Google Application Reviews

How can we improve applications?

Yuwen Huang 2/26/2021
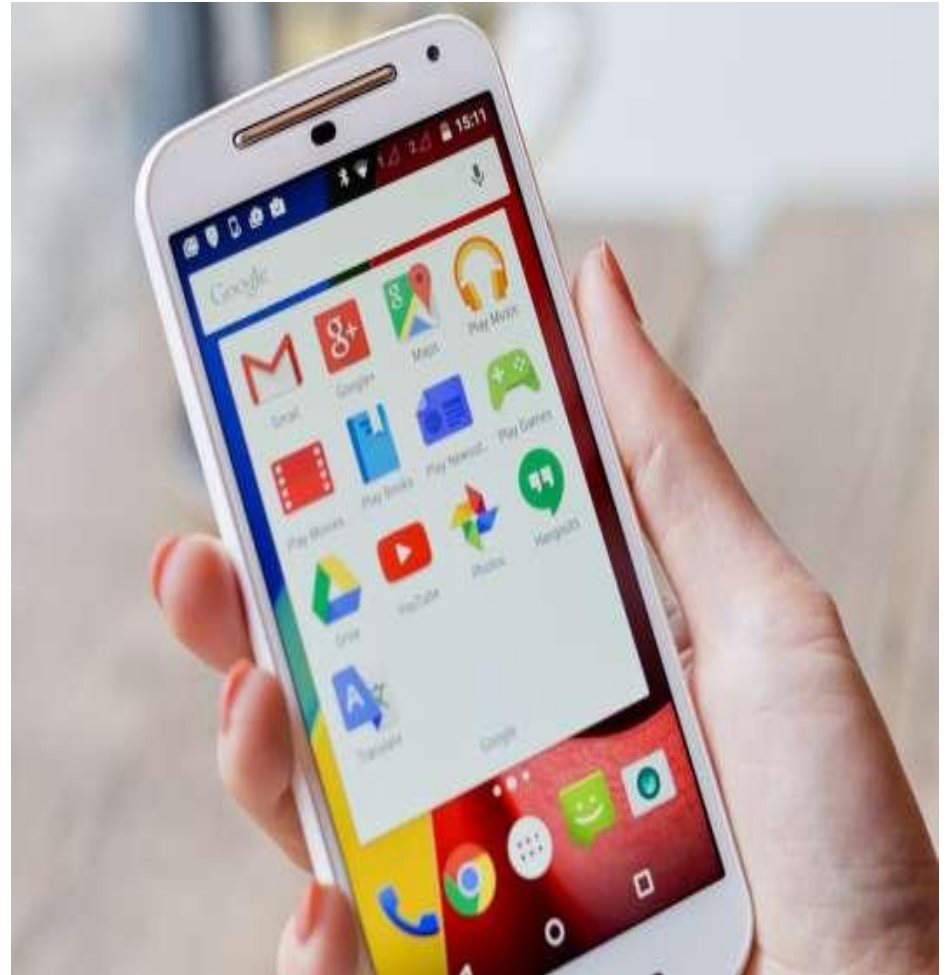
Introduction

As an app developer, we work hard to create application and strive to get as many Five-Star reviews as possible. However, earning perfect review is not critical for future development. In fact, negative reviews can actually help us to improve our application.
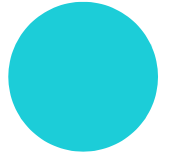
Goal

Find out:
- What topic has been discussed?
- Any specific problem or issue users has mentioned?

Data Description

- Google Application review Data from Kaggle
- Total **95,000** reviews (Text Strings)
- **82** Google Applications
- Reviews from 2014-2020

Topic Modeling-NMF Topic Model

Topic 1
nice, nice easy, nice experience, nice useful, nice nice, helpful, nice add, wallpaper, experience, nice problem

Topic 2
great, great easy, great experience, great way, great job, wish, experience, great great, job, great add

Topic 3
doesn't, fix, problem, try, add, new, open, music, download, say

Topic 4
best, best best, best camera, world, camera, best thing, best music, experience, best edit, music

Topic 5
bad, bad experience, experience, bad bad, quality, survey, bad thing, kid, slow, bad don't

Topic 6
dont, know, don't know, want, don't want, don't understand, understand, think, don't download, people

Topic 7
excellent, excellent service, service, quality, excellent easy, perfect, amaze, wallpaper, tool, motivate
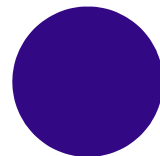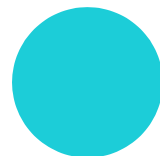
Topic 8
useful, helpful, nice useful, cool, language, translate, simple, useful tool, tool, important

Topic 9
awesome, experience, cool, helpful, add, wallpaper, awesome experience, amaze, game, keyboard

Topic 10
easy, helpful, simple, great easy, simple easy, cool, nice easy, way, survey, easy navigate

Topic Modeling-NMF

Topic 1 - NICE Apps

nice, nice easy, nice experience, nice useful, nice nice, helpful, nice add, wallpaper, experience, nice problem

Topic 2 - GREAT Apps

great, great easy, great experience, great way, great job, wish, experience, great great, job, great add

Topic 3

doesn't, fix, problem, try, add, new, open, music, download, say

Topic 4 - BEST APPs

best, best best, best camera, world, camera, best thing, best music, experience, best edit, music

Topic 5

bad, bad experience, experience, bad bad, quality, survey, bad thing, kid, slow, bad don't

Topic 6

dont, know, don't know, want, don't want, don't understand, understand, think, don't download, people

Topic 7 - EXCELLENT APPs

excellent, excellent service, service, quality, excellent easy, perfect, amaze, wallpaper, tool, motivate

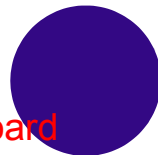**Topic 8 - USEFUL/HELPFUL APPs**

useful, helpful, nice useful, cool, language, translate, simple, useful tool, tool, important

Topic 9 - Awesome APPs

awesome, experience, cool, helpful, add, wallpaper, awesome experience, amaze, game, keyboard

Topic 10 - Easy/Simple to use

easy, helpful, simple, great easy, simple easy, cool, nice easy, way, survey, easy navigate

Topic Modeling-NMF

Topic 1
nice, nice easy, nice experience, nice useful, nice nice, helpful, nice add, wallpaper, experience, nice problem

Topic 2
great, great easy, great experience, great way, great job, wish, experience, great great, job, great add

Topic 3 - issue/problem
doesn't, fix, problem, try, add, new, open, music, download, issue

Topic 4
best, best best, best camera, world, camera, best thing, best music, experience, best edit, music

Topic 5 - bad experience
bad, bad experience, experience, bad bad, quality, survey, bad thing, kid, slow, bad don't

