Election Sentimental Analysis using Swift

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Abstract: The process of identifying and distributing opinions and views which are expressed in a piece of text, especially in order to decide whether the attitude of the user toward particular idea, product is positive, negative, or neutral is known as sentiment analysis. During election days, it’s really necessary to determine the mindset of the people towards particular tweets or sentiment. In this project we used twitter API to fetch the data using the unique key provided by the twitter. An user interface is constructed in iOS platform which can be used to search tweet related to the election. These tweets are later classified using a machine learning model(text classifier) provided by CoreML2 which calculates the points with respect to the number of tweets according to its sentiment (Positive, Negative or Neutral). These points are used to determine the actual sentiment of the people towards that particular search. Later, this classified points are displayed in user’s screen. Users also can make multiple searches as per their requirement.

Keywords: election sentiment in ios, CreateML, text classifier for election using swift.

I. INTRODUCTION

Sentiment Analysis is widely used to analyze the sentiments, attitudes, reactions, evaluation of the content of the text. Most of the time we will be analyzing the opinions, reactions, sentiments, evaluations of the various entities which can be services, products, organizations, events, issues or other topics. Sentiment Analysis where we try to find the opinion of people or text provided is also known as Opinion Mining. Among the giant platform of social media Twitter is a microblogging media which in real time expresses the persuasion of a person or group about a particular topic which can appear in Timeline. All the messages displayed in the wall of the Twitter is known as Tweets. The user are connected to each other by various tweets and followers while their timeline are key components of Twitter. The timeline is chronologically sorted and are expressed in the form of text, image or links. Because of popularity of Twitter as an information source, it led to development of applications and research in many spheres. Twitter is used in predicting the happenings of earthquakes and identifying relevant users to follow to obtain disaster relevant information. In the various prediction we are interested in the sentiments to the people towards the election. By using these sentiments we are trying to predict the most possible result to the election in a mobile Platform.

Fig 1: This is an image of Swifter API which helps us to connect and retrieve tweets from twitter.

Swifter is a greater Framework which is written in Swift to provide a swiftly experience to parse the data from the twitter API. This Framework make the task easier by making it simpler and more developer friendly. As it has a great documentation it makes the developers a lot easier to use this framework.

Fig 2: This is an image of CreateML module which is converting the raw data to the mlmodel.
Machine Learning in a mobile device is a great wish but was not possible previously. Using the Playground in Xcode by using MacOS platform we can use CreateML to produce great machine learning models. Machine learning models can be produced very effectively and can be used in mobile application with the help of createML module. All the machine learning model created can be usable when it is in .mlmodel format. A model can process various data types like structure or semi structured datasets.

