Sentiment Analysis of Social Media Reporting on Demonetization

By

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Outline

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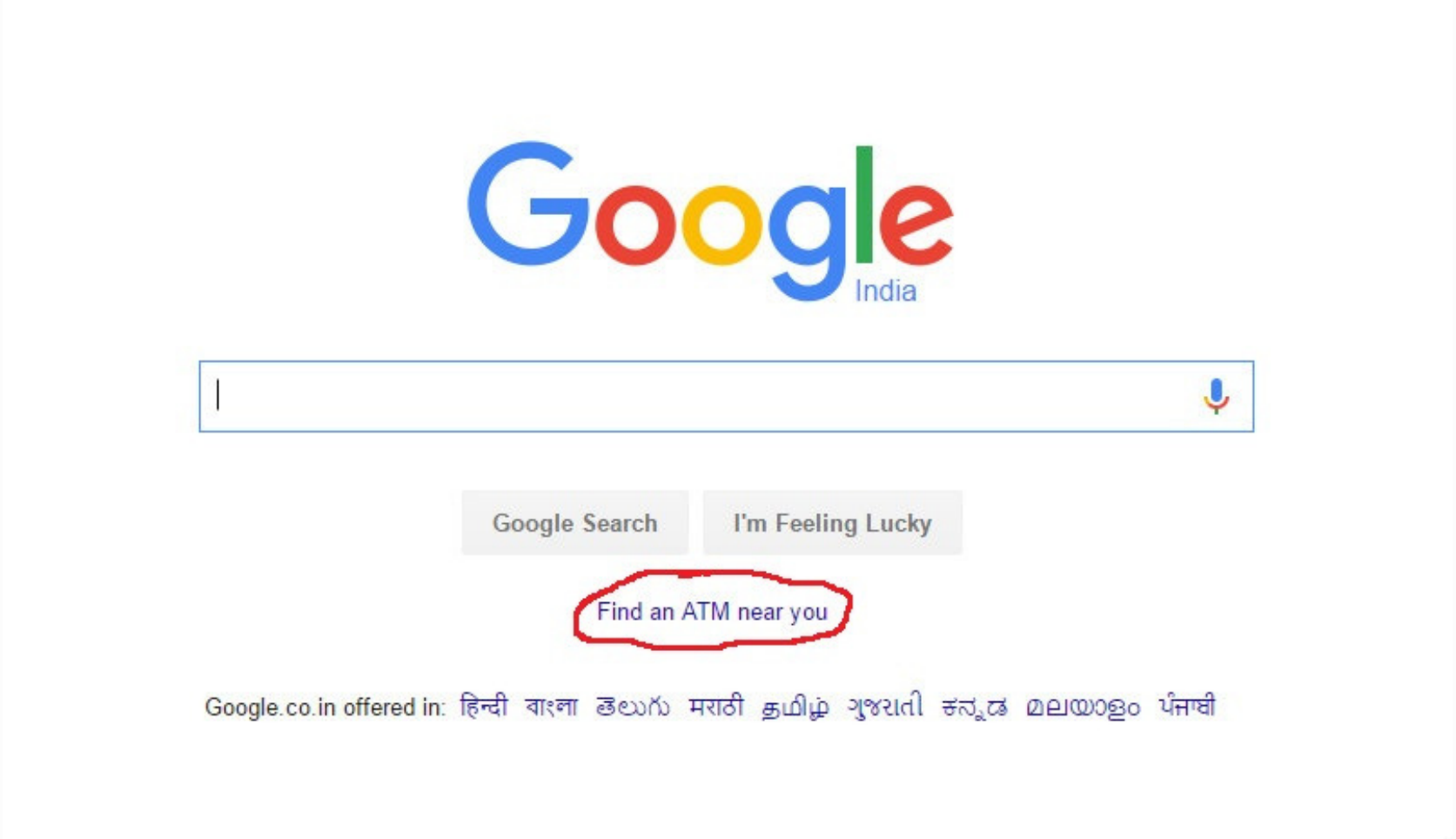
Introduction

- Sentiment analysis means to decide the demeanor of a person or any subject regarding some point or the general logical polarity or sentiment value to a record, connection or occasion(He and Zhou, 2011).
- A sentiment is a basic piece of social media platforms and has its own particular significance.