Topic 6 - Do not install
don't, know, don't know, want, don't want, don't understand, understand, uninstall, don't download

Topic 7
excellent, excellent service, service, quality, excellent easy, perfect, amaze, wallpaper, tool, motivate
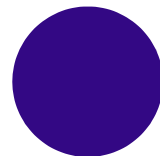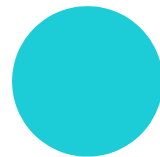
Topic 8
useful, helpful, nice useful, cool, language, translate, simple, useful tool, tool, important
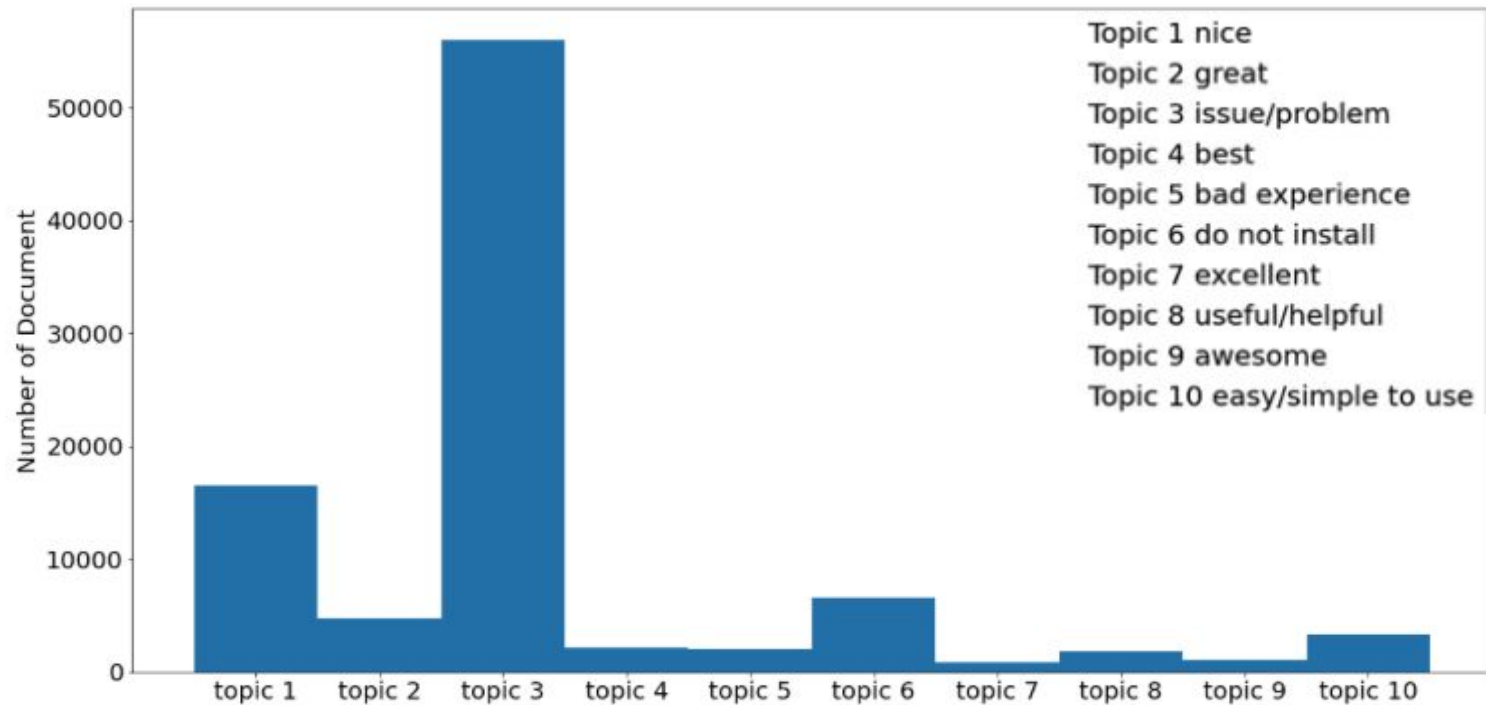
Topic 9
awesome, experience, cool, helpful, add, wallpaper, awesome experience, amaze, game, keyboard
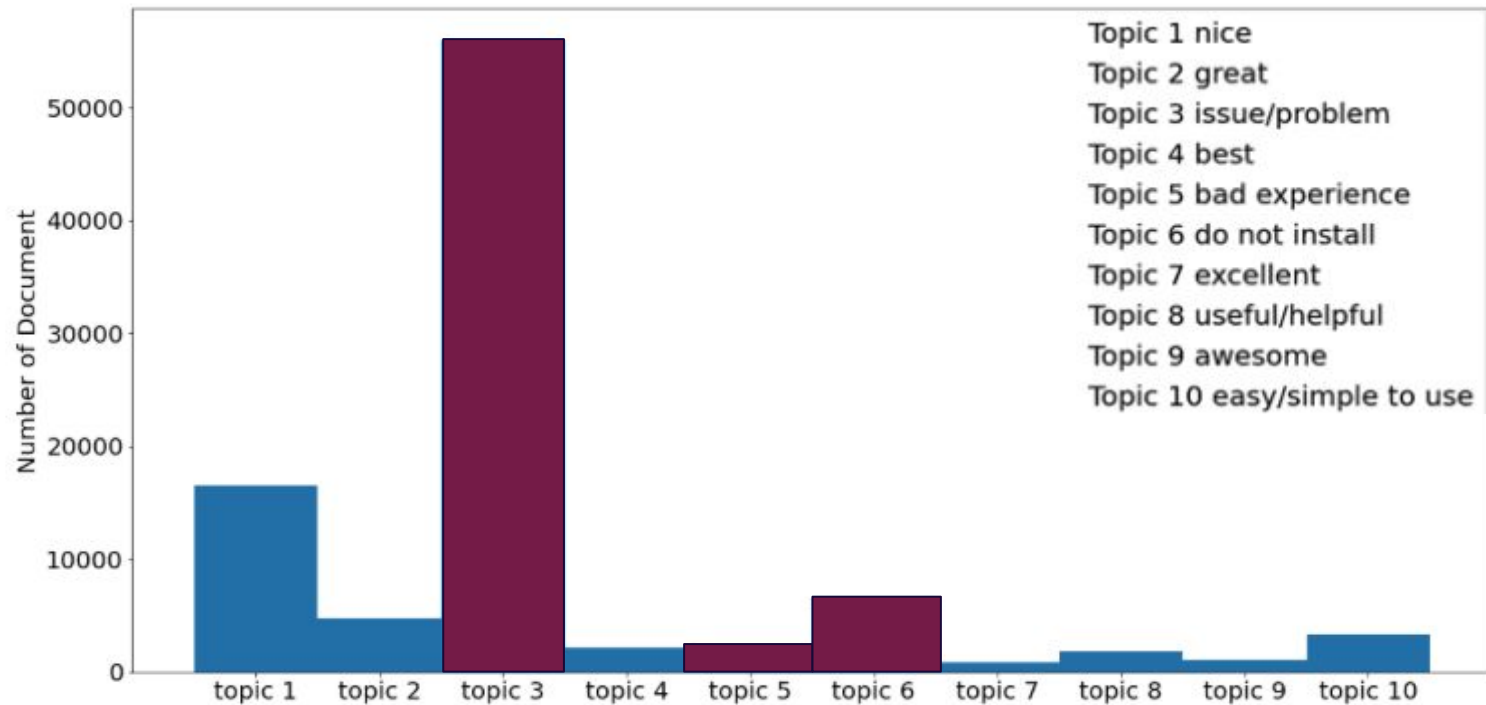
Topic 10
easy, helpful, simple, great easy, simple easy, cool, nice easy, way, survey, easy navigate

