INTELLIGENT FINANCE ADVISOR

PROJECT PROGRESS REPORT

OF PROJECT-1 (IT795)

BACHELOR OF TECHNOLOGY
in
Information Technology

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Bonafide Certificate

Certified that this synopsis for the project titled "Intelligent Finance Advisor" is a part of the project work being carried out by "Harsh Raman, Nishkarsh Gautam, Mayank, Navnit Singh and Md. Salman Asif" under my supervision.

Full Signature of the Candidates (with date)

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4. _____
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(Signature of the Supervisor)

_____
(Signature of the Head of the Department)

ACKNOWLEDGEMENT

We would like to express special thanks of gratitude to our mentor (Prof. Tapasi Bhattacharjee) without whose guidance we could never completed this project. We would as well love to express gratitude to our Head of Department (Prof. Piyal Sarkar) who gave us the golden opportunity to do this wonderful project on this topic, which also helped us in doing a lot of research and we came to know about so many new things, we are really thankful to them. We would also express our gratitude to our Co-ordinators (Prof. Subhamita Mukherjee and Prof. Prodipta Bhowmick) who helped us whenever we needed them.
Secondly, we would also like to thank our parents and friends for supporting us in all ups and downs doing this project within the limited time frame.

We are over helmed in all humbleness and gratefulness to acknowledge our depth to all those who have helped us to put these ideas, well above the level of simplicity and into something concrete.

ABSTRACT

Investopedia.com says, “Personal finance is a term that covers managing your money and savings and investing. It encompasses budgeting, banking, insurance, mortgages, investments, retirement planning, and tax and estate planning. It often refers to the entire industry that provides financial services to individuals and households and advises them about financial and investment opportunities.”

People from every generation are worried about their financial health. Also, Artificial Intelligence is revolutionizing how we do our day to day activity. From transportation to healthcare to self-driving cars – advanced data processing, personalization, and intelligent decision making has become key to doing everyday tasks.

Lack of money is not the problem. The problem is the lack of financial discipline. People need to put efforts to cope with the lack of financial discipline, but the hardest part is to make the decision and take that next step.

Our solution – “INTELLIGENT FINANCE ADVISOR” is a personal budgeting app which suggests investments in capital markets on personal savings using AI. It is a mobile application(iOS and Android) which will take data from users for their monthly budget planning and calculate personal savings and it will suggest them appropriate investments.

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INTRODUCTION

Benjamin Franklin said, “A penny saved is two pence clear.” Here, he is not equating saving to earning; instead his lesson is precisely about “opportunity cost” – the basic idea that every decision comes at the cost of the next best option. Saving is income not spent, or deferred consumption and to invest is to allocate money in the expectation of some benefit in the future.

Every individual is unique and have their own financial goals. Management of money in, money out and money growth is a very fundamental decision everyone has to take. With advancement and rapidness of our society, it is very important that we keep up the pace. Personalization with the help of user data is what society is working on in this new age.

Mobile application which can budget and suggest investments is going to be very handy and useful for users of all age. It becomes tough at times to keep an account of all our spending. It is also wise to invest some of our money for financial security of uncertain future.

We already have some budgeting apps like Mint, PocketGuard, YNAB, etc. and investing apps like Robinhood, Acorns, Stash, etc. However, there is a need of an application which can keep an account of your day to day expenses, plan your recurring expense, keep an account on money you save and suggest investments to some of that money.

Our project is going to predict some possible investment opportunities through time series analysis on top gainers and top losers and then calculating population’s expectation on those stocks through sentimental analysis.

