name	Authenticate User
Actor	User
Description	The user needs to be authenticated to continue using system.
Pre-condition	User has access system through web portal.
Post-condition	The User has successfully logged in on system and redirected to login page.
Normal flow	<ol style="list-style-type: none"> <li>1. User access system through web portal.</li> <li>2. User enter username and password.</li> <li>3. User will be redirected to dashboard page.</li> </ol>
Alternate flow	<ol style="list-style-type: none"> <li>1.a Website is not accessible by user. Make sure to have internet connection and try again.</li> </ol>

	3.a User is unable to login. username or password don't match in database. Make sure to enter correct username and password. 3.b User is unable to login, user profile does not exist in system. Create new account and try again.
Frequency of Use	Normal
Assumption	The user knows how to login

### 6.3. Trend Quality

Following is brief description of trend quality use case, that describe conditions and step that user must fulfill to get result and alternate flow if he faces problem.

*Table 15: Expanded Use Case of Trend Quality*

Use Case Name	Trend Quality
Actor	User
Description	The Keywords provided by the user, the system will predict Trend quality in terms of Authentic, Fabricated, or intermediate.
Pre-condition	The user must provide a keyword to the system, so the system can get the required data.
Post-condition	The System will provide the prediction of whether the trend is authentic or not.
Normal flow	<ol style="list-style-type: none"> <li>1. The user selects the option of Trend Quality.</li> <li>2. Users enter a keyword manually or from the provided keyword list.</li> <li>3. The system will perform Trend Analysis.</li> <li>4. The system will classify the trend.</li> <li>5. The system will predict trend authenticity.</li> </ol>
Alternate flow	5.a System is unable to perform operation due to insufficient data. Try again with another keyword with sufficient data.
Frequency of Use	Normal
Assumption	Users want to know the quality of trend of specific keyword.

### 6.4. Trend Analysis

Following is brief description of trend analysis use case, that describe conditions and step that user must fulfill to get result and alternate flow if he faces problem.

*Table 16: Expanded Use Case of Trend Analysis*

Use Case Name	Trend Analysis
Actor	User
Description	The Statistical method will be applied on trend to extract information. The system will show the result in graphical form.
Pre-condition	The user must provide a keyword to the system, so the system can get the required data.

Post-condition	The meaningful information on the requested trend will be shown to the user in graphical form.
Normal flow	<ol style="list-style-type: none"> <li>1. Users enter a keyword manually or from the provided keyword list.</li> <li>2. The user selects the option of Trend Analysis.</li> <li>3. The system will apply Statistical operation on a trend.</li> <li>4. The results will be shown to the user in graphical form.</li> </ol>
Alternate flow	4.a System is unable to do trend analysis due to insufficient data. Try again with another keyword with sufficient data.
Frequency of Use	High
Assumption	The user wants an overall overview of the trend.

## 6.5. Bot Account Recognition

Following is brief description of Recognition of bot account use case, that describe conditions and step that user must fulfill to get result and alternate flow if he faces problem.

*Table 17: Expanded Use Case of Bot Account Recognition*

Use Case Name	Bot Account Recognition
Actor	System, User
Description	The user can request for Bot account recognition, or the System requires it during Profile Analysis.
Pre-condition	User must be logged in.
Post-condition	User/System will be notified if the account is recognized as bot or not.
Normal flow	<ol style="list-style-type: none"> <li>1. System or User provides the profile's username.</li> <li>2. Requests for bot account recognition.</li> <li>3. The system performs analysis and displays outcome.</li> </ol>
Alternate flow	<ol style="list-style-type: none"> <li>3.a System is unable to display result because no user exists with provided username. Renter corrects username and try again.</li> <li>3.b System is unable to display result due to lack of data. Try again with another username.</li> </ol>
Special Requirement	Availability of Internet
Assumption	The User or System wants to know if an account is operated by bot or actual user.



## 6.6. Statistical Analysis of Profile

Following is brief description of statistical analysis of profile use case, that describe conditions and step that user must fulfill to get result and alternate flow if he faces problem.

*Table 18: Expanded Use Case of Statistical Analysis of Profile*

Use Case Name	Statistical Analysis of Profile
Actor	User
Description	The user can request for statistical analysis of any profile.
Pre-condition	User must be logged in.
Post-condition	User will get a report about the Profile's Statistical Analysis.
Normal flow	1. The user requests for Account statistical analysis. 2. User enters the profile's username. 3. The system performs statistical analysis and displays outcome.
Alternate flow	3.a System is unable to display result because no user exists with provided username. Renter corrects username and try again. 3.b System is unable to display result due to lack of data or account is set to private. Try again with another username.
Frequency of Use	Normal
Assumption	The user wants to know the statistical details about any user's profile.

## 6.7. Data Visualize

Following is brief description of data visualize use case, that describe step and condition that user should do and then system show result to user.

*Table 19: Expanded Use Case of Data Visualize*

Use Case Name	Data Visualize
Actor	User
Description	After successful statistical operation, system will show result in graphical form.
Pre-condition	System has successfully completed any desired operation.
Post-condition	The user will be provided with result in graphical form.
Normal flow	1. The user enter keyword manually or from provided keyword list. 2. The user selects any desired operation. 3. Data in graphical form is shown to user.
Alternate flow	3.a system is unable to show result to user due to insufficient data. Try again with keyword that have sufficient data.
Frequency of Use	High
Assumption	The user wants result in graphical form.

## 6.8. Developer API

Following is brief description of Developer API use case, that describe conditions and step that user must fulfill to get result and alternate flow if he faces problem.

*Table 20: Expanded Use Case of Developer API*

Use Case Name	Developer API
Actor	Programmer
Description	The third-party user will request the System to perform one of provided the use-case.
Pre-condition	The Request is valid. The Twitter Access keys are valid.
Post-condition	The system will respond according to request.
Normal flow	<ol style="list-style-type: none"> <li>1. The Programmer will request the system.</li> <li>2. The request is Valid.</li> <li>3. The system will request data from Twitter API related to the keyword.</li> <li>4. The system will perform operations according to request.</li> <li>5. The system will respond according to request.</li> </ol>
Alternate flow	2.a Request is invalid. Try again with correct request. 4.a system is unable to perform operation due to insufficient data. Try request with another keyword.
Frequency of Use	High
Assumption	Users want to know the quality of the trend of the related keyword.

## 7. Component Diagram

A component diagram breaks down the actual system under development into various high levels of functionality. A component defines its behavior in terms of provided and required interfaces.