Number of Documents by each Topic

Topic 1 nice
Topic 2 great
Topic 3 issue/problem
Topic 4 best
Topic 5 bad experience
Topic 6 do not install
Topic 7 excellent
Topic 8 useful/helpful
Topic 9 awesome
Topic 10 easy/simple to use

Number of Documents by each Topic

Negative & Positive Review by APPS Type
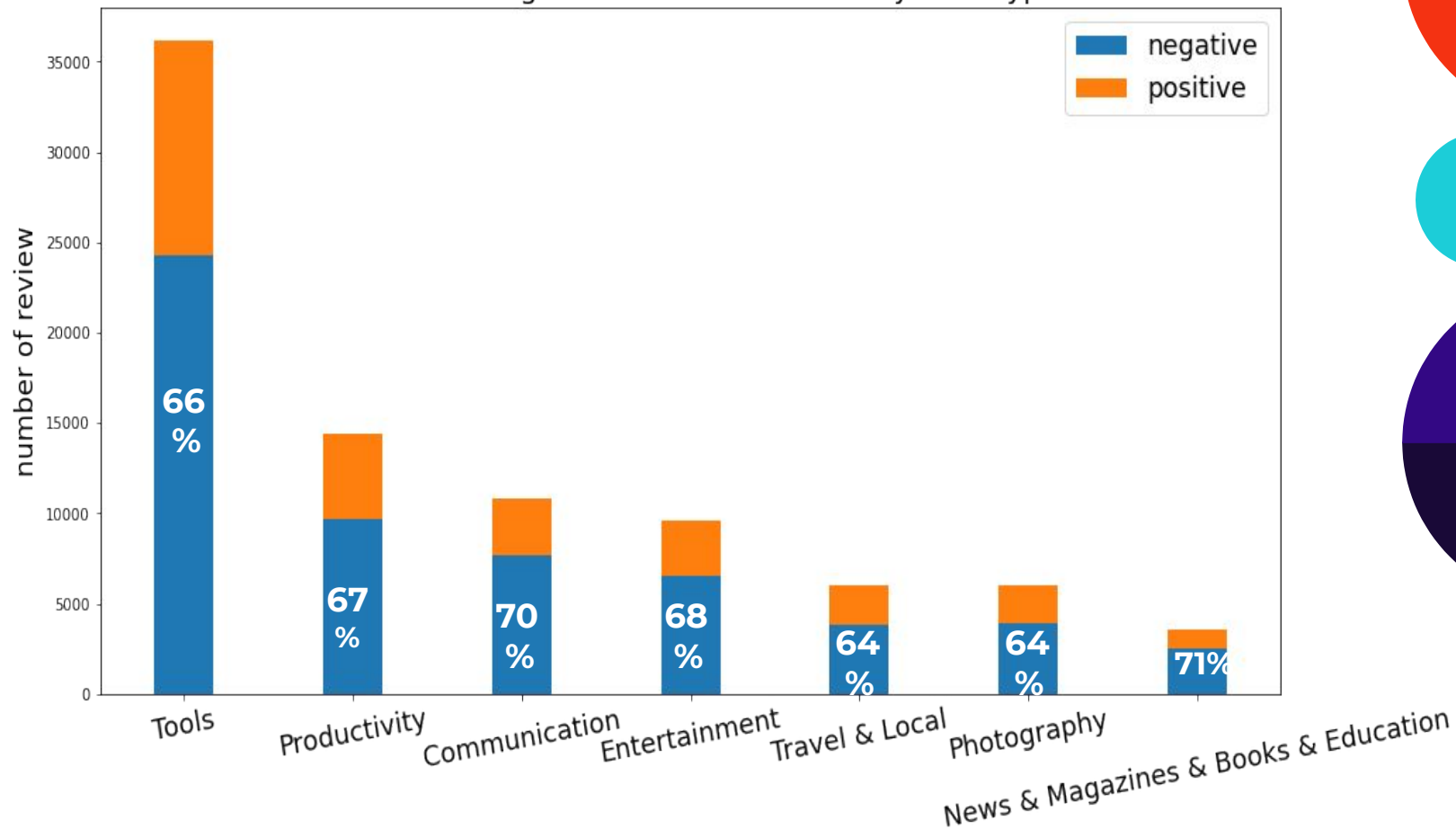
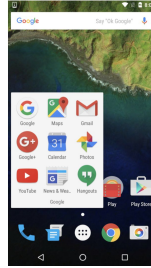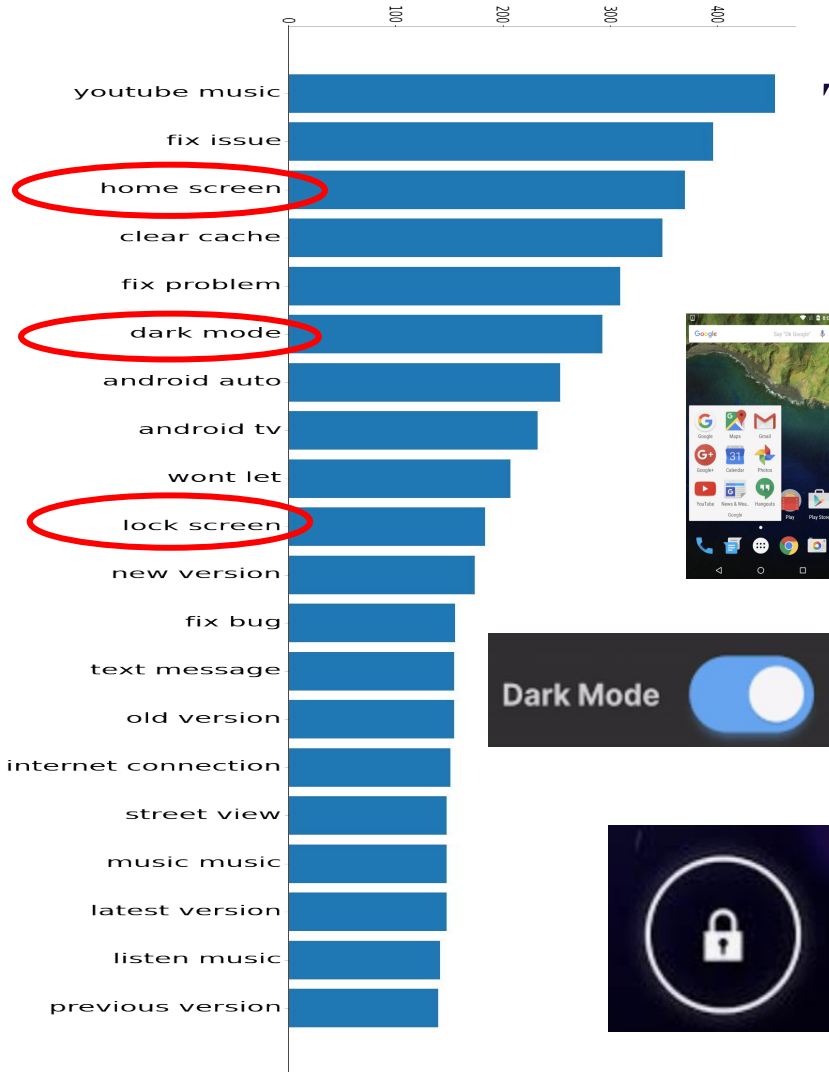# Message from Negative Reviews?
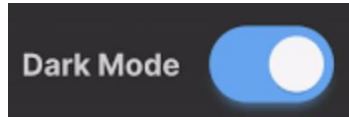
Topic 3 Issue/Problem