Motivation

- Demonetization being a controversial issue in media and society
- Impression of demonetization on Indian economy
- Media biasness on the matter
- Data abundance on twitter

Motivation Contd...



Google India homepage during demonetization

Related Works

Table: Literature review

SN.	Authors	Algorithm	Polarity	Data	Task
1	Pang and Lee (2004)	SVM	Pos/Neg	Movie Reviews	Sentiment Analysis
2	Cao et al. (2011)	Semantic, LSA-based	G	Software pro-grams, users feedback	Sentiment Classifi-cation
3	Hu and Li (2011)	Graph-Based approach	Pos/Neg	Movie, Product Reviews	Sentiment Analysis

Related Works Contd...

- Pang and Lee focused on what challenges sentiment analysis is facing and what could be the applications of them(Pang et al., 2008).
- Mahmood in 2013 investigated the tweets available on twitter to predict the winner of 2013 Pakistan elections(Mahmood et al., 2013).
- Sentiment analysis of demonetization of 500, 1000 rupee banknotes by Indian government for first 2 weeks.(Singh et al., 2017)

Aim and Objectives

- To examine people's perception of Demonetization by parsing the tweets with respect to time(8 weeks)
- To compare public sentiments through outcomes of naive bayes and support vector machine algorithms

Methodology

- Data extraction(using python and twitter APIs)
- Data cleaning
- Training and testing dataset
- Applying Naive Bayes and SVM
- Analyzing outcomes