### II. LITERATURE SURVEY

| S No. | Title of the Paper                                             | Authors                                                      | Month & Year       | Observations                                                                                     |
|-------|---------------------------------------------------------------|--------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------|
| 1     | Twitter Sentiment Analysis                                   | Aliza Sarlan, Chayanit Nadam, Shuib Basri                    | November 18 – 20, 2014 | Application Programming Interface(API), Natural Language Processing (NLP)                       |
| 2     | Sentiment Analysis on Twitter                                | Akshi Kumar and Teeja Mary Sebastian                        | July 2012          | Tweet Sentiment Scoring, Scoring Module                                                         |
| 3     | A Study on Sentiment Analysis Techniques of Twitter Data     | Abdullah Alsaeedi1, Mohammad Zubair Khan2                    | 2019               | Document-Level Sentiment Analysis Approaches                                                    |
| 4     | Sentiment Analysis of Twitter Data                           | Apoorv Agarwal Boyi Xie Ilia Vovsha Owen Rambow Rebecca Passonneau |                    | Prior polarity scoring, Feature Analysis                                                        |
| 5     | Sentiment Analysis of Twitter Data                           | Kiruthika M., Sanjana Woonna, Priyanka Giri                  |                    | Data Collection using Twitter API                                                                |
| 6     | Social Network and Sentiment Analysis on Twitter: Towards a Combined Approach | Paolo Formacciarbi, Monica Mordonini, Michele Tomauilo         |                    | Social Network Analysis: data selection, sequence of cleaning the tweet                          |
| 7     | Twitter Sentiment Analysis of Movie Reviews using Machine Learning Techniques. | Akshay Amolik, Niketan Jivane, Mahavir Bhandari, Dr.M.Venkatesan | January 2016       | Modelling of Feature Vector, Naïve Bayes Classifier, Support Vector Machine                     |
| 8     | Sentiment Analysis on Twitter Data                           | Varsha Sahayak Vijaya Shete Apashabi Pathan                  | January 2015       | Filtering, Tokenization, Removal of Stop words                                                  |
| 9     | Semi Supervised and Active Learning in video Scene Classification from Statistical Features | Tomas Sabata, Petr Pulc, Martin Holena                        |                    | Video data, scene classification, semi-supervised learning, color statistics, feedforward neural networks |
| 10    | Sentiment Analysis On Twitter Data                           | Onam Bharti Mrs. Monika Malhotra                            | June 2016          | Naive Bayes (NB), Modified approach K-mean algorithm.                                          |
| 11    | Implementation Of Sentiment Analysis On Twitter Data         | Thirupathi Rao Komati, Sai Balakrishna Allamsetty, Chaitanya Varma Pinnamaraju | 2017               | Search twitter feeds, Load Twitter API                                                           |
| 12    | Review Paper on Sentiment Analysis of Twitter Data Using Text Mining and Hybrid Classification Approach | Shubham Goyal                                               | 2017               | binary task of classifying sentiment                                                             |
| 13    | Twitter Data Analysis on Natural Disaster Management System  | Pichao wang, wanqing Li, Philip Ogunbona, Jun Wan, Sergio Escalera | 2017               | Human motion recognition, RGB-D data, Deep learning                                             |
| 14    | Empirical Study of Twitter and Tumblr for Sentiment Analysis using Soft Computing Techniques | Akshi Kumar                                                 | October, 2017      | Multilayer Perceptron (MLP), Decision Tree (DT)                                                |
| 15    | Sentiment Analysis Based On Twitter Data On Violence         | Nihal Jumhare, Raja Rajeswari G, Balaji Jayakrishnan         | February 2017      | Maximum Entropy                                                                                  |
| 16    | Stress Detection And Sentiment Prediction: A Survey          | Dr. G V Garje, Aparna Inamdar, Harsha Mahajan, Apeksha Bhansali, Saif Ali Khan | January 2016       | Opinions for a data                                                                             |
| 17    | Sentiment Analysis of Twitter Data through Big Data          | Anusha.N, Divya.G, Ramya.B                                   | June - 2017        |                                                                                                 |
I) Problem Statement: The main objective of the research is to provide effective prediction of election by studying the sentiments of people by applying the machine learning algorithm provided by the Swift’s CoreML. In this project we are majorly focused to construct the ML model that provides an effective and accurate data to the user. The ultimate goal is to ascertain data that are fetched properly from twitter successfully to classify the tweets according to sentiments to provide promising accuracy.

III. METHODOLOGY

1) API Call: Swifter can be used with the 3 different kinds of authentication protocols Twitter allows. You can specify which protocol to use as shown below. By studying the Twitter Authentication Protocol (OAuth) we can access the twitter API in following ways

A. Application-Only Authentication: Oauth2 (Bearer Token)

1) Application-only authentication is a form of authentication where an application makes API requests on its own behalf, without the user context. This method is for developers that just need read-only to access public information.

B. Application-User Authentication: Oauth 1a (Access Token For User Context)

1) The user authentication method of authentication allows an authorized app to act on behalf of the user, as the user.

C. Classification Using ML Model: Steps Required For Classifying The Twitter Data Are Given Below

Converting JSON/CSV to a MLDataTable

1) First and foremost, we'll need to tell Create ML where it can find our JSON file.

D. Splitting the Data

1) 80% of your dataset should be used for training, and you should save the other 20% to make sure everything is working as it should.

E. Training and Testing

1) Now that your data is all set up and ready, it's time to finally train it and test your resulting model.

F. Code

Code For creating the model

```swift
import Cocoa
import CreateML

//can be converted either from JSON or CSV data format
let data = try MLDataTable(contentsOf: URL(fileURLWithPath: "/Users/sudip/Desktop/8TH-SEM/FYP/TWITTER-CSV/twitterf.csv"))
let(trainingData, testingData) = data.randomSplit(by: 0.8, seed: 5)
let sentimentClassifier = try MLTextClassifier(trainingData: trainingData, textColumn: "text", labelColumn: "class")
let evaluationMetrics = sentimentClassifier.evaluation(on: testingData)
let evaluationAccuracy = (1.0 - evaluationMetrics.classificationError) * 100
let metadata = MLModelMetadata(author: "Sudip Kandel", shortDescription: "A set of data used to classify sentiments", version: "1.0")
try sentimentClassifier.write(to: URL(fileURLWithPath: "/Users/sudip/Desktop/8TH-SEM/FYP/TWITTER-CSV/twitterSentiment.mlmodel"))
try sentimentClassifier.prediction(from: "he is really good person")
try sentimentClassifier.prediction(from: "he is bad person")
try sentimentClassifier.prediction(from: "bjp")

Code for fetching the tweet using Swifter Framework

func fetchTweet(){
    if let searchText = textField.text {