Topic 5 Bad Experience

Topic 6 Do Not Download
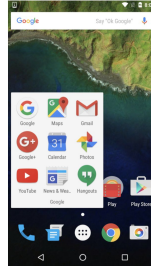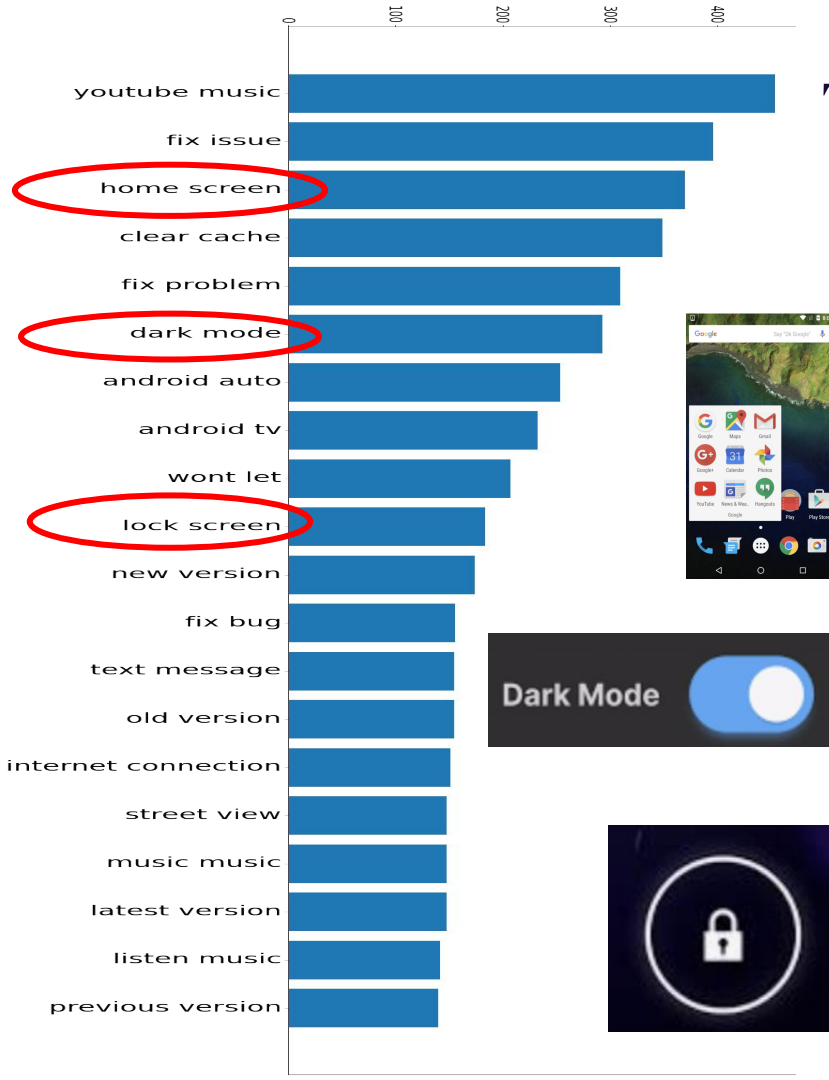
Topic 3 review-Issue & Problem Most Common words

Chart categories (top to bottom):
- youtube music
- fix issue
- home screen *(circled)*
- clear cache
- fix problem
- dark mode *(circled)*
- android auto
- android tv
- wont let
- lock screen *(circled)*
- new version
- fix bug
- text message
- old version
- internet connection
- street view
- music music
- latest version
- listen music
- previous version

X-axis: 0, 100, 200, 300, 400

Home Screen

Dark Mode

Lock Screen

Topic 3 review-Issue & Problem Most Common words

Chart categories (top to bottom):
- youtube music
- fix issue
- home screen
- clear cache
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- previous version