LITERATURE REVIEW

Pros –

- **Cross-platform application made in flutter SDK.** Google's flutter SDK allows us to write one code for both iOS and Android application in "DART" language.
- **Simple and aesthetic user-interface.** A user friendly application with a simplistic approach to presentation and usability.
- **Backend written in Python.** Backend services will be written in Python which has a huge collection of open-source libraries for various purposes.
- **NoSQL database.** MongoDB database is going to be used for storing user data. NoSQL feature makes it highly scalable.
- **Artificial intelligent predictor.** Prediction of sentiments and stock prices will be based on earlier recorded datasets.
- **Deployment to container.** Our application will be deployed to container thus mobility of this software increases between servers.

Cons –

- **Not a browser based application.** This is a native application based for Android and iOS operating systems.
- **Predictions will be based on available datasets only.** User data is ever-increasing and our models will be working on only past datasets so there is a risk of unexpected outcomes on unusual scenarios.
- **Users have to organize their money only through feeding data.**

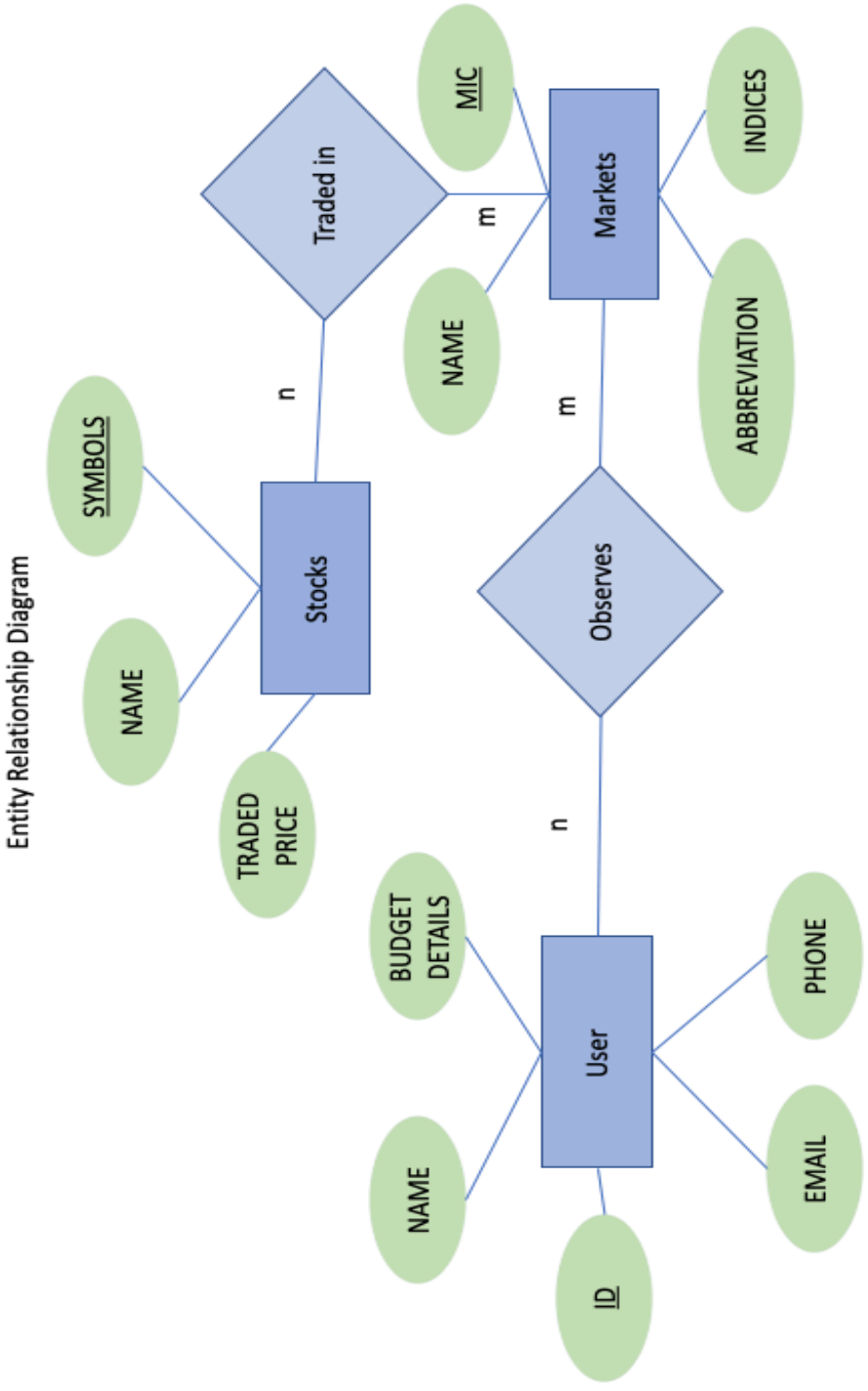
THERE IS ALWAYS A SCOPE OF IMPROVEMENT.