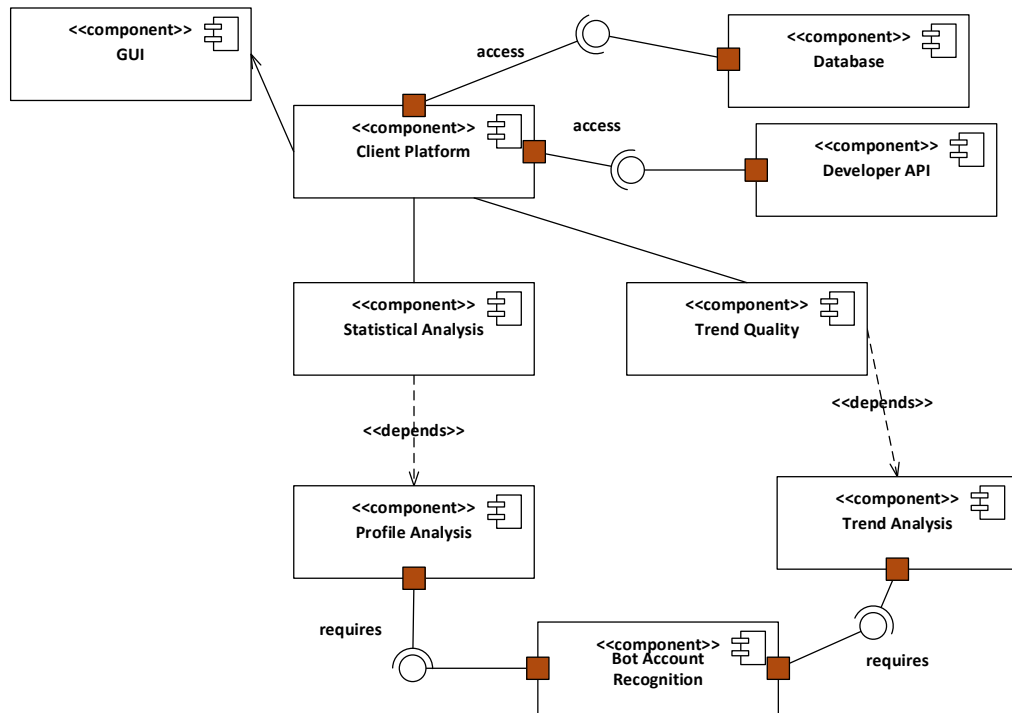


Figure 2: Component Diagram

## 8. Data Flow Diagram

Data-flow diagrams are system models that show a functional perspective where each transformation represents a single function or process. DFDs are used to show how data flows through a sequence of processing steps.

The figure below shows Classic DFD that is drawn for what's trending. It shows user that who will interact with system. In between user and process, there is data flow that indicate the existence of information exchange between user and system.

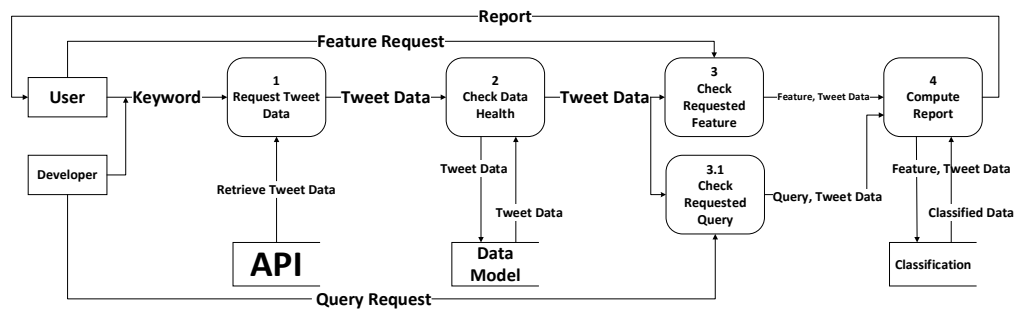


Figure 3: Classic DFD in Gane-Sarson notation

## 9. Package Diagram

Package diagrams are often used to illustrate the logical architecture of a system—the layers, subsystems, packages. package diagram provides a way to group elements.