Axis values: 0, 100, 200, 300, 400

Home Screen
- Downloaded App disappeared
- Add home screen feature doesn't work
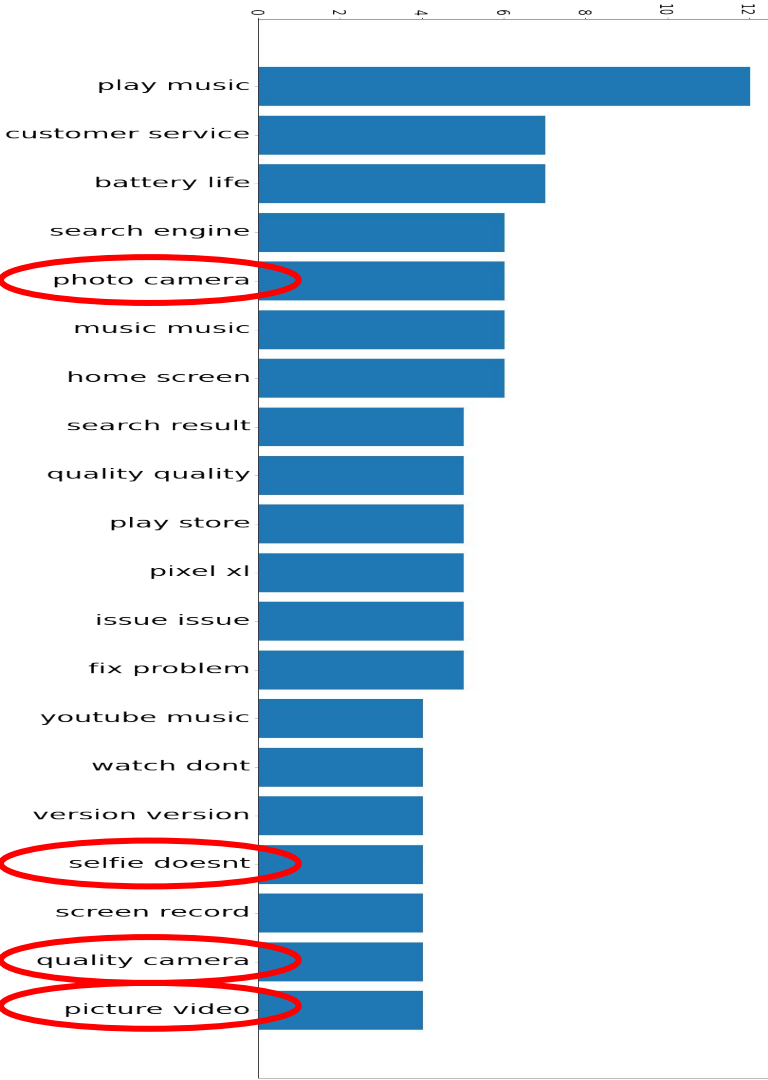- Widget missing
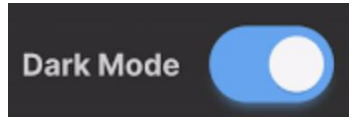
Dark Mode
- Need Dark Mode option

Lock Screen
- not able to pick up phone call unless unlock screen
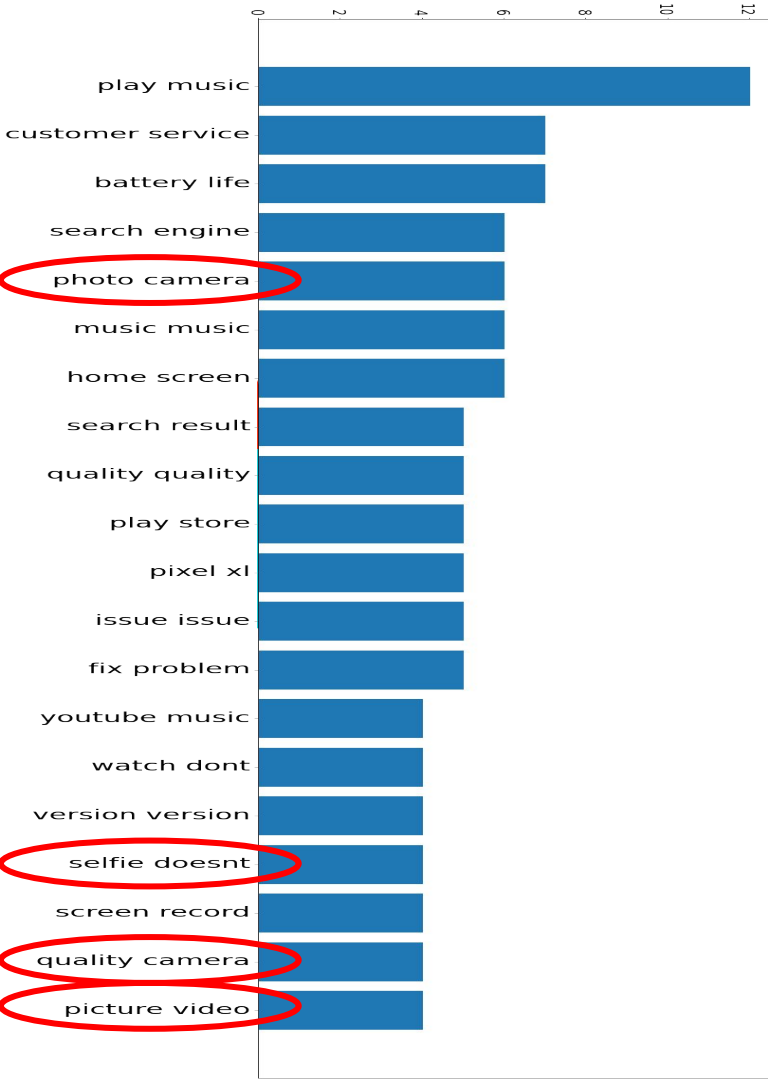- Clock- Not able to turn off alarm.

Topic 5 review-Bad Experience Most Common words

Word	Value
play music	12
customer service	7
battery life	7
search engine	6
photo camera	6
music music	6
home screen	6
search result	5
quality quality	5
play store	5
pixel xl	5
issue issue	5
fix problem	5
youtube music	4
watch dont	4
version version	4
selfie doesnt	4
screen record	4
quality camera	4
picture video	4

Topic 5 review-Bad Experience Most Common words

Chart (horizontal bar, values from 0 to 12):

Word	Value
play music	~12
customer service	~7
battery life	~7
search engine	~6
photo camera *(circled)*	~6
music music	~6
home screen	~6
search result	~5
quality quality	~5
play store	~5
pixel xl	~5
issue issue	~5
fix problem	~5
youtube music	~4
watch dont	~4
version version	~4
selfie doesnt *(circled)*	~4
screen record	~4
quality camera *(circled)*	~4
picture video *(circled)*	~4

Google Photos
- Not able to search picture file name
- Hard to edit photo

Google Camera
- Night mode- bad quality(terrible noise ratio)