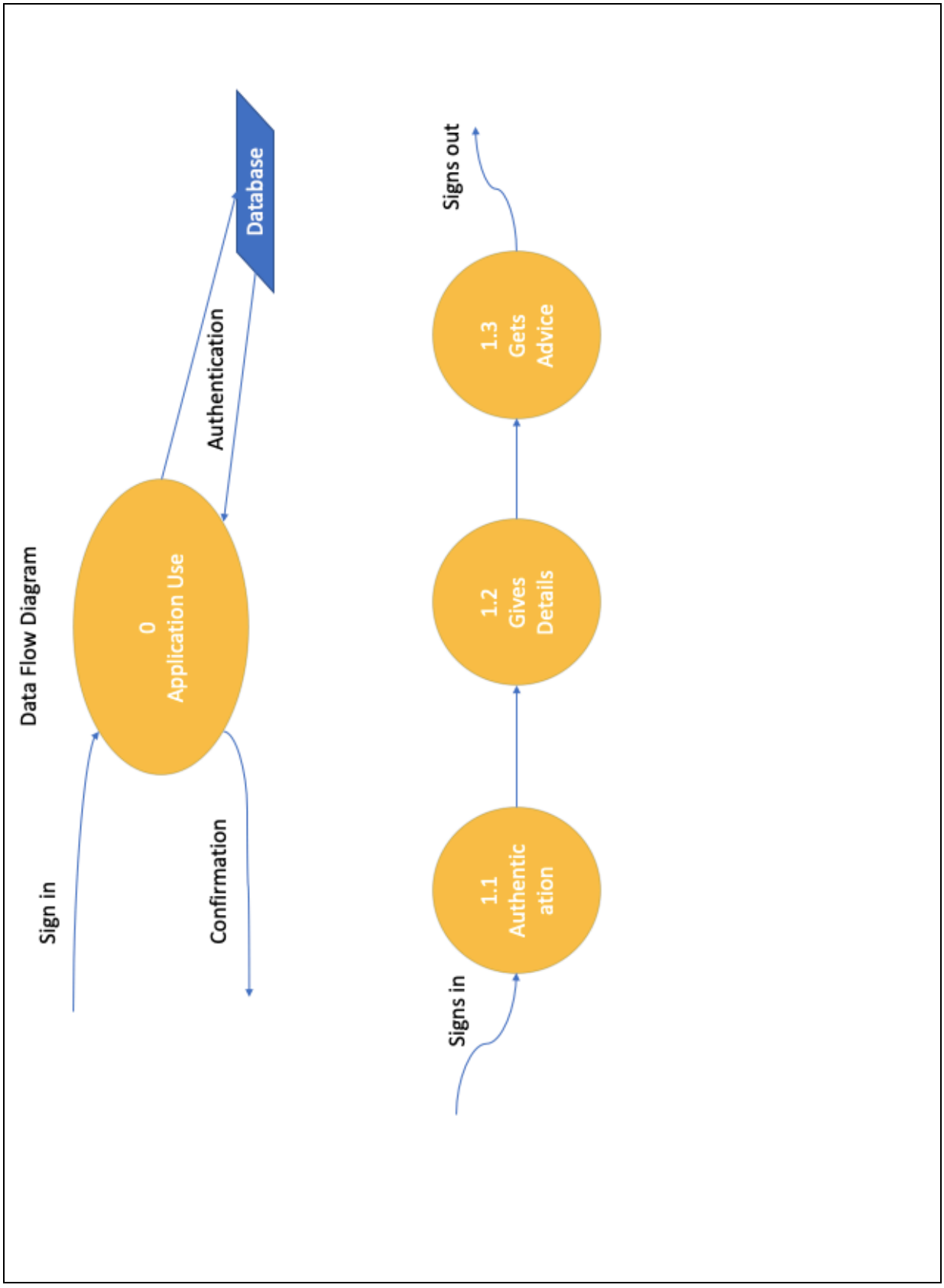
PROBLEM DEFINITION

Accounting, budgeting and investing are the basic three stages of financial planning. Our solution is going to take data from users like income, expenditures and investments, and is going to suggest them investments in capital markets on which has a good reputation and is expected to grow using text data taken from twitter and time series analysis. It is a cross-platform application which user can use anytime and can get personalized assistance in no time. It is difficult to create an accounting system for our day to day expenditures. A software which can take data from users and present results solves a lot of financial decision making problems and is very handy. Investing to get a financial security is a good practice and it is quite costly to get a financial advisor on your money. Through this application, one can get cheap investment suggestions. This saves a lot of time as you only need to open your mobile application to get advices and not physically go to a financial advisor.

Backend service is also written in Python which has a huge open source community and an ever-increasing stack of libraries for various utilities. A NoSQL database makes the software highly scalable, thus giving it a high performance. A docker container makes this application easily movable to different servers.

SOFTWARE DESIGN




Data Flow Diagram
Sign in
0
Application Use
Confirmation
Authentication
Database
Signs in
1.1
Authentic
ation
1.2
Gives
Details
1.3
Gets
Advice
Signs out

SOFTWARE REQUIREMENTS

- Visual Studio
- Flutter SDK
- Anaconda Navigator
- Python 3 environment
- Django
- Numpy
- Pandas
- Scikit-learn
- Tensorflow
- Pytorch
- Statsmodels
- Tweepy
- NLTK
- Textblob
- bsedata
- Postman
- Docker
- Heroku
- Git