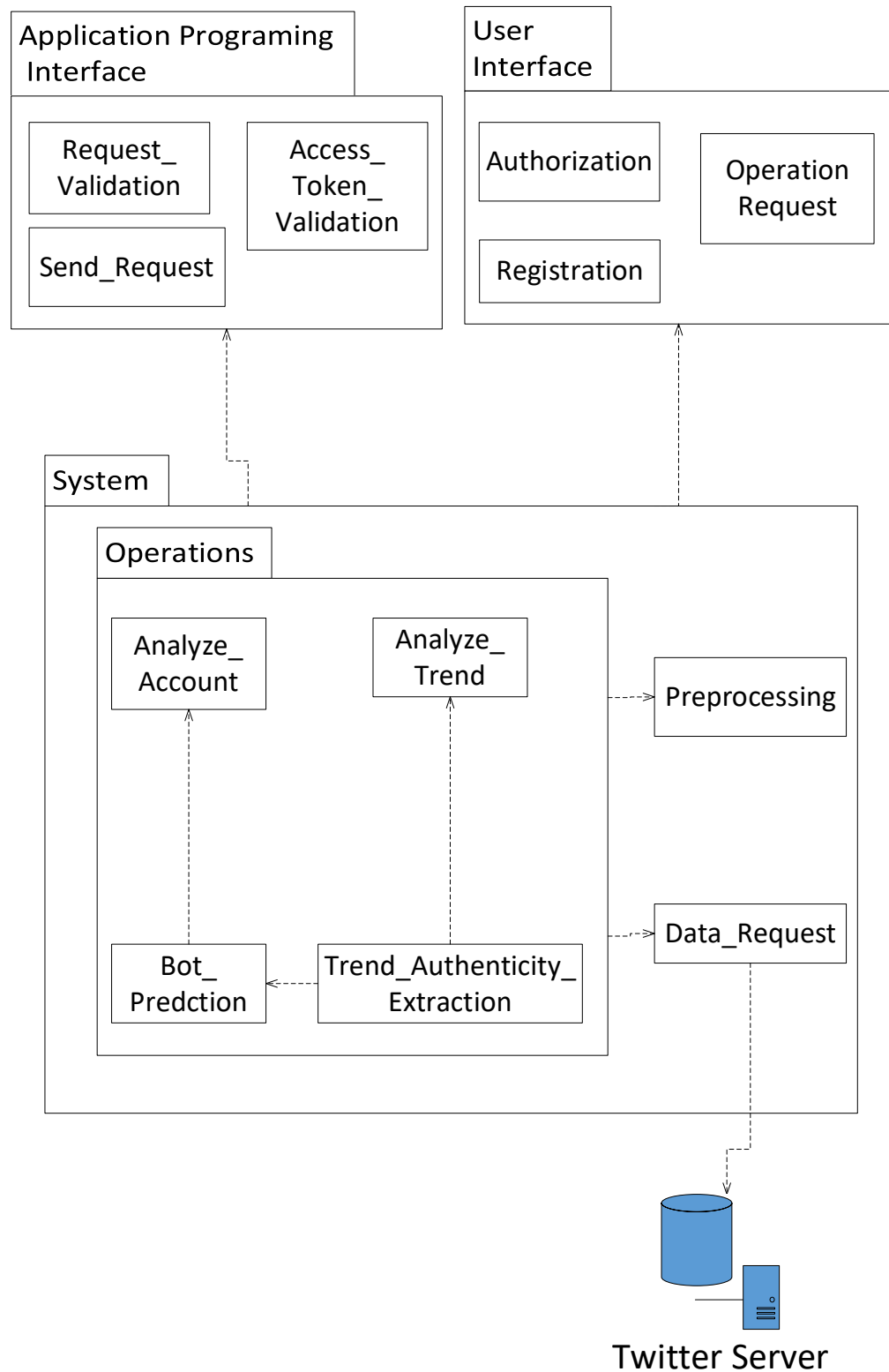


Figure 4: Package Diagram

## 10. State Machine Diagram

A state machine diagram shows the lifecycle of an object: what events it experiences, its transitions, and the states it is in between these events. The figure below shows state machine that is drawn for what's trending. It shows transition of state on user interaction with system. Initially system is in idle state, after user authentication state system enter dashboard state. If user select simple user, system goes into simple user state, otherwise system goes to developer portal state. In both state it waits for user interaction.

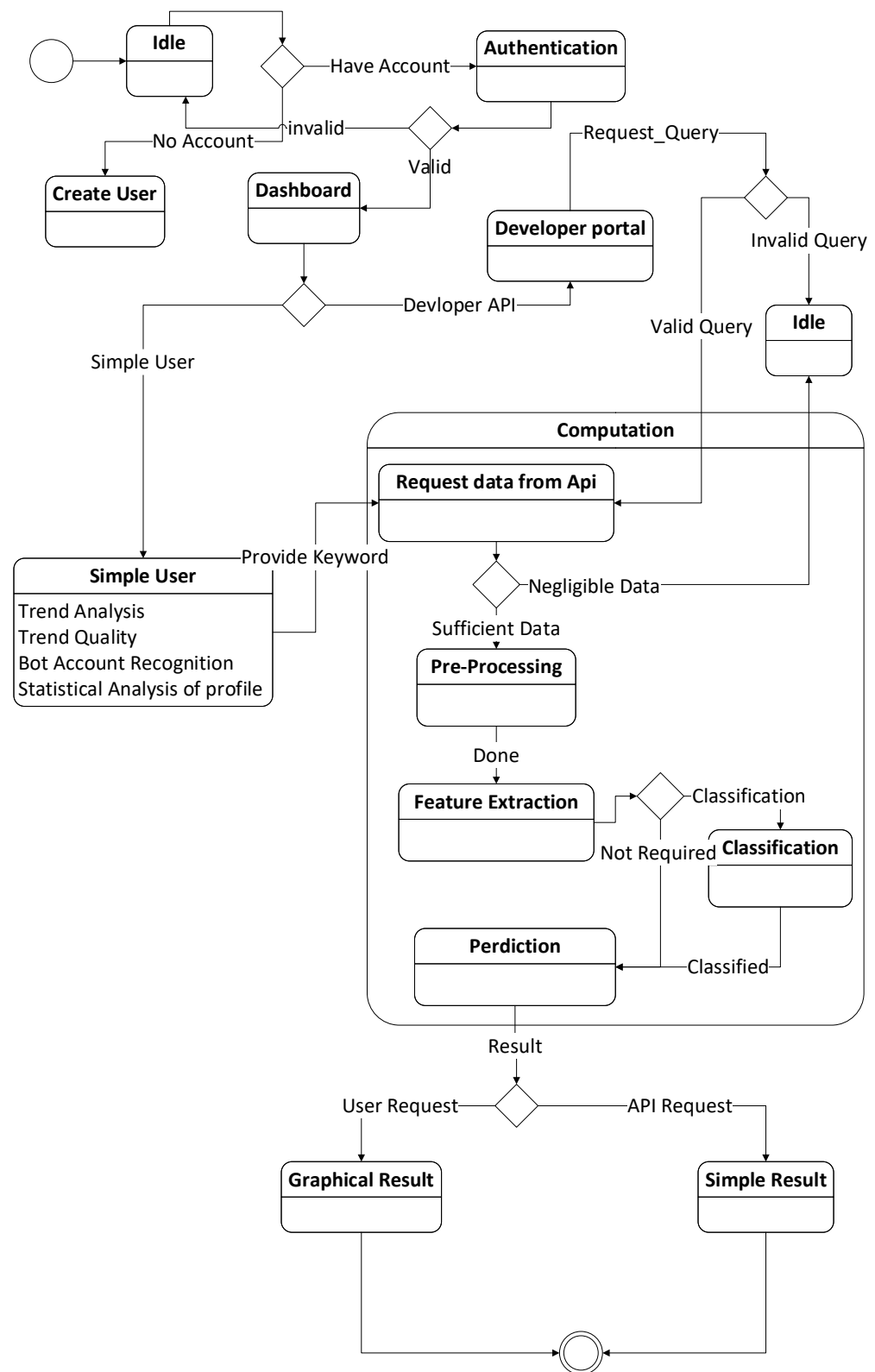


Figure 5: State Machine Diagram



## 11. Swim Lane Diagram

A swim lane diagram is a type of flowchart that delineates who does what in a process.