Google Street View
- Most photo be outdated
- Photos open very slow

Topic 6 review-Do Not Download Most Common words
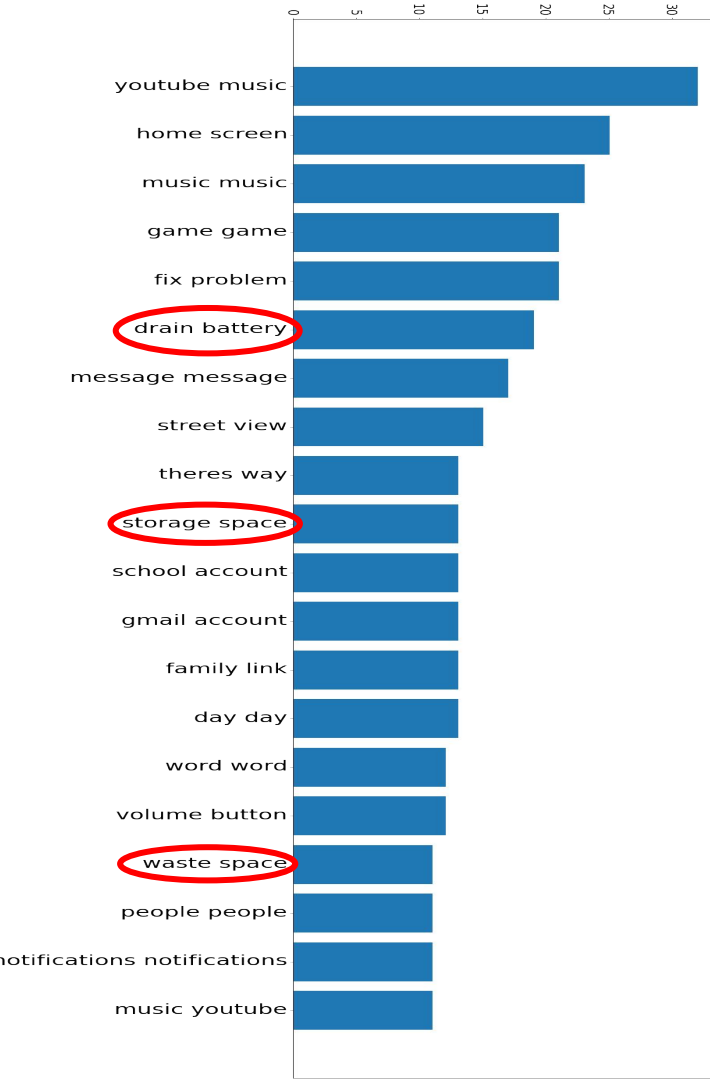
Drain Battery

Not enough space

Topic 6 review - Do Not Install

Drain Battery:

- Google Family Link for children & teens
- Google Play Services for AR
- Google Fit

Taking out space:

- Google one
- Google VR Services

Conclusion
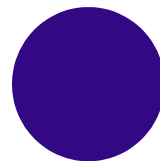
Topic Model: NMF - 10 Topics

Topic 3 issue/problem: What are the issue and problem need to be solved?
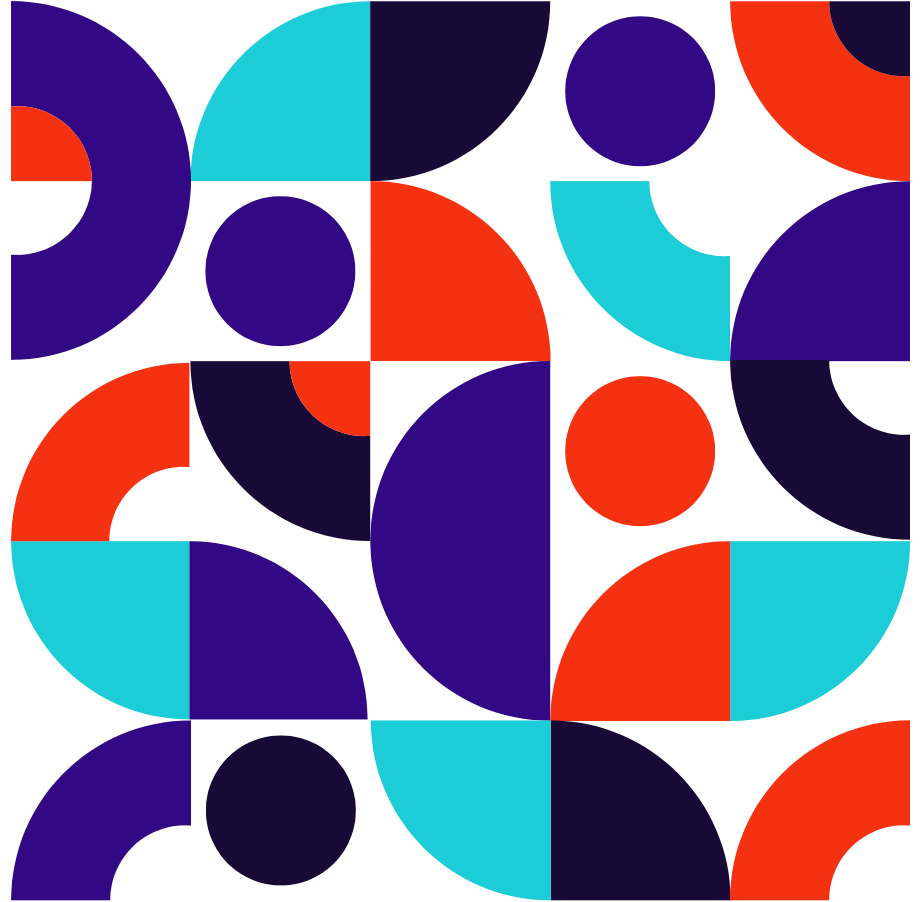
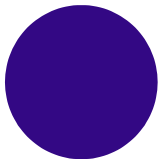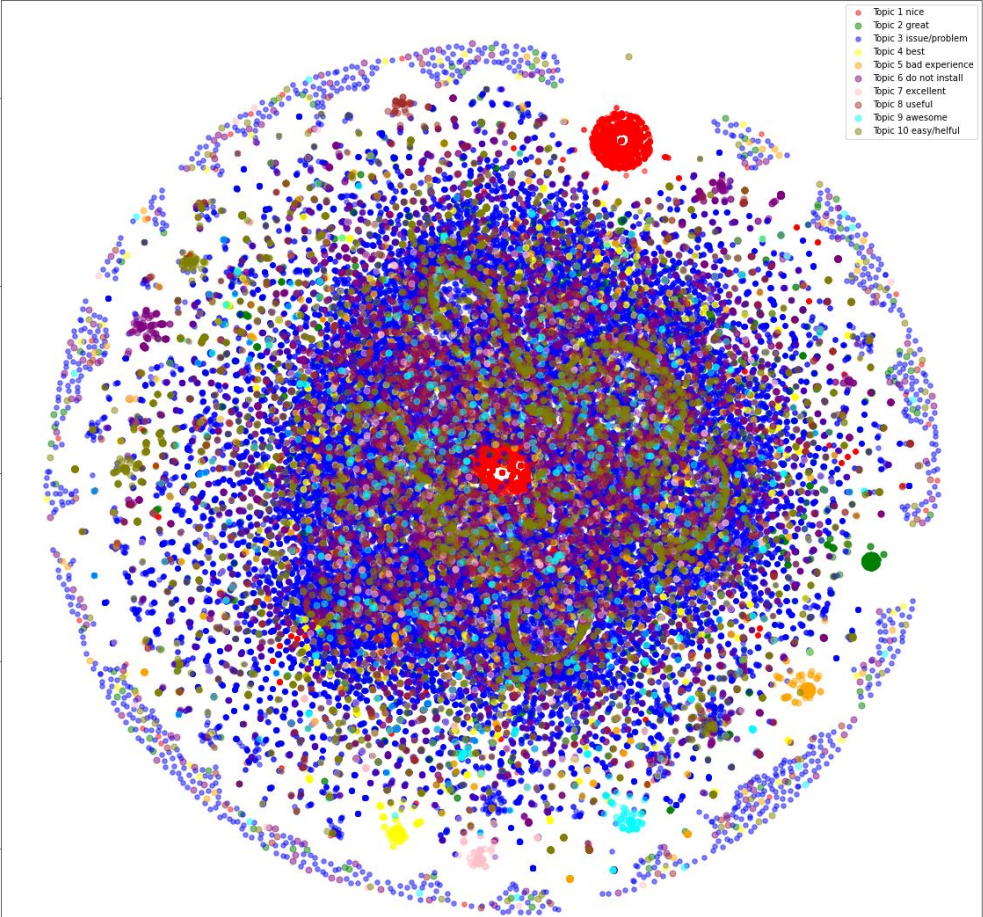Topic 5 Bad experience: What features can we improve?

