CUSTOMER SENTIMENT ANALYSIS

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Business Problems – Analytical solutions

How to address Business problems using NLP/Machine Learning Techniques

1. Customer Sentiments – Pre/Post Sw updates/New features/Products.

2. Revenue Growth
   - Customer Churn Analysis - Converting Neutral or Negative customers to Elite customers.
   - Take data driven decisions using customer wishlist features/products.

3. Identify own brand's influencers and promoters: by tracking those on social media who are usually associated with a positive sentiment for our brand.

4. Gather competitive intelligence: Track social media mentions for top competitors by simply adding competitors brands in the keywords – "Skip Mode vs AutoHop".

5. Spot industry trends: Track social media mentions to identify news and events in industries of interest.

6. Create and review Interactive Dash Boards – Manager/ Sales/ Product Life cycle.

Business Problem

"How to Analyse/Evaluate Customer Sentiments about TiVo products/features.**"**
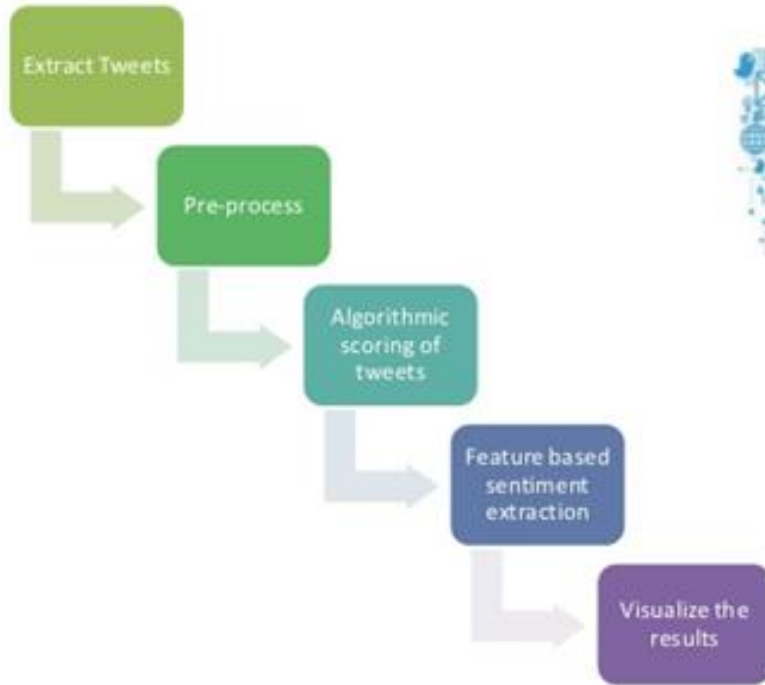
Top features picked:

1. TiVo BOLT VOX.

2. Hydra UI.

3. Personalized Content Predictions.

4. Apps (Netflix/Youtube) watching experience.

5. Commercials Skip Mode.

6. TiVO BOLT.
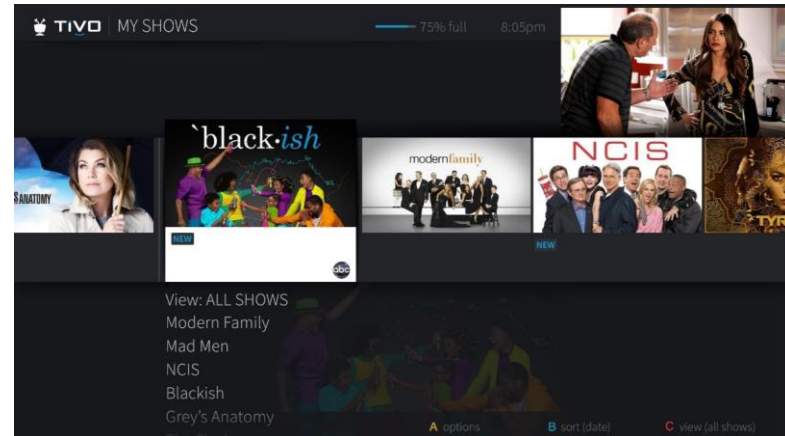
Sentiment Analysis Using Analytical Approach

1. Business Problem Definition
    - **Customer Sentiment Analysis.**

2. Data Sources
    - **Social Media – Twitter, Facebook.**
    - **Tech Reviews– CNN, Engadget, Amazon.**

3. Basic Process and Algorithm
    - **Opinion Mining/Sentiment Polarity.**
    - **Machine Learning/Reinforcement Learning.**

4. Data Metrics/Visualization
    - **Tableau/Kibana, Elastic search.**

5. Challenges/Limitations, Alternate Approaches, Tools used

6. Conclusion

7. Future Enhancements/Recommendations

Process and Sentiment Polarity

Extract Tweets → Pre-process → Algorithmic scoring of tweets → Feature based sentiment extraction → Visualize the results

Sentiment Analysis: Text Input, Tokenization, Stop Word Filtering, Negation Handling, Stemming, Classification, Sentiment Class

Data Sources

Blogs, Forums, Social Network ....