11.1. Swim Lane Diagram of User Interface

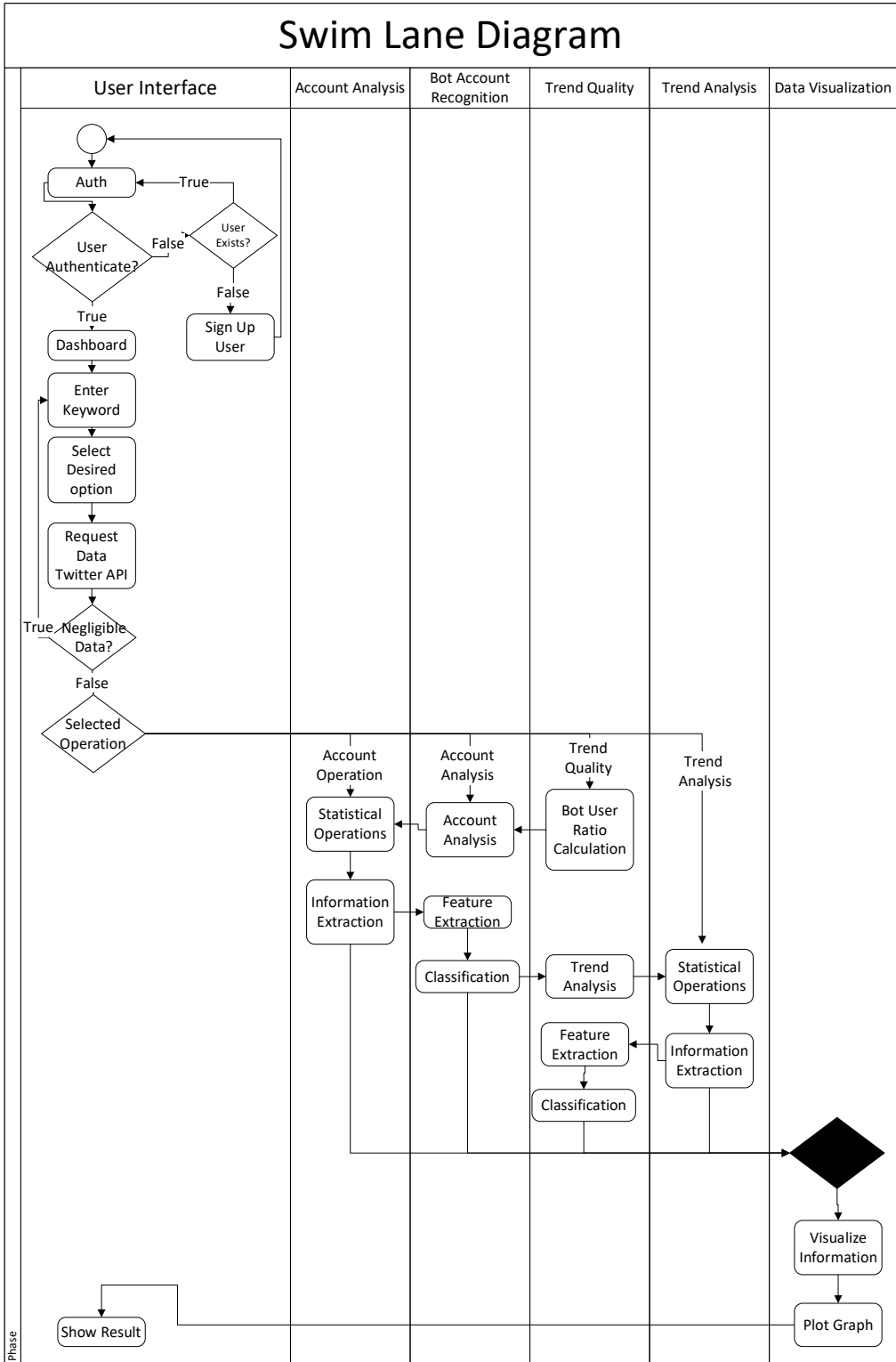


Figure 6: Swim Lane Diagram of UI Interface

11.2. Swim Lane Diagram of Developer API

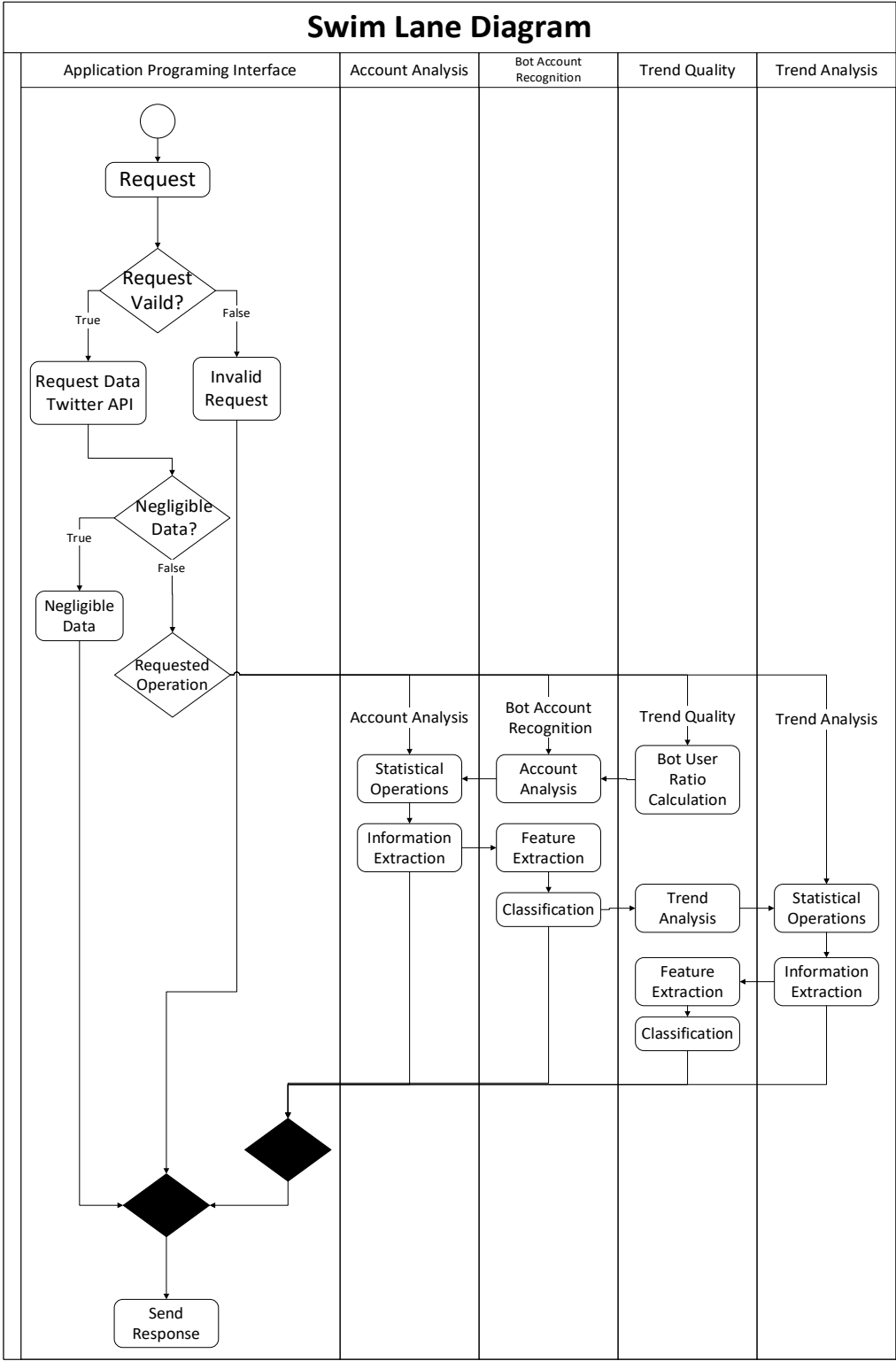


Figure 7: Swim Lane Diagram of Developer API Interface

## 12. System Sequence Diagram

A system sequence diagram is a picture that shows, for one particular scenario of a use case, the events that external actors generate, their order, and inter-system events.