Topic 6 do not install: Why number of user drops?

Thanks !
Any Questions?

Appendix

Word Cloud for All Reviews

NMF Model Visualization plot

Topic 1 nice
Topic 2 great
Topic 3 issue/problem
Topic 4 best
Topic 5 bad experience
Topic 6 do not install
Topic 7 excellent
Topic 8 useful
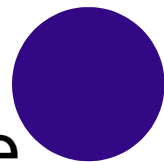Topic 9 awesome
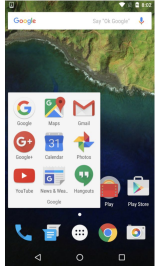Topic 10 easy/helful

Sentiment Analysis
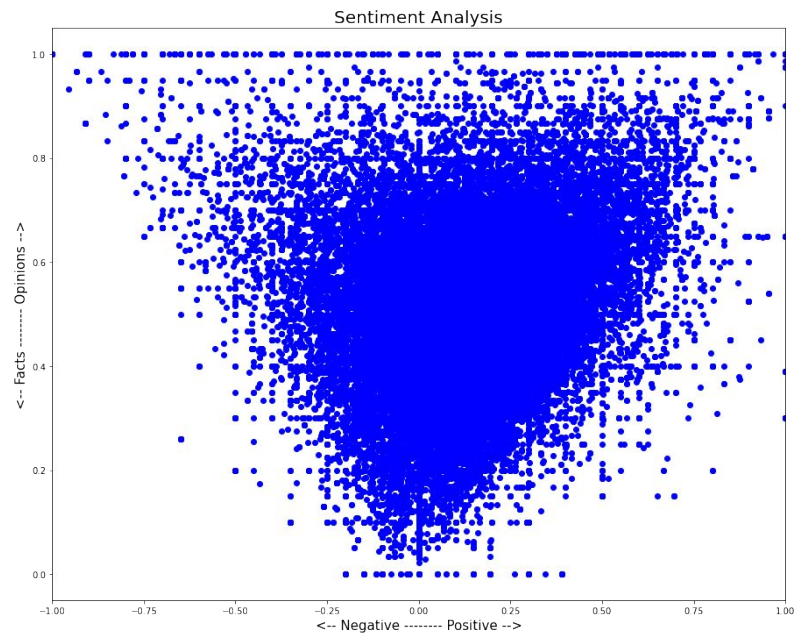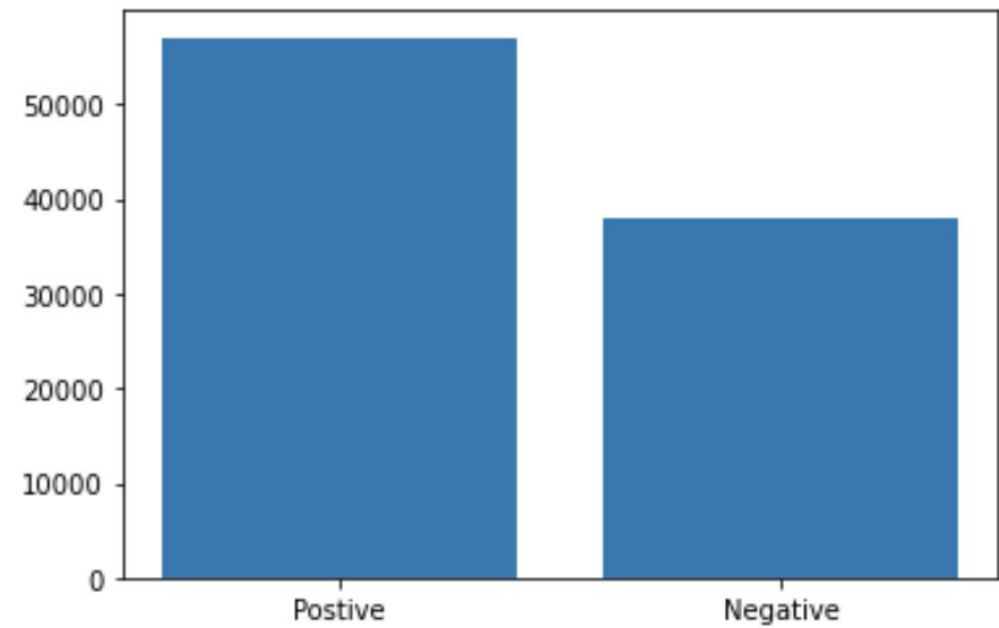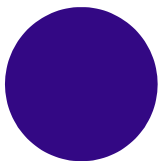
Sentiment Analysis

