

Industry Review of Mobile Apps for Offline Navigation

DASHBOARD GUIDE

DASHBOARD LINK

https://fsviben.shinyapps.io/offline_navigation_dashboard/

DATA GATHERING METHODOLOGY: Web scraping

TIMELINE: 15.06.2016 – 15.06.2020.

SAMPLE: 8 offline navigation apps

Smaller apps	Larger apps
Genius Maps	Sygic
TomTom	Maps.me
CoPilot	Waze
Navmii GPS World	Here

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1. DASHBOARD CONTENT

Please note that all data in this dashboard is shown only for app reviews with comments (scraped reviews). In other words, reviews without comments (users who have rated the app on a scale from 1 to 5 without leaving a comment) aren't included in this report.

Data has been scraped from the link which are shown below. Reviews which weren't written in English were excluded from the analysis, but they make only 2%-5% of all reviews (depending on the app).

Genius Maps	https://play.google.com/store/apps/details?id=hr.mireo.arthur&hl=en
TomTom	https://play.google.com/store/apps/details?id=com.tomtom.gplay.navapp&hl=en
CoPilot	https://play.google.com/store/apps/details?id=com.alk.copilot.mapviewer&hl=en
Navmii	https://play.google.com/store/apps/details?id=com.navfree.android.OSM.ALL&hl=en
Sygic	https://play.google.com/store/apps/details?id=com.sygic.aura&hl=en
maps.me	https://play.google.com/store/apps/details?id=com.mapswithme.maps.pro&hl=en
Waze	https://play.google.com/store/apps/details?id=com.waze&hl=en
Here	https://play.google.com/store/apps/details?id=com.here.app.maps&hl=en

Except language, date was also an excluding factor. Only those reviews which were created in the following timeline were used in this dashboard: 15th of June 2016 until 15th of June 2020.

*Note that timeline for Waze is a bit different since the app has so many reviews that web scraper wasn't able to reach very old data. Timeline for Waze reviews is following: 12th of September 2018 until 15th of June 2020.

Below you can find a table which shows sample size for each app analyzed in this dashboard:

Genius Maps	N=277
TomTom	N=8145
CoPilot	N=34136
Navmii	N=1044
Sygic	N=36140
maps.me	N=32449
Waze	N=30386
Here	N=21567

Dashboard is divided between 6 main pages and each page shows different kind of analysis. Following pages are included in this dashboard:

- Descriptive statistics
- Review frequency
- Star rating
- Sentiment
- Word frequency
- Tables

Descriptive statistics	Review frequency	Star rating	Sentiment	Word frequency	Tables
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1.1. Descriptive statistics

This page contains basic information about each app; total number of reviews used in analysis and average number of reviews per day, week, month and year

1.2. Review frequency

Displays number of reviews in a certain period for each app. Consists of 3 different views:

- Reviews through time which are displayed on daily, weekly and monthly basis. Data is presented in frequencies

Daily Weekly Monthly

- Seasonal number of reviews through time where data is cumulated for each data point. Seasonal reviews are displayed on three different points: days of the week (Monday to Sunday), week in the year (Week 1 to Week 53) and months (January to December). For example, data shown for Monday in the “Day of the Week” overview contains the data for all Mondays in the project timeline (15th of June 2016 until 15th of June 2020). Data is presented in shares (%) of total number of reviews for each app.

Seasonal - Day of the Week Seasonal - Week in the Year Seasonal - Month

- Predicted number of reviews where collected data is presented on weekly basis on the left and smoothed predicted data is presented on the right. Predicted data is calculated for the next 365 days (until 15th of June 2020) using Bayesian structured time series machine learning model.

BSTS predicted number of reviews in the next year

1.3. Star rating

Displays average star rating (on a 1 to 5 scale) in a certain period for each app. Consists of 2 different views:

- Star rating through time which are displayed on daily, weekly and monthly basis. Note that line chart for daily star rating is smoothed because the data is very volatile (especially for smaller apps) and hard to read.

Daily Weekly Monthly

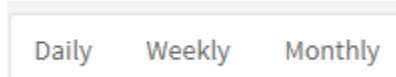
- Seasonal star rating through time where data is cumulated for each data point. Seasonal reviews are displayed on three different points: days of the week (Monday to Sunday), week in the year (Week 1 to Week 53) and months (January to December).