CODE TEMPLATES

```
In [2]: from bsedata.bse import BSE

In [3]: b = BSE(update_codes = True)

In [4]: print(b.getScripCodes())
```


```
{'533022': '20 Microns Ltd.', '532628': '3i Infotech Ltd.', '523395': '3m India Ltd.', '590116': '7seas Technologies
Ltd-$', '512161': '8k Miles Software Services Ltd.', '538351': 'A.f. Enterprises Ltd', '539300': 'A.k. Spintex Ltd',
'530499': 'A.k.capital Services Ltd.', '533292': 'A2z Infra Engineering Limited', '531611': 'Aadhaar Ventures India L
td.', '530027': 'Aadi Industries Ltd.', '531866': 'Aagam Capital Ltd.', '539096': 'Aananda Lakshmi Spinning Mills Ltd
', '538812': 'Aanchal Ispat Ltd', '524412': 'Aarey Drugs & Pharmaceuticals Ltd.', '524348': 'Aarti Drugs Ltd.', '5242
08': 'Aarti Industries Ltd.', '514274': 'Aarvee Denims & Exports Ltd.', '531731': 'Aarya Global Shares And Securities
Ltd.', '519319': 'Aashee Infotech Ltd.', '512038': 'Aaswa Trading & Exports Ltd.', '523204': 'Aban Offshore Ltd.', '5
12165': 'Abans Enterprises Ltd', '500002': 'Abb India Limited', '500488': 'Abbott India Ltd.', '505665': 'Abc Bearing
s Ltd.-$', '513119': 'Abc Gas (international) Ltd.', '520123': 'Abc India Ltd.-$', '532682': 'Abg Shipyard Ltd.', '53
2057': 'Abhinav Capital Services Ltd.', '538952': 'Abhinav Leasing & Finance Ltd', '532831': 'Abhishek Corporation Lt
d.', '538935': 'Abhishek Finlease Ltd', '511756': 'Abirami Financial Services (india) Ltd.', '526955': 'Abl Biotechno
logies Ltd.', '531161': 'Abm Knowledgeware Ltd.', '500410': 'Acc Ltd.', '532774': 'Accel Frontline Ltd.', '517494': '
Accel Transmatic Ltd.', '532268': 'Accelya Kale Solutions Limitd', '531897': 'Accentia Technologies Ltd.-$', '526347'
: 'Acclaim Industries Limited', '530513': 'Accurate Transformers Ltd.', '530093': 'Ace Edutrend Ltd', '531525': 'Ace
Software Exports Ltd.-$', '536492': 'Ace Tours Worldwide Ltd', '538570': 'Achal Investments Ltd', '517356': 'Aci Info
com Ltd.', '530901': 'Acil Cotton Industries Limited', '530043': 'Acknit Industries Ltd.', '539391': 'Acme Resources
Ltd', '533330': 'Acropetal Technologies Ltd.', '513149': 'Acrow India Ltd.', '524091': 'Acrysil Ltd.', '532762': 'Act
ion Construction Equipment Ltd.', '511706': 'Action Financial Services (india) Ltd.', '511359': 'Ad-manum Finance Ltd
.', '512599': 'Adani Enterprises Ltd.', '532921': 'Adani Ports And Special Economic Zone Ltd.', '533096': 'Adani Powe
```


FIG 6.1
GETTING
MARKETS
DATA FROM
EXTERNAL
API

```
In [5]: b.topGainers()
```

```
Out[5]: [{'securityID': 'YESBANK',
          'scripCode': '532648',
          'LTP': '66.90',
          'change': '3.50',
          'pChange': '5.52'},
         {'securityID': 'ISEC',
          'scripCode': '541179',
          'LTP': '331.50',
          'change': '16.65',
          'pChange': '5.29'},
         {'securityID': 'CARERATING',
          'scripCode': '534804',
          'LTP': '479.00',
          'change': '22.95',
          'pChange': '5.03'},
         {'securityID': 'MAGMA',
          'scripCode': '524000',
          'LTP': '47.15',
          'change': '2.20',
          'pChange': '4.89'},
         {'securityID': 'DCMSHRIRAM',
          'scripCode': '523367',
          'LTP': '349.70',
          'change': '16.10',
          'pChange': '4.83'}]
```

FIG 6.2
GETTING TOP GAINERS

```
In [6]: b.topLosers()
```

```
Out[6]: [{'securityID': 'JISLJALEQS',
          'scripCode': '500219',
          'LTP': '10.45',
          'change': '-0.55',
          'pChange': '-5.00'},
         {'securityID': 'DHFL',
          'scripCode': '511072',
          'LTP': '19.95',
          'change': '-1.05',
          'pChange': '-5.00'},
         {'securityID': 'ITDCEM',
          'scripCode': '509496',
          'LTP': '65.45',
          'change': '-3.40',
          'pChange': '-4.94'},
         {'securityID': 'COFFEEDAY',
          'scripCode': '539436',
          'LTP': '45.40',
          'change': '-2.35',
          'pChange': '-4.92'},
         {'securityID': 'LAKSHVILAS',
          'scripCode': '534690',
          'LTP': '19.40',
          'change': '-0.90',
          'pChange': '-4.43'}]
```