Dataset

	A	B	C	D	E	F	G	H	I	J	K	L	
1		X	text	favorited	favoriteC	replyToSI	created	truncated	replyToS	id	replyToU	statusSource	screenN
2	1	1	RT @rssurjewala: Critical question: Was PayTM informed about #Demonetization edict b	FALSE	0	NA	11/23/2016 18:40	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	HASHTA
3	2	2	RT @Hemant_80: Did you vote on #Demonetization on Modi survey app?	FALSE	0	NA	11/23/2016 18:40	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	PRAMOI
4	3	3	RT @roshankar: Former FinSec, RBI Dy Governor, CBDT Chair + Harvard Professor	FALSE	0	NA	11/23/2016 18:40	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	rahulja:
5	4	4	RT @ANI_news: Gurugram (Haryana): Post office employees provide cash exchange to pat	FALSE	0	NA	11/23/2016 18:39	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	deeptiy
6	5	5	RT @satishacharya: Reddy Wedding! @mail_today cartoon #demonetization #ReddyWed	FALSE	0	NA	11/23/2016 18:39	FALSE	NA	8.01E+17	NA	<a href="http://cpimharyana.c	CPIMBa
7	6	6	@DerekScissors1: India's #demonetization: #Blackmoney a symptom, not the disease htt	FALSE	0	DerekSci	11/23/2016 18:39	FALSE	NA	8.01E+17	2.6E+09	<a href="http://twitter.com" re	ambaza
8	7	7	RT @gauravcsawant: Rs 40 lakh looted from a bank in Kishtwar in J&K. Third such inc	FALSE	0	NA	11/23/2016 18:38	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	bhodia:
9	8	8	RT @Joydeep_911: Calling all Nationalists to join...	FALSE	0	NA	11/23/2016 18:38	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	KARUNA
10	9	9	RT @sumitbhati2002: Many opposition leaders are with @narendramodi on the	FALSE	0	NA	11/23/2016 18:38	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	sumitbl
11	10	10	National reform now destroyed even the essence of sagan. Such instances urge giving #c	FALSE	0	NA	11/23/2016 18:38	TRUE	NA	8.01E+17	NA	<a href="https://mobile.twitte	HelpInc
12	11	11	Many opposition leaders are with @narendramodi on the #Demonetization	FALSE	1	NA	11/23/2016 18:37	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	sumitbl
13	12	12	RT @Joydas: Question in Narendra Modi App where PM is taking feedback if people supp	FALSE	0	NA	11/23/2016 18:37	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	Monish
14	13	13	@Jaggesh2 Bharat band on 28??<ed><U+00A0><U+00BD><ed><U+00B8><U+0082>Those wh	FALSE	0	Jaggesh2	11/23/2016 18:37	FALSE	8.01E+17	8.01E+17	1.2E+09	<a href="http://twitter.com/dc	yuvaraj_
15	14	14	RT @Atheist_Krishna: The effect of #Demonetization !!	FALSE	0	NA	11/23/2016 18:36	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	PMKejri
16	15	15	RT @sona2905: When I explained #Demonetization to myself and tried to put it down in	FALSE	0	NA	11/23/2016 18:36	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	hkgupta
17	16	16	RT @Dipankar_cpiml: The Modi app on #DeMonetization proves once again that the govt	FALSE	0	NA	11/23/2016 18:35	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	aazaad
18	17	17	RT @roshankar: Former FinSec, RBI Dy Governor, CBDT Chair + Harvard Professor	FALSE	0	NA	11/23/2016 18:35	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	darkdes
19	18	18	RT @Atheist_Krishna: BEFORE and AFTER Gandhi ji heard they are standing there	FALSE	0	NA	11/23/2016 18:34	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	snoover
20	19	19	RT @pGurus1: #Demonetization The co-operative banking sector in Kerala is as good as	FALSE	0	NA	11/23/2016 18:34	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	Vishwa
21	20	20	RT @roshankar: Former FinSec, RBI Dy Governor, CBDT Chair + Harvard Professor	FALSE	0	NA	11/23/2016 18:34	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com" re	Politica
22	21	21	RT @Hemant_80: Did you vote on #Demonetization on Modi survey app?	FALSE	0	NA	11/23/2016 18:34	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	MdShua
23	22	22	RT @roshankar: Former FinSec, RBI Dy Governor, CBDT Chair + Harvard Professor	FALSE	0	NA	11/23/2016 18:33	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	BharatP
24	23	23	RT @Atheist_Krishna: BEFORE and AFTER Gandhi ji heard they are standing there	FALSE	0	NA	11/23/2016 18:33	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	ihavnth
25	24	24	RT @MahikaInfra: @narendramodi	FALSE	0	NA	11/23/2016 18:33	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	GajjarBI
26	25	25	RT @Hemant_80: Did you vote on #Demonetization on Modi survey app?	FALSE	0	NA	11/23/2016 18:33	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com" re	Rss_cha
27	26	26	RT @roshankar: Former FinSec, RBI Dy Governor, CBDT Chair + Harvard Professor	FALSE	0	NA	11/23/2016 18:33	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	mukesh
28	27	27	RT @kapil_kausik: #Doltiwal I mean #JaiChandKejriwal is "hurt" by #Demonetization as t	FALSE	0	NA	11/23/2016 18:32	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	mrx565
29	28	28	RT @roshankar: Former FinSec, RBI Dy Governor, CBDT Chair + Harvard Professor	FALSE	0	NA	11/23/2016 18:32	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com" re	iMirzaG
30	29	29	RT @kapil_kausik: #Doltiwal I mean #JaiChandKejriwal is "hurt" by #Demonetization as t	FALSE	0	NA	11/23/2016 18:32	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com/dc	PontiFu
31	30	30	RT @AAPVind: #Demonetization Is Disaster! @naam_pk	FALSE	0	NA	11/23/2016 18:31	FALSE	NA	8.01E+17	NA	<a href="http://www.twitter.c	sehgal_
32	31	31	RT @Hemant_80: Did you vote on #Demonetization on Modi survey app?	FALSE	0	NA	11/23/2016 18:31	FALSE	NA	8.01E+17	NA	<a href="http://twitter.com" re	BoscoU

Dataset

Activate Windows

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Naive Bayes

- Naive bayes is applied for evaluating the sentiment values of tweets. For k outcomes and classes, it works on following probabilistic model :

$$\mathbf{p(Ck \ / \ z1,z2.....,zn)}$$

- But for larger value of n above formula doesnt work well. So, bayes theorem interfuses the conditional probability as :

