



CUSTOMER SENTIMENT ANALYSIS

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Business Problems – Analytical Solutions

How to address Business Problems using NLP/Machine Learning Techniques

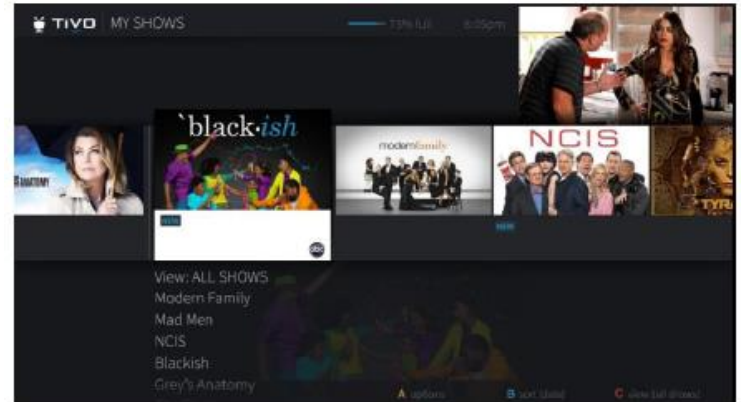
1. Customer Sentiments – Pre/Post Sw updates/New features/Products.
2. Customer Churn Analysis - Identify own brand's influencers and promoters, converting Neutral or Negative customers to Elite customers and take data driven decisions using customer wishlist features/products.
3. Gather competitive intelligence: Track social media mentions for top competitors by simply adding competitors brands in the keywords – “Skip Mode vs AutoHop”.
4. Spot industry trends: Track social media mentions to identify news and events in industries of interest.
5. 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. App (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

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-legitimate-sites-for-paid-surveys/>