FIG 6.3
GETTING TOP LOSERS

```
for tweet in twitter_data_raw:
    review=re.sub('((www\.[^\s]+)|(https?://[^\s]+))','url',tweet)
    review=re.sub('@[^\s]+','at_user',review)
    review=re.sub(r'#([\^s]+)', r'\1', review)
    review=re.sub('[^a-zA-Z]',' ',review)
    review=review.lower()
    review=review.split()
    ps=PorterStemmer()
    review=[ps.stem(word) for word in review if word not in set(stopwords.words('english')) and word not in remove]
    review=' '.join(review)
    twitter_data.append(review)


result=[]
from textblob import TextBlob
for check_tweet in twitter_data:
    analysis=TextBlob(check_tweet)
    if analysis.sentiment.polarity>0:
        res='positive'
    elif analysis.sentiment.polarity==0:
        res='neutral'
    else:
        res='negative'
    result.append(res)

pos=result.count('positive')
neg=result.count('negative')
neu=result.count('neutral')

for i in range(43):
    if result[i]=='negative':
        print(i)
```

FIG 6.4
GETTING TWITTER DATA

FIG 6.5
ANALYSIS

```
import twitter
api=twitter.Api(consumer_key='XUjMfGNoBHciRVC4kNCOa3Esw',
                consumer_secret='M5qyE97XarqyXfi0EE9YhCIx7rM7SqhhLKSd2zycPUx3d7WulD',
                access_token_key='1170978534170361857-YILY0jBYMVhSPi7oGdwIlfKvghp2GO',
                access_token_secret='rMuhIXdwOiK4bYiLnpfG6jBY7z8zTqjvTE9hcbabHMNk2')
print(api.VerifyCredentials())

twitter_data_raw=[]

def create_test_data(search_string):
    try:
        tweets_fetched=api.GetSearch(search_string, count=2000)
        print("fetched")
        for status in tweets_fetched:
            if status.retweet_count>0:
                if status.text not in twitter_data_raw:
                    twitter_data_raw.append(status.text)
            else:
                twitter_data_raw.append(status.text)
            if len(twitter_data_raw)==100:
                break
    except:
        print("sorry")
        return None
```

TESTING

– TWITTER DATA FOR RELIANCE

Index	Type	Size	Value
0	str	1	polit system relianc huge sum money mani neg impact one largest
1	str	1	anil ambani bankrupt relianc naval record win streak ambani bet cash f ...
2	str	1	six last seven bar goal come via set piec includ saturday win legan va ...
3	str	1	user user honest player reflect face make stand apart chao confiden
4	str	1	rt user btw tent titl cover scare say final edit ck meantim htt
5	str	1	rt user user boost women empower one highest prioriti help countri adv ...
6	str	1	user user user user user user limit governmen
7	str	1	user doubl camera shift see huge camera angl chage counter hit zani
8	str	1	yahoo
9	str	1	relianc gibbou lettuc
10	str	1	reliancetickterminaltradingplatform relianc tick termin trade platform ...
11	str	1	club would like congratul st antoni hss pazhuvil school includ fc kera ...
12	str	1	relianc jio inch closer becom telecom market leader trai startup news ...
13	str	1	calori raw lli low avail rs raw presseri rang vegan almond milk ltr in ...
14	str	1	rt user polit system relianc huge sum money mani neg impact one larges ...
15	str	1	central part bangalor town domlur user poor network coverag lodg com
16	str	1	user user user haan use jiofi type fibr much better realli
17	str	1	rt user today govern ethiopia amp eu launch million euro programm jigj ...
18	str	1	disagre tori want privat individu enterpris less relianc big compani a ...
19	str	1	rt user user user paid tweet brother also agre u jio wors servic wors ...
20	str	1	user user relianc one hand talk revolutionis digit landscap india bu
21	str	1	rt user grid energi key self relianc subsaharanafrica user amp user lo ...
22	str	1	vishwa patil author marathi novel panipat sent notic copyright violat ...
23	str	1	nifti monthli gainer adx chart zeel yesbank sbin indusindbk bhartiartl ...