$$\mathbf{p(Ck/z) = p(Ck)\ p(z/Ck)/p(z)}$$

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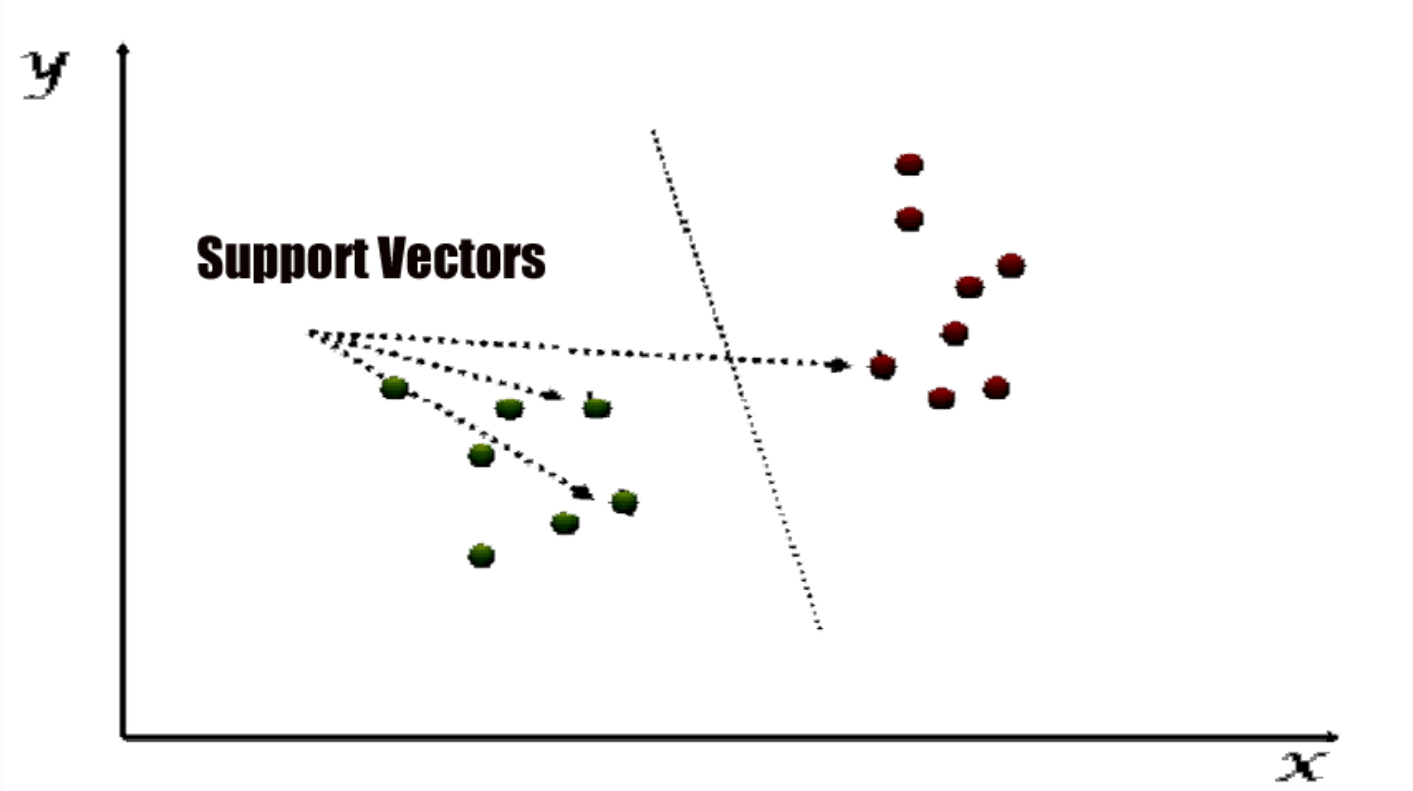
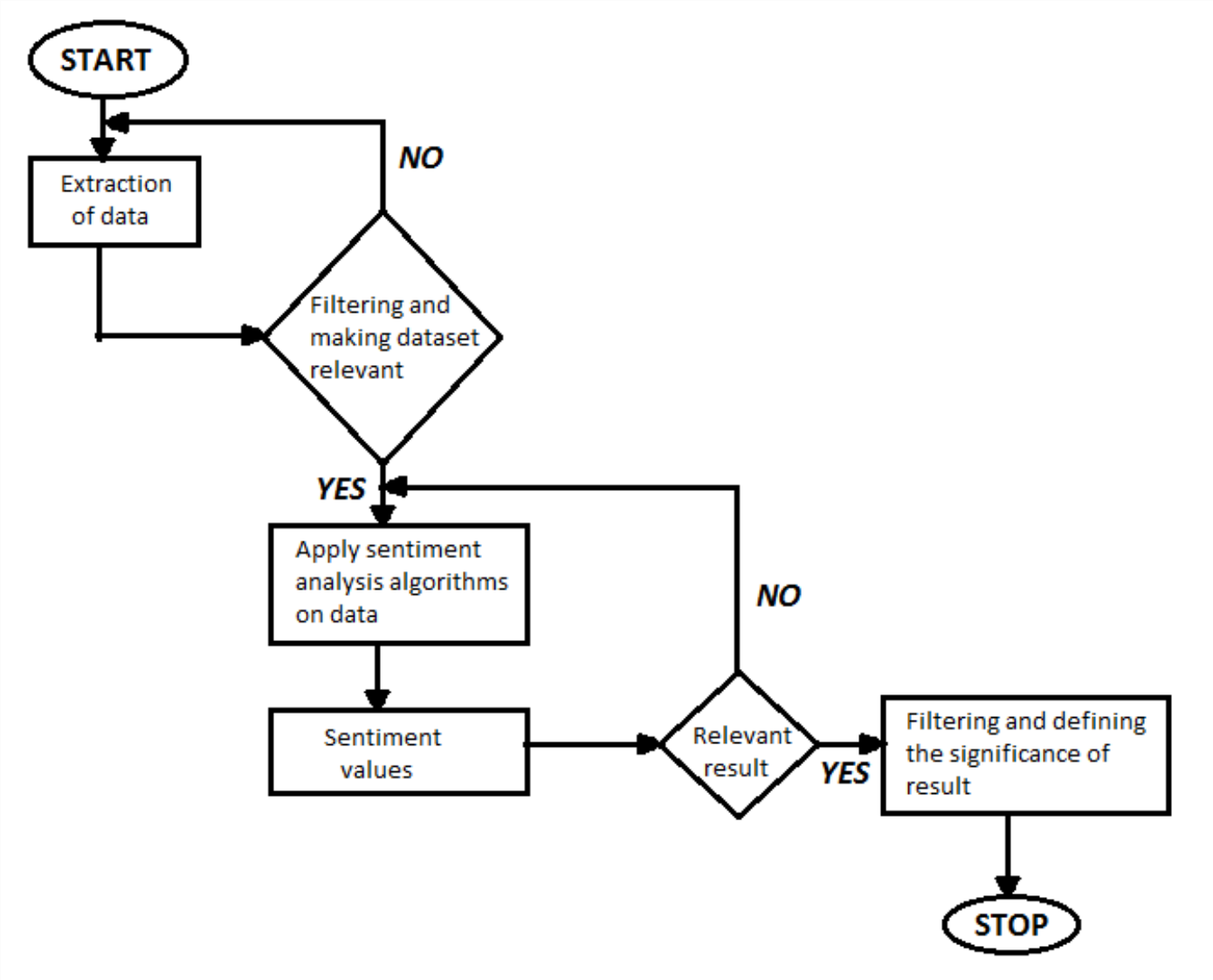
Support Vector Machine(SVM)