```
let prediction = try! sentimentClassifier.prediction(text: "@BJP is great and best")
print(prediction.label)

swifter.searchTweet(using: searchText, lang : "en", count: tweetCount,tweetMode : .extended,success: { (results, metadata) in

//tweets is a object of the twitterSentimentInput.mlmodel which is kept inside a array which holds the input value from the twitter ie each tweet which is stored inside the array.
var tweets = [twitterSentimentInput]()
//a for loop that iterates from 0 to 100 so total 100 tweet
for i in 0..<self.tweetCount{
    //"full_text" is the json value from the twitter which is converted into string
    //tweetForClassification classifies each tweet
    if let tweet = results[i]"full_text",string{
        let tweetForClassification = twitterSentimentInput(text: tweet)
        //those hundred tweets are stored inside the tweets array object
        //and append each tweet inside it
        tweets.append(tweetForClassification)
    }
}
//if successfully tweets are fetched and inserted inside the array of strings inside the variable called tweets send the tweets to makePrediction function
self.makePrediction(with: tweets)
//if error produce error
}) { (error) in
    print("There was an error with Twitter API request , \(error)")
    self.sentimentLabel.text = "Sorry we are not able to fetch the tweets. Try Again"
    self.errorToRecieve()
}

G. Structure and Data Flow Diagram

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Fig 3: Graph View of Result
The above diagram shows us how the Features are taken extracted and managed by the CoreML where data are classified accordingly and later fed to the model with respect to the tweet searched.

IV. RESULT AND CONCLUSION

Fig 5: Representation of Welcome Page and Functionality Page in iOS Simulator (iPhone XS).
V. CONCLUSIONS

From the survey we have carried out on election sentiment analysis through apple’s CreateML framework people are actively showing their interest in election and many tweets are observed and a thorough study gives us an idea that sentiments can be used for classifying the data which can have a approximate match to the actual sentiments. Also, the machine learning framework provided by Apple is highly accurate with 79.345% accuracy to the data we are feeding and can be improved by providing more appropriate ratio of test to training data. Further we can use other classifying algorithms like SVM(Support Vector Machine) to classify the data and fed it through a API to provide more satisfying results.
REFERENCES

[1] Kavitha, S & J. Anandhi, R. (2014). A survey of image compression methods for low depth-of-field images and image sequences. Multimedia Tools and Applications. 74. 10.1007/s11040-014-2032-0.

[2] J. Anandhi, R. & Subramanyam, Natarajan. (2014). Privacy Protected Mining Using Heuristic Based Inherent Voting Spatial Cluster Ensembles. 10.1007/978-81-322-1602-5_124.

[3] J. Anandhi. R & Subramanyam, Natarajan & Abburu, Sunita. (2010). An enhanced clusterer aggregation using nebulos pool. Proceedings of the 1st Amrita ACM-W Celebration of Women in Computing in India, A2CWiC’10. 61. 10.1145/1858378.1858439.

[4] R. J. Anandhi & Subramanyam, Natarajan. (2010). A Robust -knowledge guided fusion of clustering Ensembles. International Journal of Computer Science and Information Security.

[5] Abburu, Sunita & J. Anandhi. R. (2010). Concept ontology construction for sports video. Proceedings of the 1st Amrita ACM-W Celebration of Women in Computing in India, A2CWiC’10. 50. 10.1145/1858378.1858428.

[6] Dr. Mohan Kumar S & Dr. Balakrishnan, Classification Of Breast Mass Classification – CAD System And Performance Evaluation Using SSNE, IJSET – International Journal of Innovative Science, Engineering & Technology, Vol. 2, Issue 9, 417-425, ISSN 2348 – 7968

[7] Dr. Mohan Kumar S, Dr. Balakrishnan, Classification Of Breast Mass Classification – CAD System With Performance Evaluation, International Journal of Engineering And Computer Science, Volume 4, Issue 09, 14187-14193, ISSN 2319-7242, September, 2015

[8] Dr. Mohan Kumar S, Dr. Balakrishnan, Classification Of Breast Microcalcification- CAD System And Performance Evaluation Using SSNE, International Journal of Advanced Research in Computer Science and S

[9] Software Engineering, Volume 5 , Issue 9, 824-830, ISSN: 2277 128X, Sep–2015

[10] Dr. Mohan Kumar S, Kirthikayini, Essential Best Practices And Processes In Higher Educational Technical Institutions, International Journal Of Engineering Research And General Science, Volume 3, Issue 6, 231-236, ISSN 2091-2730 231, December, 2015

[11] Dr. Mohan Kumar S, Kirthikayini, LNW-A System Model For A High Quality Effective E-Learning Using Cloud Environments, International Journal of Current Research and Review, Volume 7, Issue 23, 21-25, ISSN: 0975-5241, December, 2015