### 12.1. Sign up

User is an actor who will start signup process. Then user provide email, username, password and confirm password. If user credential is correct, then his account will get created.

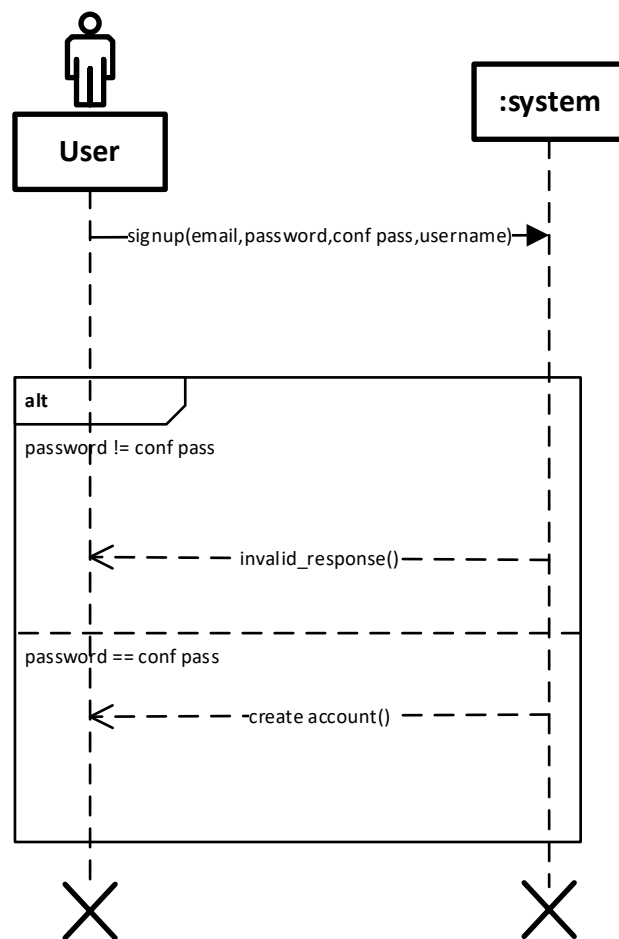


Figure 8: SSD of Sign Up

## 12.2. Login

User is an actor who will start Login process. Then user provide username and password. After matching credential from database user will be redirected to dashboard page.

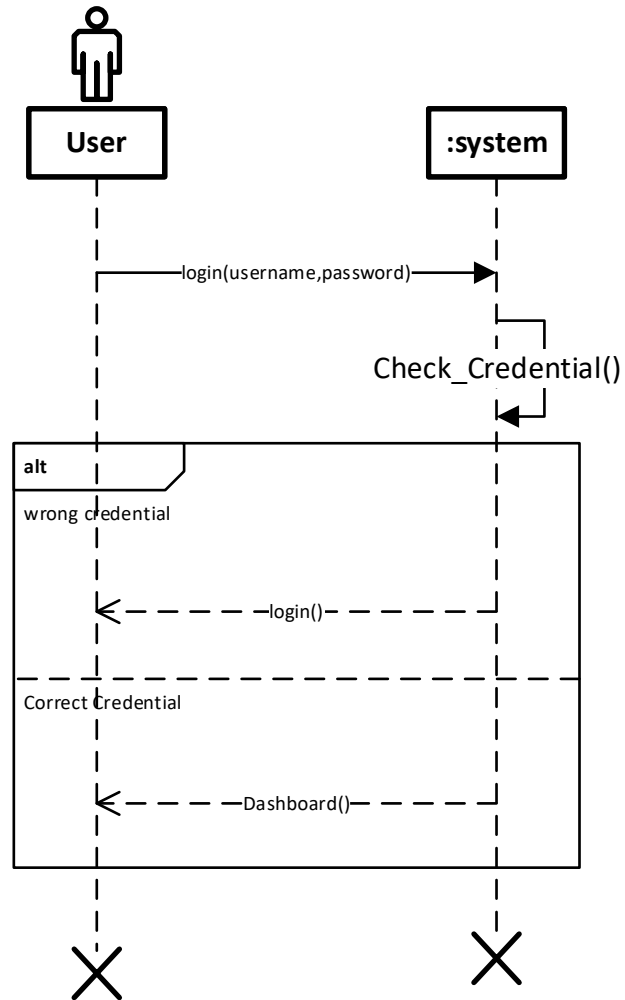


Figure 9: SSD of Login

### 12.3. Trend Analysis

User is an actor who will start Trend Analysis process. Then user provide keyword and system request data from Twitter API. After getting data system will perform operation on it and return result to user.

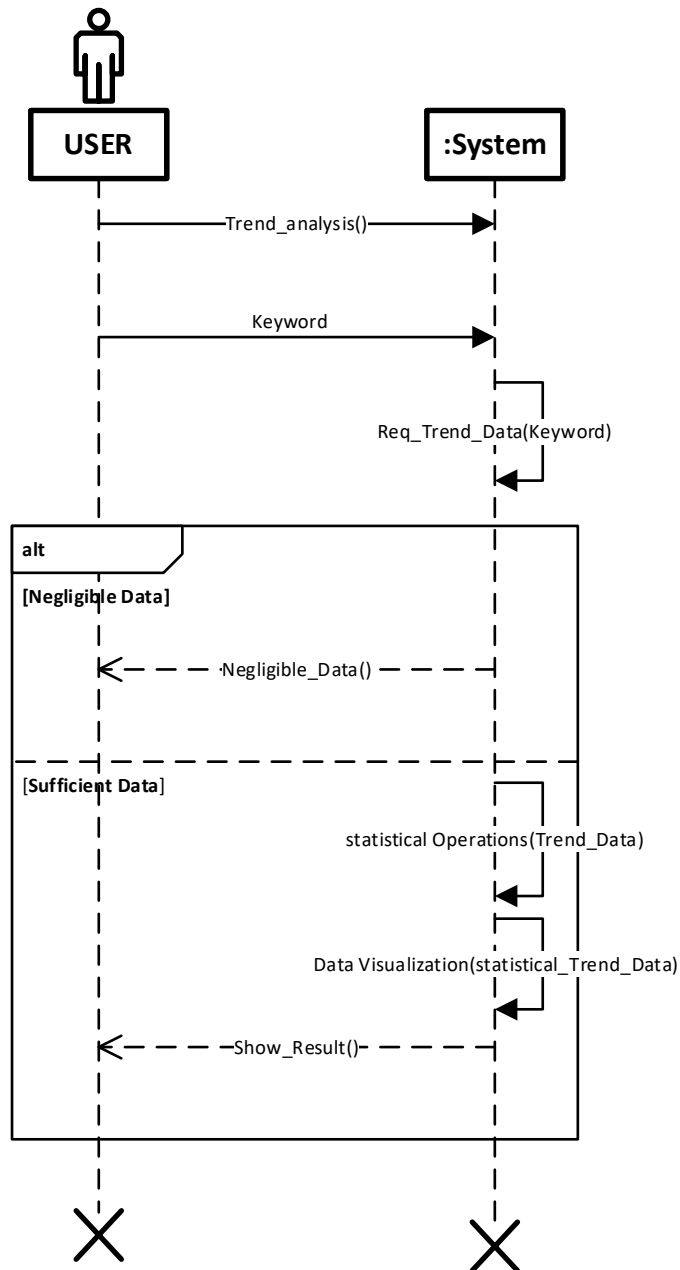


Figure 10: SSD of Trend Analysis

## 12.4. Trend Quality

User is an actor who will start Trend Quality process. Then user provide keyword and system request data from Twitter API. After getting data system will perform operation on it and return result to user.