Support vector machine is a supervised ML algorithm which has the ability to linearly separate the classes by a large margin.



SVM

Flowchart



Flowchart

Results and Discussion

Table: Weekly distribution of dates

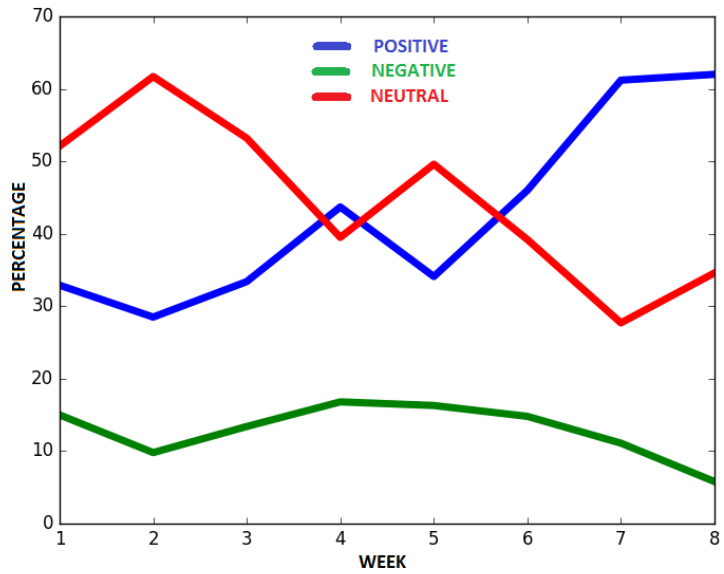
Week	From	To
W 1	09-Nov-2016	14-Nov-2016
W 2	15-Nov-2016	20-Nov-2016
W 3	21-Nov-2016	27-Nov-2016
W 4	28-Nov-2016	04-Dec-2016
W 5	05-Dec-2016	10-Dec-2016
W 6	11-Dec-2016	17-Dec-2016
W 7	18-Dec-2016	24-Dec-2016
W 8	25-Dec-2016	31-Dec-2016

Results Contd...

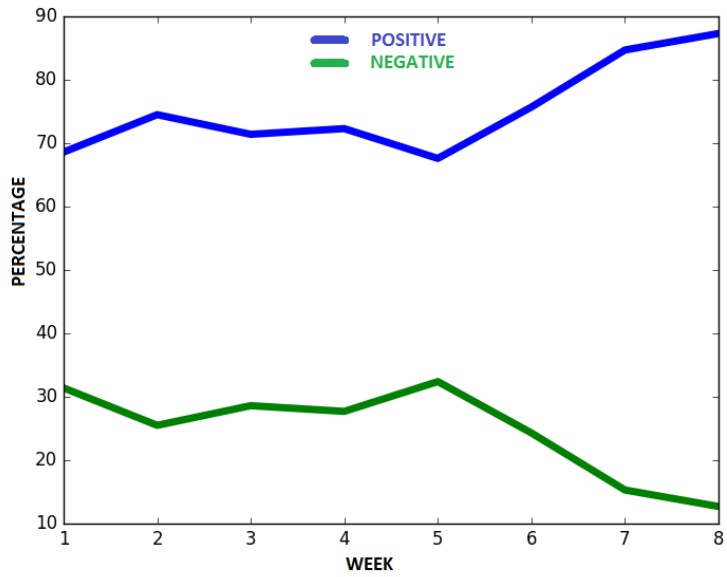
Table: Weekly distribution of sentiment values over different algos

Week No.	Positive NB (in %)	Positive SVM (in %)	Negative NB (in %)	Negative SVM (in %)	Neutral NB (in %)	Neutral SVM (in %)
W 1	32.90	27.00	**15.00**	**15.00**	52.10	58.00
W 2	28.50	23.00	9.80	9.80	**61.70**	**67.20**
W 3	33.40	35.60	13.40	12.30	53.20	52.10
W 4	43.70	46.20	16.80	13.30	39.50	40.50
W 5	34.10	77.10	16.30	16.90	49.60	06.00
W 6	46.00	44.20	14.80	13.30	39.20	42.50
W 7	61.20	63.10	11.10	08.50	27.70	28.40
W 8	**61.30**	**88.40**	06.17	09.40	32.53	02.20

Results Contd...



Different sentiment values over time(NB)



P/N sentiment values over time(NB)