Sentiment of Routine Over Time
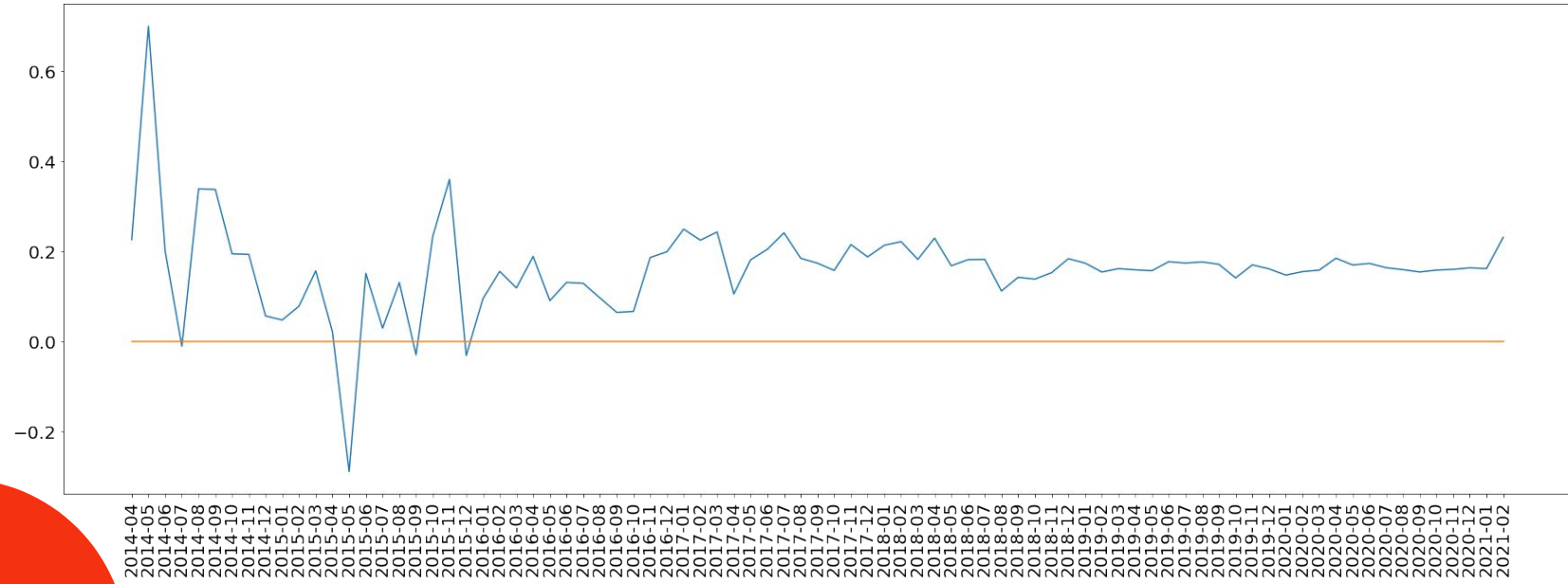
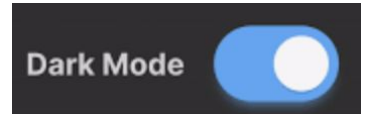# Topic 3 review-Issue/Problem

Home Screen:
- Downloaded App disappeared
- Add home screen feature doesn't work
- Widget missing

Dark Mode:
- Need Dark Mode option

Lock Screen:
- Hang out- not able to pick up phone call unless unlock screen
- Clock- Not able to turn off alarm.

Topic 5 review-Bad Experience

Google Photos:
- Not able to search picture/ video file name
- Hard to edit photo

Google Camera:
- Night mode- bad quality(terrible noise ratio)

Google Street View:
- Most photo be outdated
- Photos open very slow

Text Preprocessing Steps

1. Remove
   a. number,
   b. capital letter,
   c. and punctuation
2. reduce the letter repeat more 2
3. removing extra white spaces
4. Lemmatizer:
   a. Singular word
   b. Verb

Model & analysis:

1. LDA
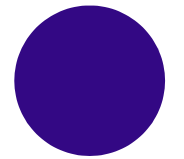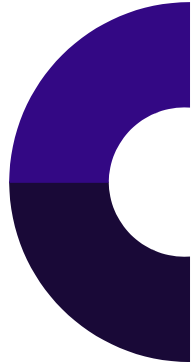2. LSA
3. NMF (TF- IDF vectorizer)
4. Sentiment Analysis

Word Cloud for All Reviews

Word Cloud for All Reviews

Tool Apps reviews

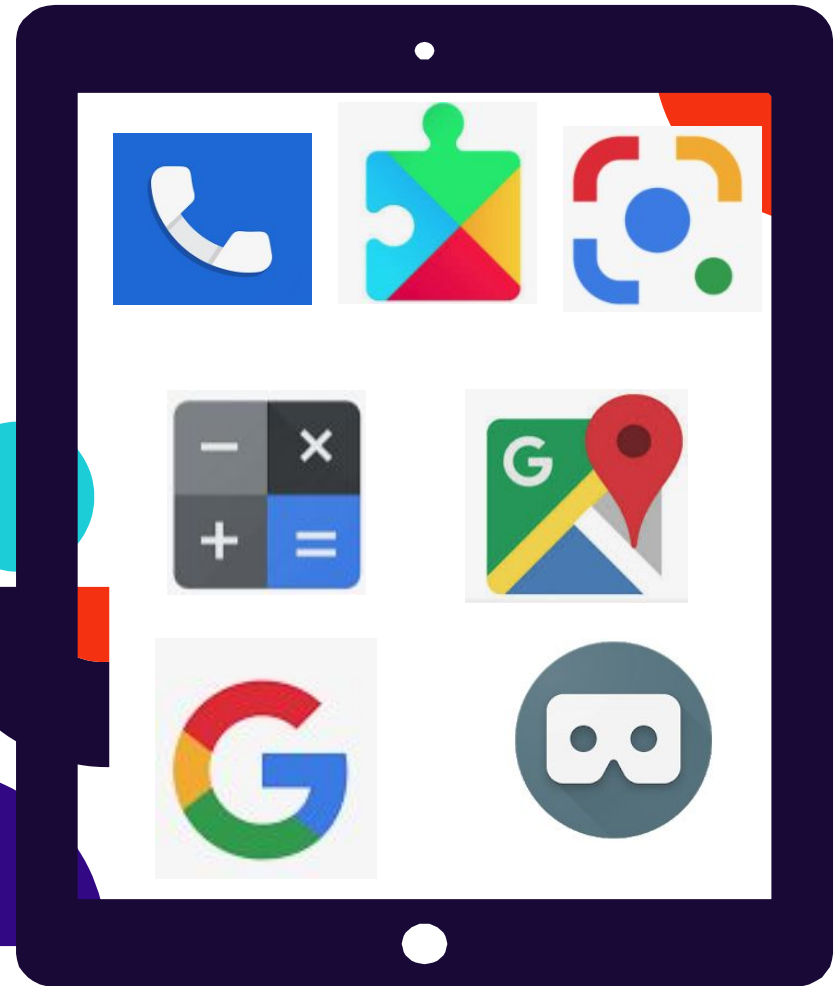Topic 4 review - issue/problem
- Download issue
- Update issue

Topic 5 review - bad Experience
- Hard to scroll
- bad translation
- Limit screen time

Topic 6 review - do not download
-

Topic Model: NMF

Positive Review

Negative Review

Topic 3
issue/problem

Topic 5
Bad experience

Topic 6
do no install