FIG 7.1 TWEETS

Index	Type	Size	Value
0	str	1	positive
1	str	1	positive
2	str	1	positive
3	str	1	positive
4	str	1	neutral
5	str	1	neutral
6	str	1	neutral
7	str	1	positive
8	str	1	neutral
9	str	1	neutral
10	str	1	positive
11	str	1	neutral
12	str	1	neutral
13	str	1	negative
14	str	1	positive
15	str	1	negative
16	str	1	positive
17	str	1	neutral
18	str	1	negative
19	str	1	neutral
20	str	1	neutral
21	str	1	neutral
22	str	1	neutral
23	str	1	neutral

FIG 7.2 ANALYSIS

.

– TWITTER DATA FOR TCS

Index	Type	Size	Value
0	str	1	splish splash dodg shower amp head adventur prize log cabin splashi ot ...
1	str	1	happen right front offic one life lost rtc employe want join back kcr ...
2	str	1	user interpon demanda contra el president de la rep blica user por lo ...
3	str	1	rt user team user chennai year ascent engin mastermind congratul jayak ...
4	str	1	anyway tc thank time wdyl
5	str	1	tc
6	str	1	rt user competit time monday exactli month christma amp give peopl per ...
7	str	1	rt user teamperavurani gaja wr post peravurani week overse relief resc ...
8	str	1	rt user full novemb updat come quick note happen also astound pictur f ...
9	str	1	rt user tc woman employe sohinisaxena crush death wheel speed tsrtc bu ...
10	str	1	rt user twitter amaz bc get free unsolicit analysi psycholog motiv mar ...
11	str	1	rt user wait thought get blink so tc
12	str	1	wonder so sat bc stand tc ju leav dem like dat
13	str	1	rt user user interpon demanda contra el president de la rep blica user ...
14	str	1	rt user employe surviv two young children age four five sohini tsrtc
15	str	1	tc probabl said wdyl tonight boy
16	str	1	kid play expect return kin tc employe sohinisaxena kill hyderabad rtc ...
17	str	1	user user user user user quier recuperar laboratorio lopez otra vez
18	str	1	rt user lundi il ne restera officiel plu qu moi avant l et nou donnon ...
19	str	1	rt user refresh tl see everyon la show tweet almost got feelin like la ...
20	str	1	rt user win lego db courtesi user simpli rt amp f user chanc win givea ...
21	str	1	moot la show scream shit tc funni
22	str	1	rt user data driven insight help hr profession improv effect hire recr ...
23	str	1	bike tc set

FIG 7.3 TWEETS

Index	Type	Size	Value
0	str	1	neutral
1	str	1	positive
2	str	1	neutral
3	str	1	neutral
4	str	1	neutral
5	str	1	neutral
6	str	1	positive
7	str	1	neutral
8	str	1	positive
9	str	1	neutral
10	str	1	positive
11	str	1	neutral
12	str	1	neutral
13	str	1	neutral
14	str	1	positive
15	str	1	neutral
16	str	1	neutral
17	str	1	neutral
18	str	1	neutral
19	str	1	neutral
20	str	1	positive
21	str	1	negative
22	str	1	positive
23	str	1	neutral

FIG 7.4 ANALYSIS

CONCLUSIONS

- We were able to create a login and sign up page in flutter which works in android and iOS devices natively.
- For backend authentication, Google's Firebase is used.
- We are calling the data of top five gainers and top five losers with help of 'bsedata' api by Quandl.
- Those gainers and losers' twitter sentiments are checked by Textblob with help of NLTK library.
- Integration of Firebase and native application is completed for user authentication.

FURTHER ENHANCEMENTS/RECOMMENDATIONS

- Backend REST api is yet to made.
- Time series analysis is going to fetch stock price prediction.
- Budgeting section of app will be made.
- MongoDb Database is yet to be created.
- Deployment and integration will be done.

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