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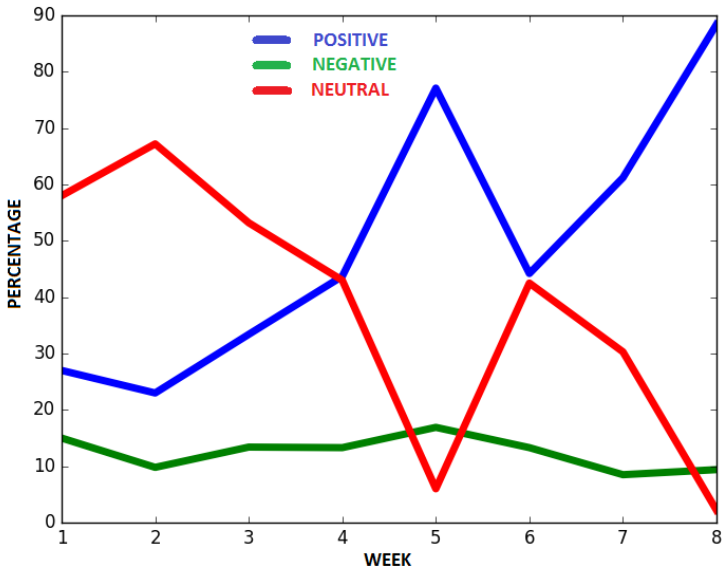
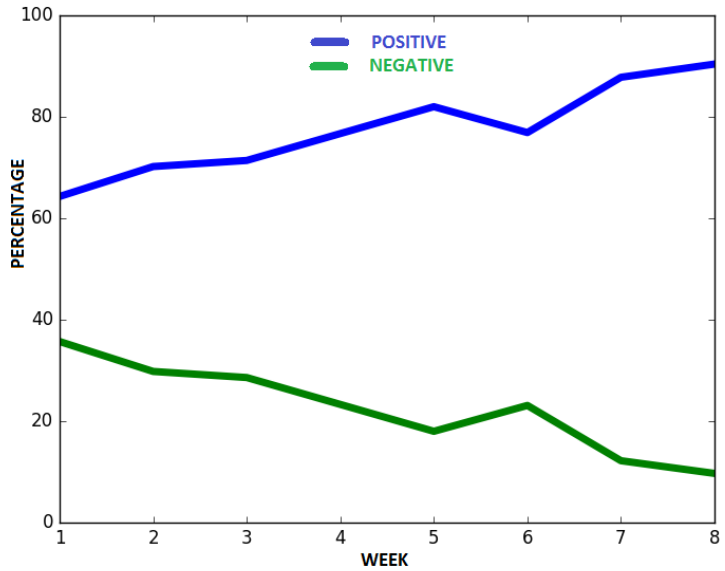
Results Contd...



Different sentiment values over time(SVM)



P/N sentiment values over time(SVM)

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Results Contd...

Table: Overall distribution of different sentiment values over different algorithms

Sentiment	Naive Bayes (in %)	SVM (in %)
Positive	39.60	33.90
Negative	14.80	10.30
Neutral	45.6	55.80

Dissemination of previous work

- Previous study(Singh et al., 2017) showed analysis for first two weeks only.
- Negative emotions diminished marginally in second week.
- Our analysis demonstrates the total open feeling over eight weeks.

Discussion

- Consistent increment in positive sentiments
- Gradual decrement in negative sentiments
- General sentiments got cleared with time

Conclusion

The study shows that with every passing week, negativity in the sentiments started to decrease and the number of positive responses increased.

- Privileged of our general public is supported most.
- Not fair for everyone but appreciated by upper class.
- Positive reactions of users towards demonetization.

References

- Pang, B., Lee, L. et al.: 2008, Opinion mining and sentiment analysis, Foundations and Trends R in Information Retrieval 2(12), 1135.
- Mahmood, T., Iqbal, T., Amin, F., Lohanna, W. and Mustafa, A.: 2013, Mining twitter big data to predict 2013 pakistan election winner, Multi Topic Conference (INMIC), 2013 16th International, IEEE, pp. 4954.
- Singh, P., Sawhney, R. S. and Kahlon, K. S.: 2017, Sentiment analysis of demonetization of 500 1000 rupee banknotes by indian government, ICT Express.
- He, Y. and Zhou, D.: 2011, Self-training from labeled features for sentiment analysis, Information Processing Management 47(4), 606616.

References

- Saif, H., He, Y. and Alani, H.: 2012, Semantic sentiment analysis of twitter, The Semantic WebISWC 2012 pp. 508524.
- Cao, Q., Duan, W. and Gan, Q.: 2011, Exploring determinants of voting for thehelpfulness of online user reviews: A text mining approach,Decision SupportSystems50(2), 511521.
- Hu, Y. and Li, X.: 2011, Context-dependent product evaluations: an empiricalanalysis of internet book reviews,Journal of Interactive Marketing25(3), 123133.

Thank You!

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