Seasonal - Day of the Week Seasonal - Week in the Year Seasonal - Month

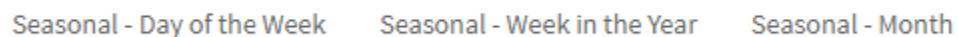
1.4. Sentiment

Displays sentiment score in a certain period for each app. Sentiment analysis is part of the natural language processing field and it calculates share of positive and negative emotions present in the text. It ranges from -1 (negative) to +1 (positive). Calculations are made against dictionaries where each word has predefined sentiment value (eg. word “awesome” has a sentiment of 0.7, word “flowing” has a sentiment of 0.0 and word “worse” has a sentiment of -0.5). Machine learning algorithm then calculates sentiment for each word in a review and creates average sentiment score for each review. It consists of 2 different views:

- Sentiment rating through time which are displayed on daily, weekly and monthly basis.



- Seasonal sentiment rating through time where data is cumulated through time for each data point. Seasonal reviews are displayed on three different points: days of the week (Monday to Sunday), week in the year (Week 1 to Week 53) and months (January to December).

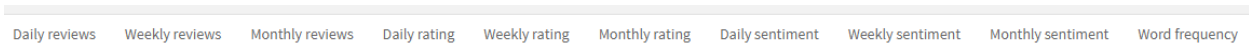


1.5. Word frequency

Displays how frequently a specific word is mentioned in reviews of each app. Prior to calculating the word frequency, all words are being stemmed. Stemming is the process of reducing original words to their root forms. Stemming helps to correctly calculate the frequency of each word no matter in which form is the word written (eg. “worked” and “working” are both stemmed to its root - “work”).

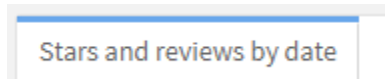
1.6. Tables

This page contains data of all previous pages organized in tables. Each table is displayed in a separate sheet. Table displays first 10 rows, but you can display other rows using the navigation panel in the bottom left corner. All tables are also interactive.



In addition, Tables page also includes Stars and reviews by date sheet:

- On this sheet average star rating and number of reviews are calculated for each day and for each app.

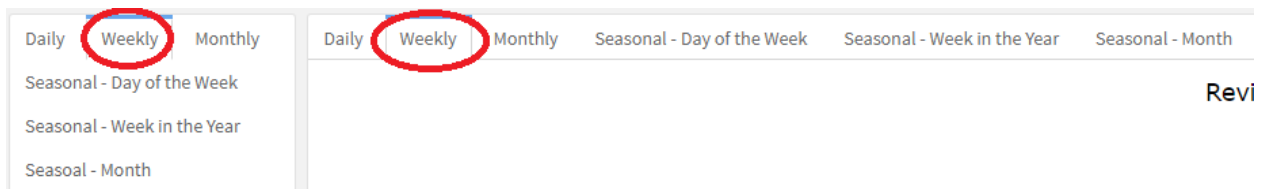


2. INTERACTIVE ELEMENTS

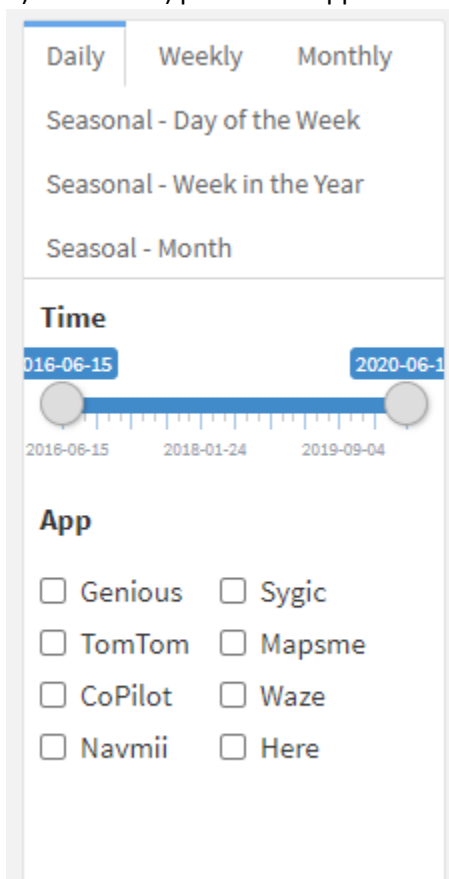
This dashboard is created with the intention of users having the ability to explore and play with the data. All charts and tables inside this dashboard are interactive (except for the “Descriptive statistics” page).

2.1. Interacting with charts

In order to control variables on a single chart, matching sidebar sheet and chart sheet should be selected. In the example shown below, “Weekly” sheet is selected in both sidebar box and chart box.



On pages “Review frequency”, “Star rating” and “Sentiment”, you can control charts with two variables: 1) time and 2) previewed app. Control board is located on the sidebar in the left hand side of the page.