[12] Dr. Mohan Kumar S, Ayurveda Medicine Roles In Healthcare Medicine, And Ayurveda Towards Ayurinformatics, International Journal of Computer Science and Mobile Computing, Volume 4, Issue 12, 35-43, ISSN 2320-088X, December, 2015

[13] Dr. Mohan Kumar S, Muralidhara, Importance Of Accreditation And Autonomous Status In HEI – An Assessment With Special Orientation To Karnataka State, International Journal of Innovative Sciences & Research Technology, Volume 5, , Issue 1, 472-479, ISSN : 2277-9655, January, 2016

[14] Dr. Mohan Kumar S, Interrelated Research Works And Importance Of Object Oriented Analysis And Modeling, International Journal of Engineering Sciences & Research Technology, Volume 5, Issue 1, Page Numbers:59-62, ISSN : 2277-9655, January, 2016

[15] Dr. S Mohan Kumar, R.Jaya, A Survey On Medical Data Mining – Health Care Related Research And Challenges, International Journal of Current Research, Volume 8, Issue 01, Page Numbers:59-62, ISSN : 2277-9655, January, 2016

[16] R.Jaya, Dr S Mohan Kumar, A Study On Data Mining Techniques, Methods, Tools And Applications In Various Industries, International Journal of Current Research & Review, Volume 8, Issue 04, Page Numbers:35-43, ISSN: 0975-5241, January, 2016

[17] Clara K, Dr S Mohan Kumar, Cyber Crime Variant Activities And Network Forensic Investigation, International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 04, Page Numbers: April 2016, ISSN:2250-2459 , March, 2016.

[18] Clara K, Dr S Mohan Kumar,Exploratory Study Of Cyber Crimes, Digital Forensics And Its Tools, International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 04, Page Numbers: April 2016, ISSN:2250-2459, March, 2016

[19] Revathi Y, Dr S Mohan Kumar, Efficient Implementation Using RM Method For Detecting Sensitive Data Leakage In Public Network International Journal of Modern Trends in Engineering and Research, Volume 3, Issue 04, Page Numbers: 515-518, ISSN (Online):2349-9745 ISSN (Print):2393-8161 , April, 2016

[20] Revathi Y, Dr S Mohan Kumar, Review On Importance And Advancement In Detecting Sensitive Data Leakage In Public Network, International Journal Of Engineering Research And General Science, Volume 4, Issue 02, Page Numbers:263-265, ISSN:2091-2730, April, 2016

[21] Revathi Y, Dr S Mohan Kumar, A Survey On Detecting The Leakage Of Sensitive Data In Public Network International Journal of Emerging Technology and Advanced Engineering, Volume 6, Issue 03, Page Numbers:234-236, January, 2016

[22] Vandana CP, "Security improvement in IoT based on Software Defined Networking (SDN)".International Journal of Science, Engineering and Technology Research (IJESET)

[23] Volume 5, Issue 1 ,Pages 291-295

[24] Vandana cp,"Internet of Things and Security".International Journal of Computer Science and Mobile Computing ,Volume 5,Issue 1

[25] Pages 133-139, JICSMC, Vol. 5, Issue. 1, January 2016

[26] Vandana cp,Study of Resource Discovery trends in Internet of Things (IoT). Journal Int. J. Advanced Networking and Applications ,Volume 8,Issue 3

[27] Pages 3084-3089

[28] Vandana cp,IOT future in edge computing Journal International Journal of Advanced Engineering Research and Science

[29] Volume 3 ,Issue 12 , Al Publications

[30] Sujithra Is.Baswaraju Swathi, sonia singh,Inclusive analysis of incomplete data sets using IkNN search, International Journal of Innovative Research in Computer and Communication Engineering,

[31] Subathra Muthuraman, Mrs Swathi Baswaraju, Mrs B Mounica, LARGE SCALE IMAGE RETRIEVAL USING DESCRIPTORS AND DISTANCE MEASURE, International Journal of Computer Science and Mobile Computing, Vol.4 Issue.5

[32] Swathi Baswaraju, Balani Somesh, Shrestha Niza Barun-SURVEY ON HOME SECURITY SURVEILLANCE SYSTEM BASED ON WI-FI CONNECTIVITY USING RASPBERRY PI AND IOT MODULE, International Journal of Advanced Research in Computer Science . Mar/Apr2018, Vol. 9 Issue 2.

[33] Mr.Dilish BabuJ, Dr.S Mohan Kumar, A Survey On Secure Communication In Public Network During Disaster , IJESRT -International Journal Of Engineering Sciences & Research Technology, Volume 5, Issue 3, Page Numbers:430-434. ISSN: 2277-9655, March 2016