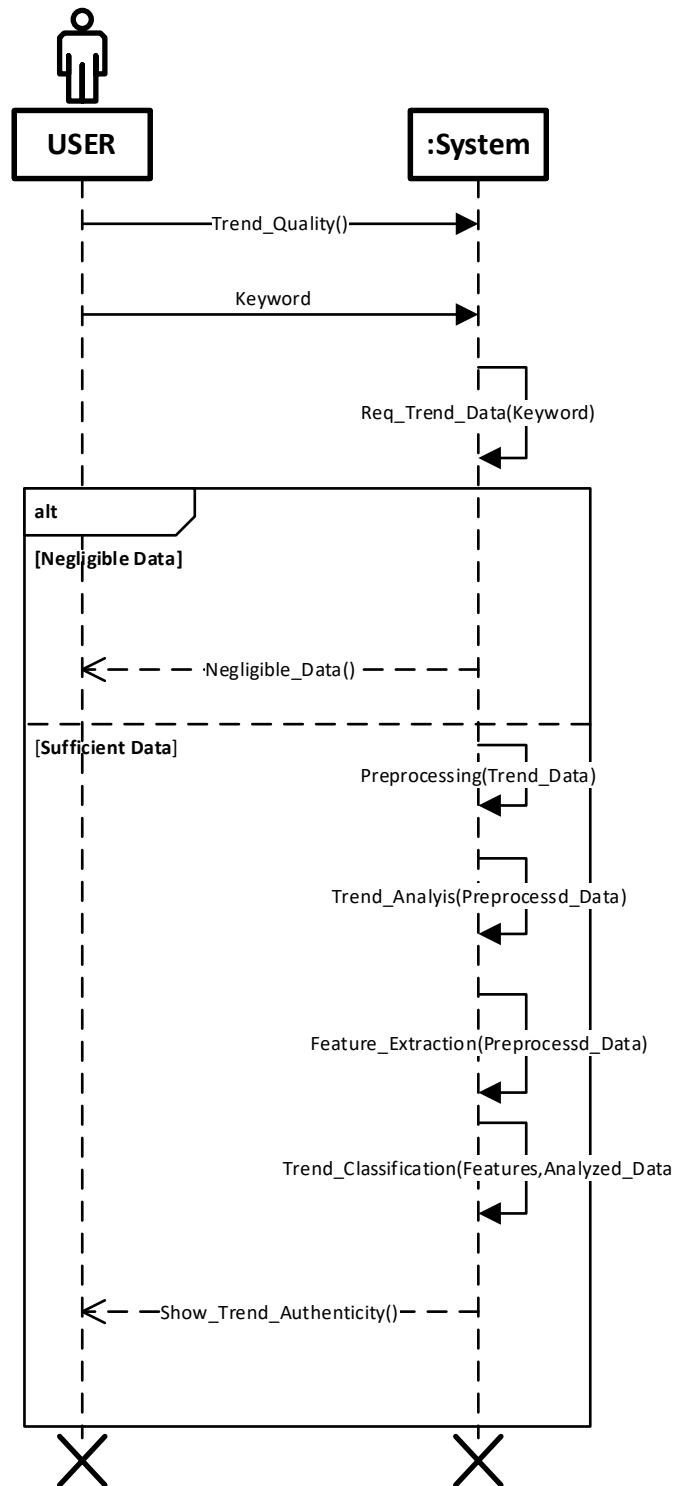


Figure 11: SSD of Trend Quality

## 12.5. Bot Account Recognition

User is an actor who will start Recognition of bot account process. Then user provide username and system request data from Twitter API. After getting data system will perform operation on it and return result to user.