Picture Courtesy: http://imfoundation.blogspot.com/p/im-forumsblogs.html
Picture Courtesy:http://www.my-social-network.org/

Survey

Picture Courtesy: http://www.oksociety.in/the-guest-for-legitmate-sites-for-paid-surveys/

Tech Reviews

Data Collection Metrics

S.No	Feature	Twitter	Amazon	Blogs /Tech Reviews	TOTAL
1	BOLT VOX	32	126	400	526
2	HYDRA UI	3	222	165	390
3	PREDICTIONS	67	320	305	692
4	COMMERCIAL-SKIP	132	356	322	810
5	NETFLIX/YOUTUBE	88	406	562	1056
6	BOLT	168	**594**	296	1058
	TOTAL	458	2024	**2050**	

Sentiment Analysis Results

TiVo Features/Products - Sentiment Analysis
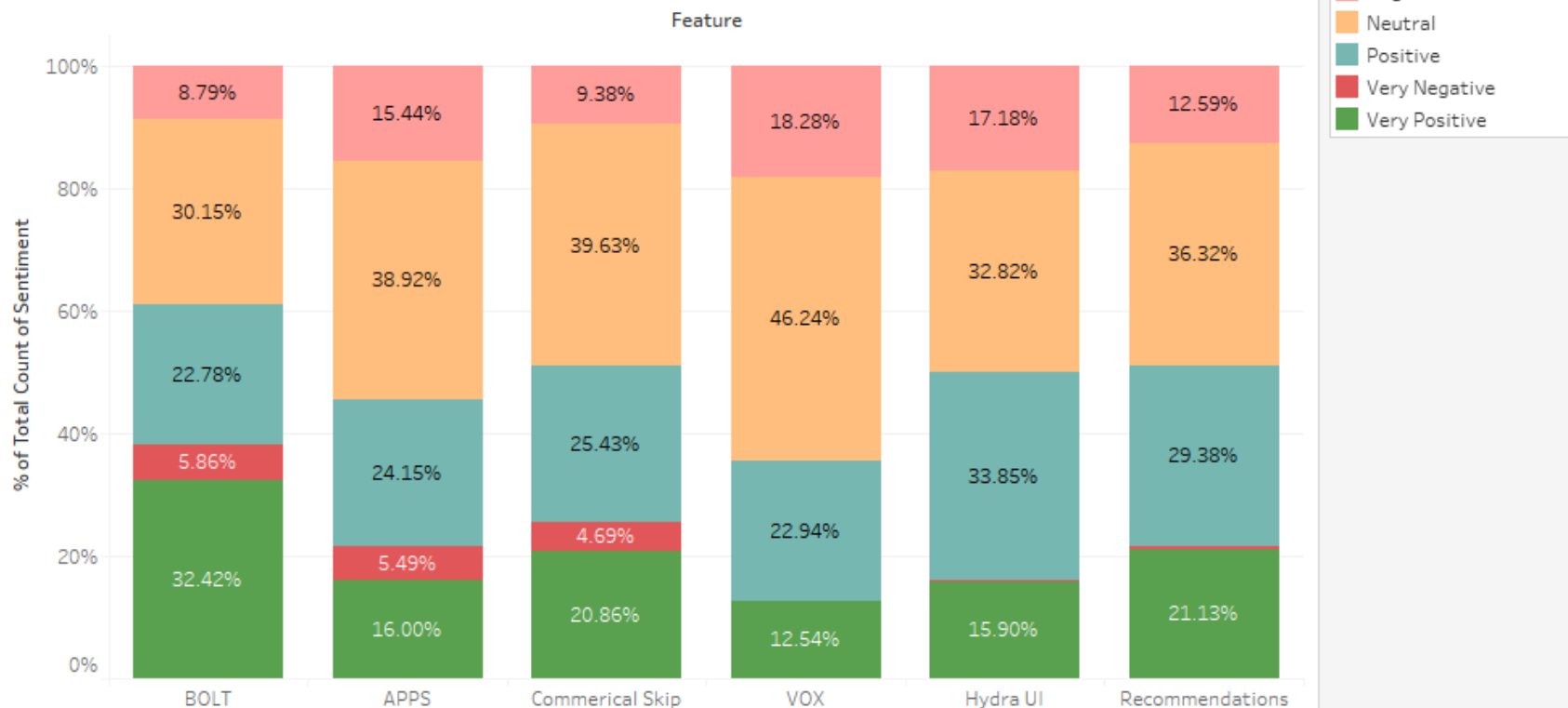
Sentiment Logs

1. ## Very Positive
   - **02-12-2017**   "Verified Purchase" - Finally something I can talk to that doesn't talk back
   - **20-11-2017**   "Verified Purchase" - Upgraded my Bolt to the new software, love the voice control!!!
   - **14-11-2017 17:15**   b"What's your favorite way to #TalkToTheVOX? Get inspired but some of our fans' favorite searches!