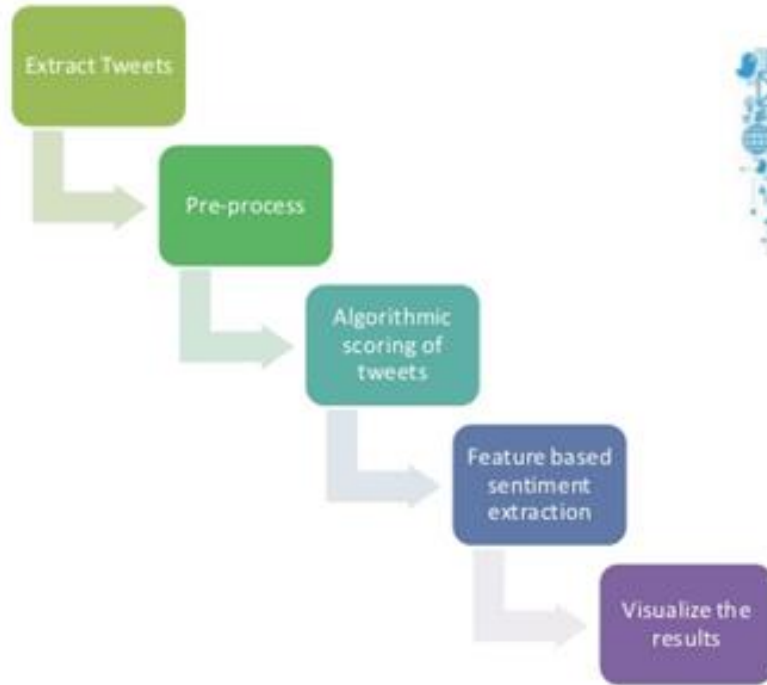
Tech Reviews



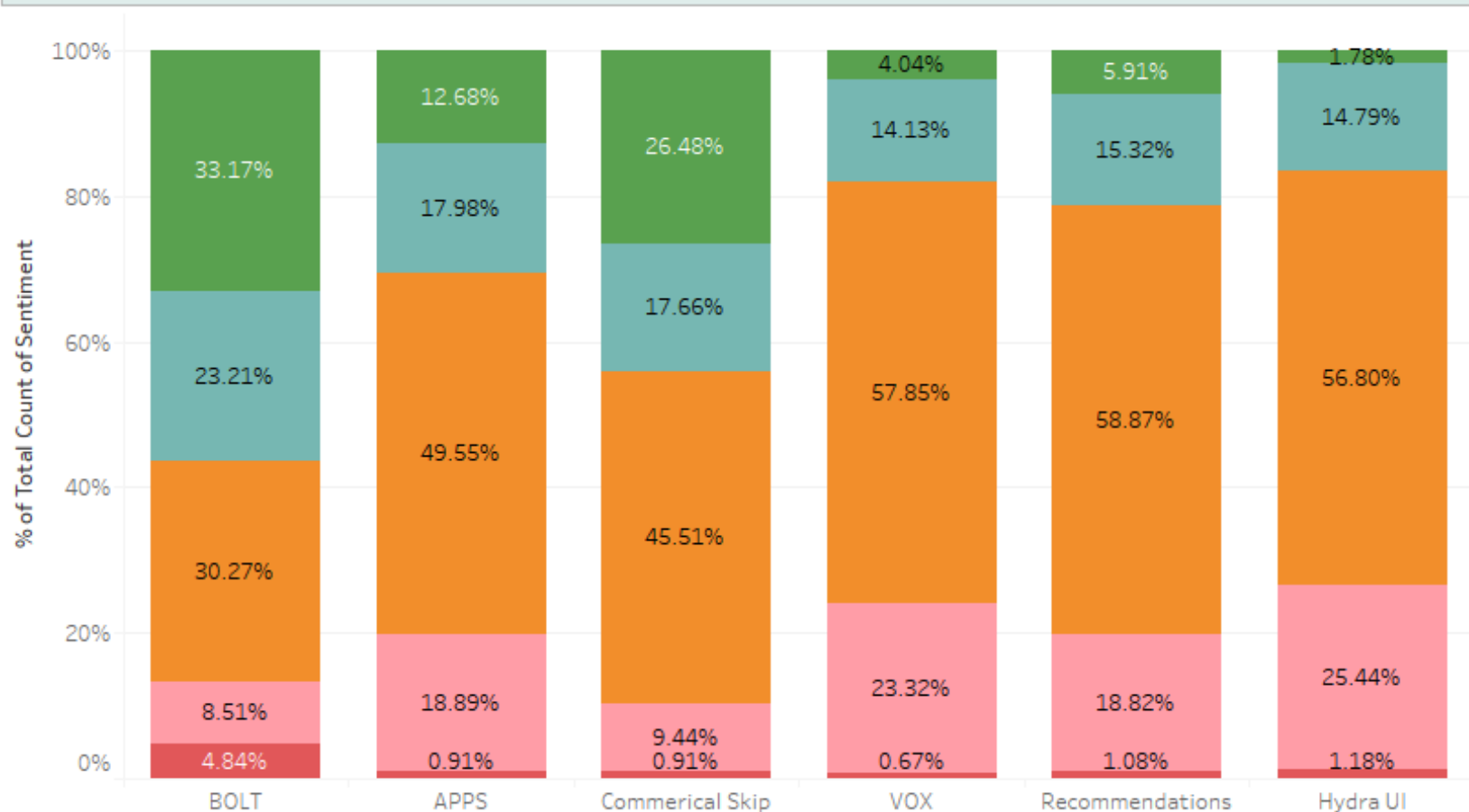
Data Collection Metrics

| S.No | Feature | Twitter | Amazon | Blogs /Tech Reviews | TOTAL |
|------|-----------------|---------|--------|---------------------|-------|
| 1 | BOLT VOX | 32 | 14 | 400 | 446 |
| 2 | HYDRA UI | 3 | 1 | 165 | 169 |
| 3 | PREDICTIONS | 67 | 1 | 305 | 373 |
| 4 | COMMERCIAL-SKIP | 132 | 203 | 322 | 657 |
| 5 | NETFLIX/YOUTUBE | 88 | 123 | 562 | 773 |
| 6 | BOLT | 168 | 570 | 296 | 1034 |
| | TOTAL | 490 | 912 | 2050 | 3452 |

Process and Sentiment Polarity



Sentiment Analysis Scores



Sentiment

- Very Positive
- Positive
- Neutral
- Negative
- Very Negative

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

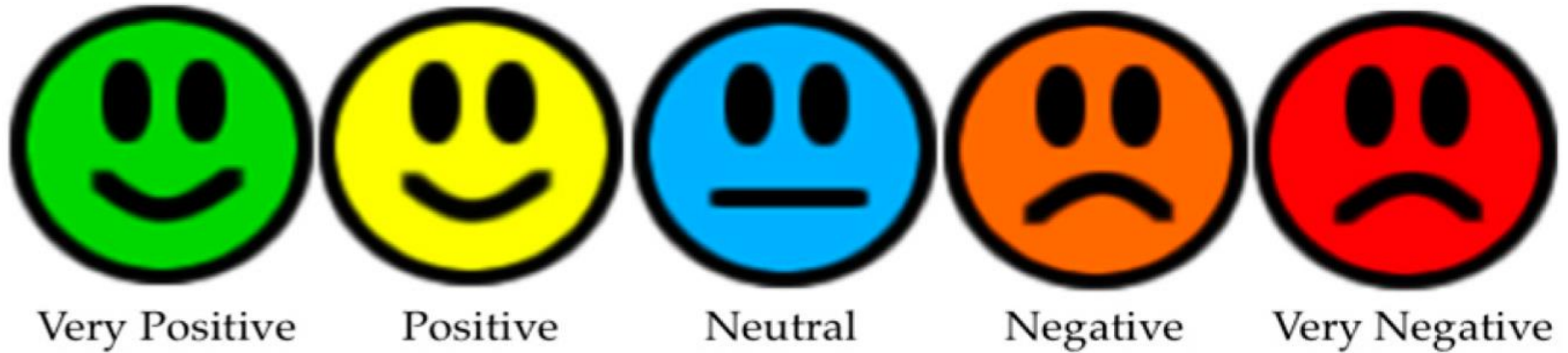
- **29-10-2017** The TiVo VOX Remote can be purchased separately by existing TiVo BOLT, TiVo Roamio and first-generation TiVo Mini customers for \$40 in either black or white. The VOX Remote for Roamio products (OTA, Pro and Plus) and first-generation TiVo Mini will be available in black only and will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

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.



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

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.

THANK YOU for Your Time and Attention