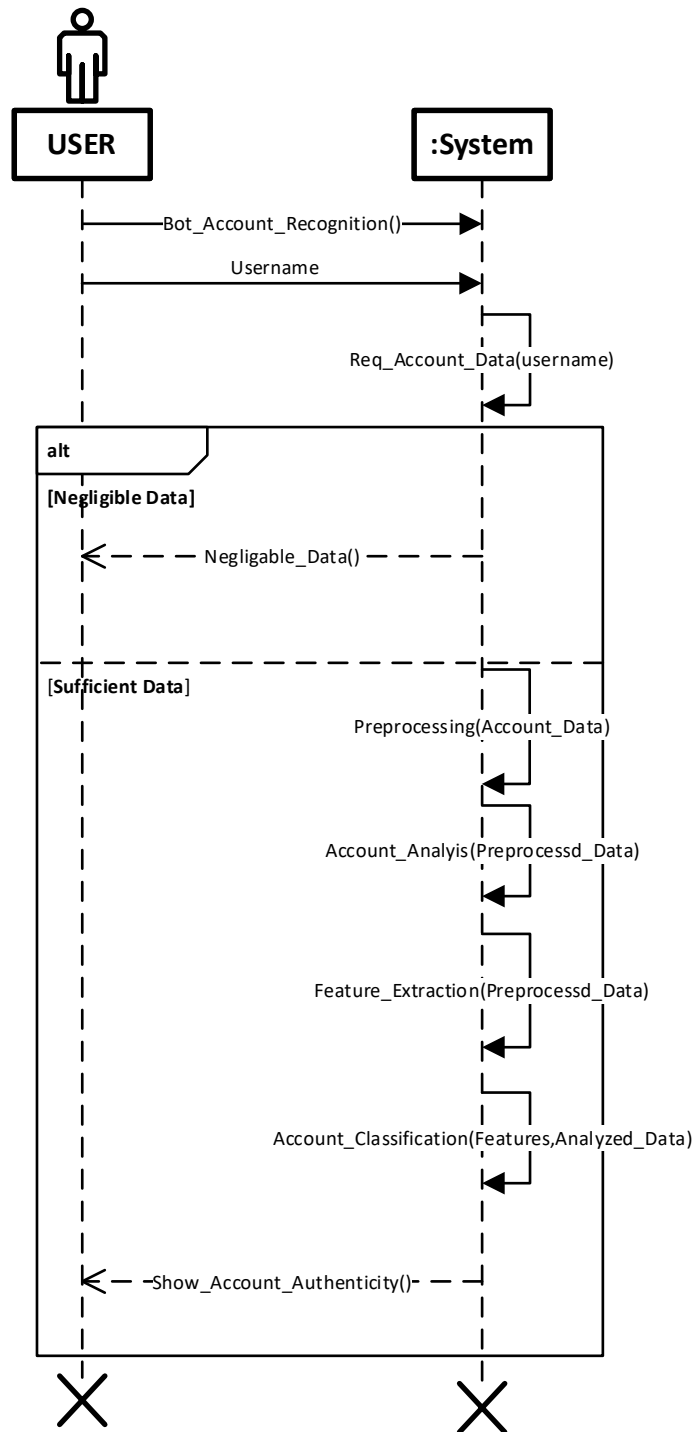


Figure 12: SSD of Bot Account Recognition



## 12.6. Statistical Analysis of Profile

User is an actor who will start account analysis process. Then user enter username and system request data from Twitter API. After getting data system will perform operation on it and return result to user.

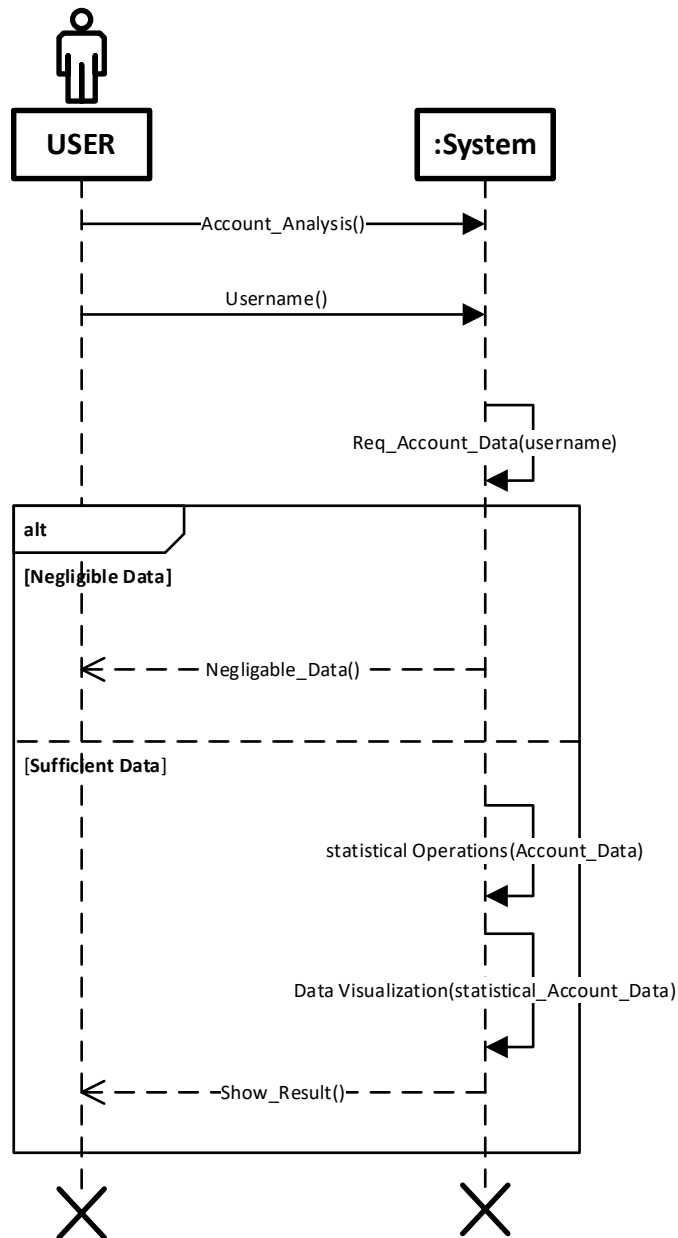


Figure 13: SSD of Statistical Analysis of Profile

## 12.7. Developer API

User is an actor who will start developer API process. Then user provide query and keyword and system request data from Twitter API. After getting data system will perform operation on it and return result to user.

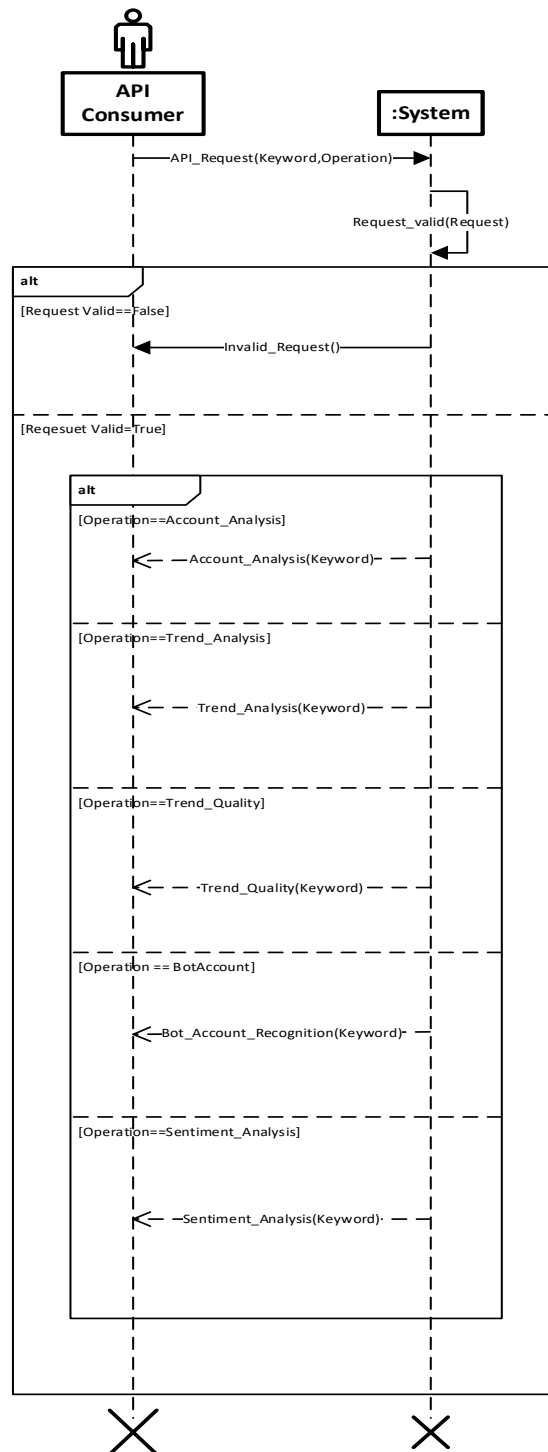


Figure 14: SSD of Developer API

### 13. Sequence Diagram

Sequence diagrams are used to model the interactions between the actors and the objects in a system and the interactions between the objects themselves.