2. ## Positive
   - **28-10-2017**   VR maker TiVo announced its first devices that can be controlled with voice commands Tuesday: The new TiVo BOLT VOX DVR and the TiVo VOX mini companion box both come with a remote control with integrated microphone. The company is considering adding support for **third-party voice assistants** and hardware as well,

3. ## Neutral
   - **29-10-2017**   The TiVo VOX Remote can be purchased separately by existing TiVo BOLT, TiVo Roamio and first-generation TiVo Mini customers for $40 in either black or white. The VOX Remote for Roamio products (OTA, Pro and Plus) and first-generation TiVo Mini will be available in black only and will cost approximately $45, including Bluetooth adapter.

4. ## Negative
   - **29-10-2017**   I am a loyal TiVo user for the past 10+ years, so I was looking forward to this new VOX remote. Unfortunately, The VOX remote is a step backwards. My old slide pro remote was a learning remote and I was able to program it to turn ON/OFF BOTH the TV and the AV receiver. I CAN\'T DO THATt with the VOX remote at the same time. Also, to skip the Ads (which is a GREAT feature), on the old slide remote pro, I push on the D button and it skips. You can do that on a VOX remote, but to use your voice, you have to push Voice and then speak "Skip", so two steps on the new VOX remote- push button and speak, while one step on the old slide remote- push D.

Challenges/ Tools

1. **Data Specific Limitations**
   - Infrastructure issues specially to download Twitter in continuous time were seen, for example any Twitter handle provides latest 3200 tweets for free.
   - Missing fields, for example – facebook data miss the date info of like/comments.

2. **Technological Limitations**
   - Entity level vs Article level sentiment.
   - Can't identify the root cause of the review.

3. **Language Specific Limitations**
   - Words have different meaning, for example spanish, however python packages available for language specific Text means.
   - Context matters, for example sarcasm"Oh, yeah, Fast Food Restaurant. I just LOVE the 30 minute wait for my food.", however can be addressed by sentiment solver.s

4. **Data Collection** - Tweepy for Tweets, Google scraper for URLs.

5. **Data Clean up** - Identification of invalid strings/fields.

6. **Sentiment Scoring** - Textblob for calculating Sentiment polarity.

7. **Visualization** - Kibana, Elastic Search.

Conclusion

- While we couldn't cover all of the limitations, however Developed a Sentiment Analysis tool that can judge the type of sentiment present in Social media/Technical reviews/Blogs/Community Data. Sentiment levels like these can be achieved.

Very Positive Positive Neutral Negative Very Negative
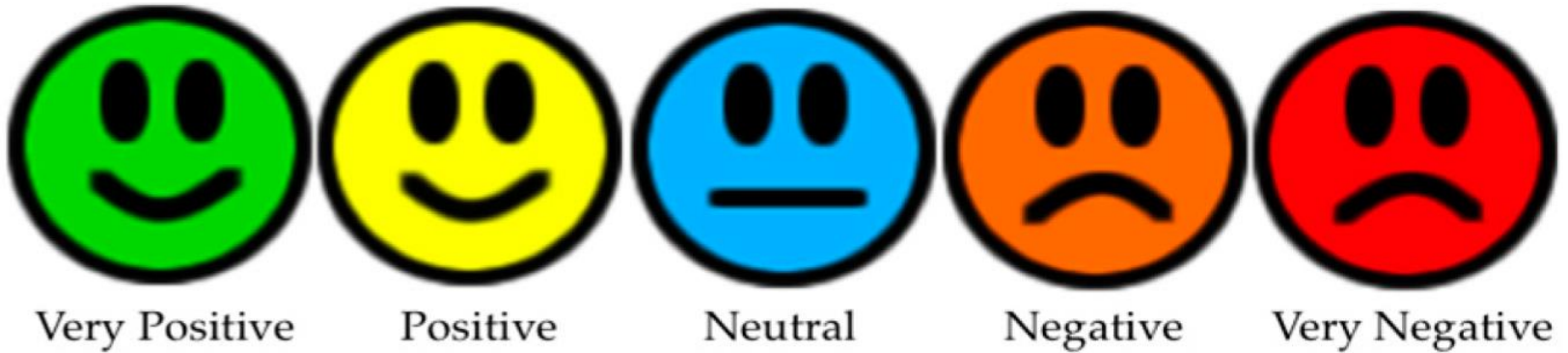
- Social Media Campaign to be improved, for example reviews can be engaged in Twitter, Facebook, Youtube ..etc.

THANK YOU for Your Time and Attention