On page “Word frequency”, you can control display charts for specific app using the filter in the sidebar box on the left

App1

Genius ▼

App2

Navmii ▼

2.2. Tables

Columns within the table are always fixed, but you can control rows by interacting with the following columns:

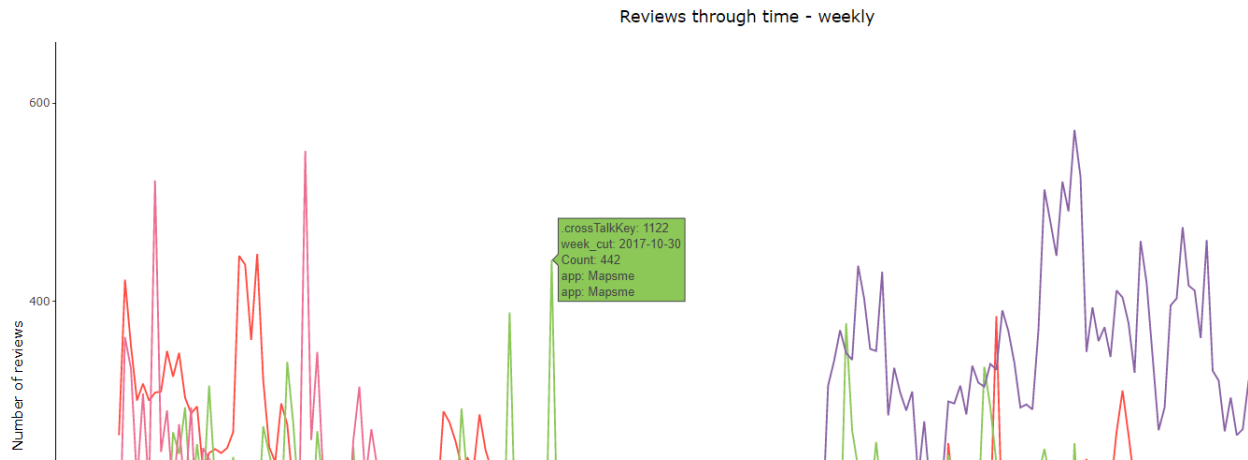
- Date – order rows by date or select rows matching a specific date
- Number of reviews – order rows by the number of reviews per day or select rows matching a specific range
- Average star rating – order rows by the average star rating per day or select rows matching a specific range
- Day – order rows by date or select rows matching a specific day in the month
- Week – order rows by week or select rows matching a specific week in the year
- Month – order rows by month or select rows matching a specific month
- Year – order rows by year or select rows matching a specific year
- App – order rows by apps (alphabetical) or select rows matching a specific app

3. CHARTS AND TABLES FUNCTIONS

All charts and tables have additional features which could be useful while exploring the data.

3.1. Charts

Labels – There are no labels shown on any chart but hovering with a mouse over a data point will display a label for that specific data point.



Label will display the following:

- Row number in the data frame (not important while exploring the data)
- X value (in the example above, first day of the selected week number is shown)
- Y value (in the example above, number of reviews on selected week is shown)
- Category (in the example above, data for Maps.me is selected)

Zoom in – You can zoom in on a specific area of the chart by holding left click on the mouse and dragging it over the selected area. This action will immediately filter X and Y axis values. You can always reset the zoom in option by double clicking the left mouse key inside the chart area.

Additional features – additional features are shown in the upper right-hand side of the chart



List of features includes following (from left to right):

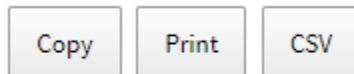
- Download plot as .png
- Zoom – select specific area you wish to zoom in
- Pan – navigate plot by holding left mouse click and dragging mouse across the plot
- Zoom in
- Zoom out

- Autoscale – scale X and Y axis in a way that all selected data is shown
- Reset axes – basically resets all used features on the plot. Note that this doesn't reset elements selected on the sidebar
- Toggle Spike Lines – show lines which connect selected data point with X and Y axes
- Show closest data on hover – shows data point label when hovering it with a mouse
- Compare data on hover – shows label of all categories (apps) in the selected data point on X axis

3.2. Tables

Apart from filtering and ordering data on columns, tables have additional features which are available through different buttons and features located above and below the tables.

List of features includes following:



- Copy – Copy all data from the table
 - Print – Print all data from the table
 - CSV – Download all data from the table in .csv format
- *Note that Copy, Print and CSV function will work on all selected data from the table, not only on data that is shown on the screen. As previously mentioned, you can select specific data with interactive elements.

Search:

- Search: - Search whole table on a specific input



- Page buttons – Only first 10 rows are shown on each page, and you can use this feature to navigate through the rest of the table