#### 13.1. UI Interface

What’s trending on web interface allow user to select any desire operation and show result after series of interaction. SD for user interface show sequential order of interaction.

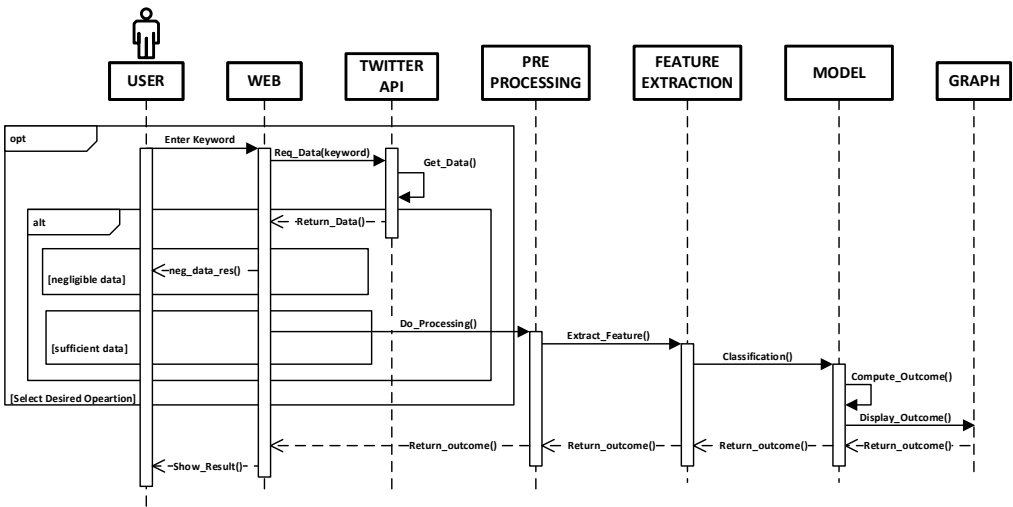


Figure 15: Sequence Diagram of User Interface

### 13.2. Developer API Interface

What's trending on API interface allow user to provide query and show result after series of interaction. SD for user interface show sequential order of interaction.

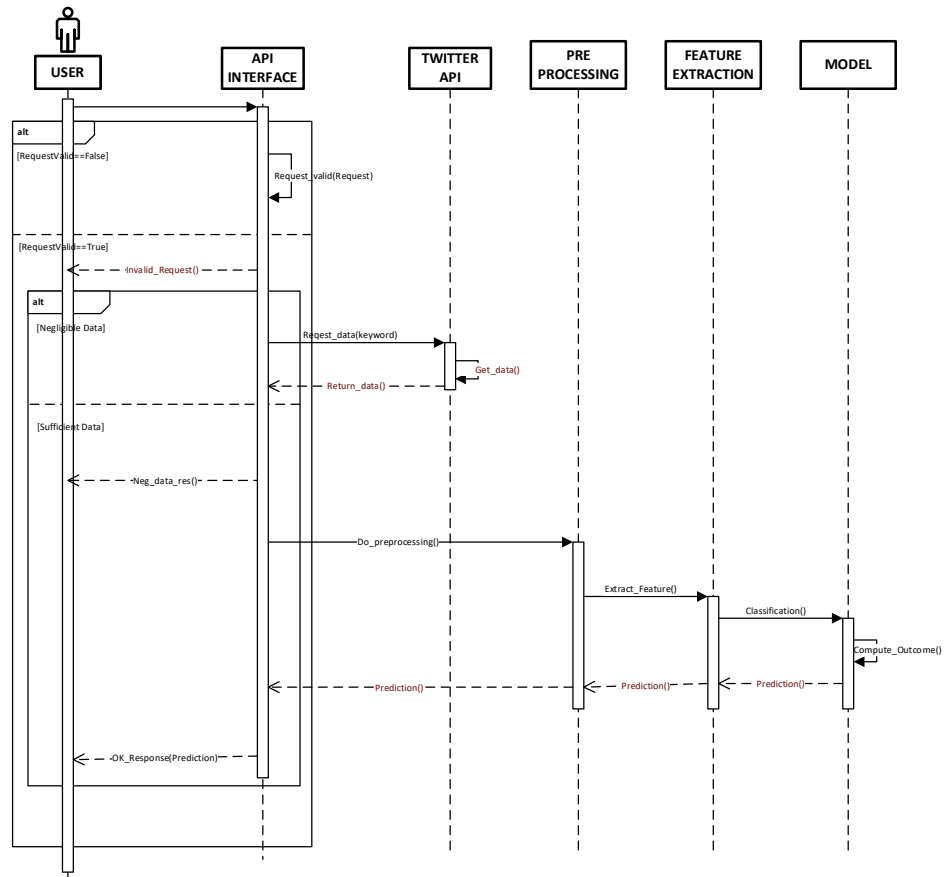


Figure 16: Sequence Diagram of Developer Interface

14. Architecture Diagram

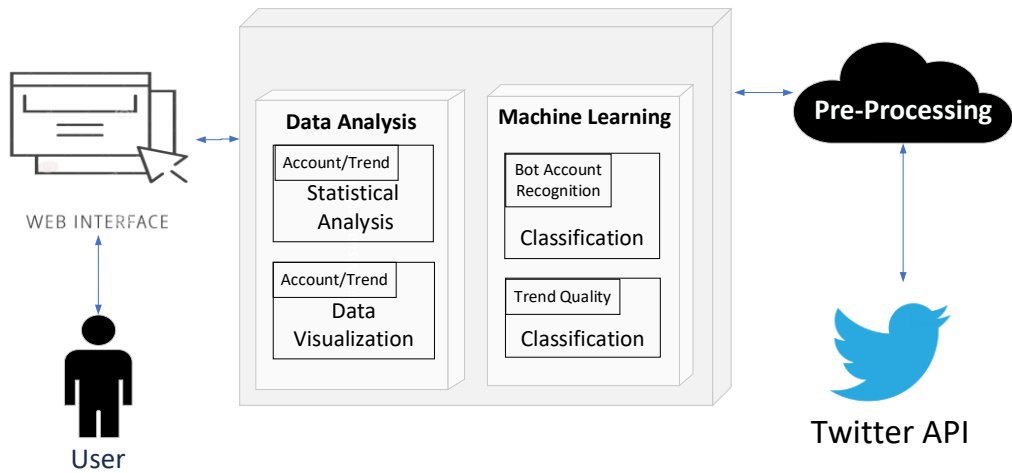


Figure 17: Architecture Diagram