CETM25

Visualising artist airplay over the Covid-19 Pandemic

Mark Stent - 8 December 2021

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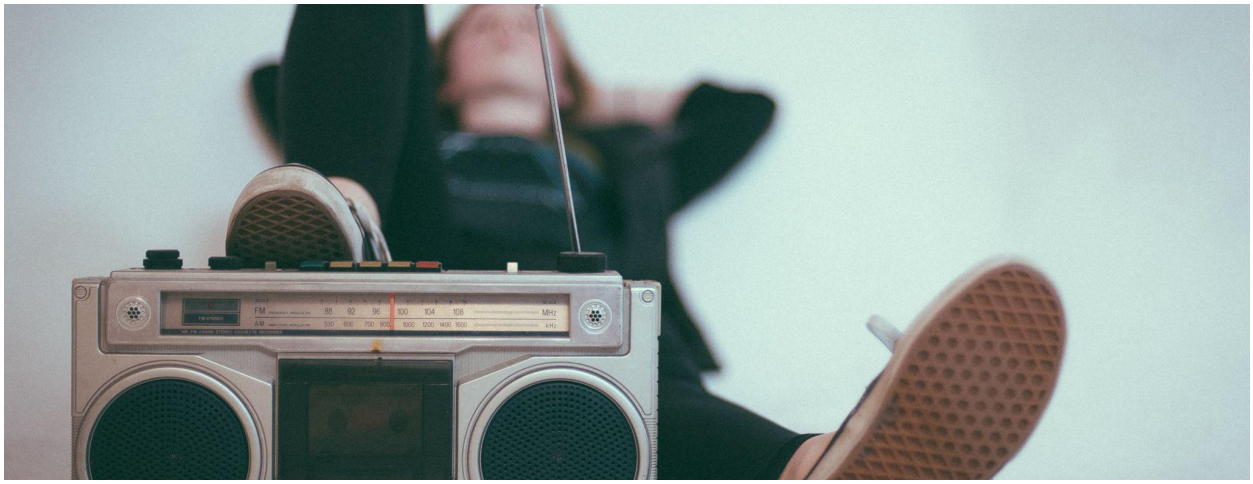

Introduction

The Covid-19 pandemic has wreaked havoc on the livelihoods of musicians and music producers in South Africa. For many, the central source of income was the performance of their music on radio stations ('spins') and live events. However, with the introduction of lockdowns and curfews, live performances have just about disappeared, leaving radio spins and music streaming as a single source of income for many musicians. The South African Music Association (SAMRO) charges a set rate per second of radio play as royalty due to its member musicians.

The SAMRO Musician Relief fund team is looking at the impact of the Covid 19 pandemic on individual artists' radio support. They want to understand this impact better to determine whether their per-second rate should increase to assist struggling artists in earning a living.

Data source

Data was obtained with permission from Radiomonitor (www.radiomonitor.com), an independent radio station airplay tracker used by major broadcasters and media worldwide for royalty management. Radiomonitor was chosen as a data source for many reasons, including:

- It is currently the most credible airplay tracker available for the South African market.
- It is the only airplay tracker to have a formal relationship with SAMRO.
- Data is maintained and cleaned daily.

The data is in a Microsoft Excel format (.xlsx) and was received via email from the Radiomonitor team; the dates range from 2016 to 2021 and include the radio spin data for South Africa's most prominent and successful artist, 'Black Coffee.'

The dataset summarises radio play across 43 South African radio stations. The data dictionary of the dataset is as follows:

- Station - The radio station on which the spin was recorded.
- Title - The title of the track played
- Impacts - A metric created by The Broadcast Research Council of South Africa (BRC), a non-profit organisation. 'Impacts' tracks the influence of the radio station by listenership and demographic using Radio Audience Measurement (RAMS) figures.
- Seconds played - The total number of seconds of play of the track for that spin.
- Date/Time - The date/time of the spin

An initial sample of the data available is in figure 1 below:

	Station	Artist	Title	Imp's	Sec	Date/time
0	North West FM	Black Coffee feat. Nakhane Toure	We Dance Again	21,000	0	01 Jan 2020 - 00:07
1	MFM	Black Coffee feat. Shekhinah	Your Eyes	0	0	01 Jan 2020 - 00:08
2	947	Black Coffee & David Guetta feat. Delilah Montagu	Drive	11,000	180	01 Jan 2020 - 00:35
3	Eldos FM	Black Coffee feat. Soulstar	You Rock My World	0	0	01 Jan 2020 - 00:39
4	YFM 99.2	Black Coffee feat. Zhao	Any Other Way	29,000	0	01 Jan 2020 - 00:50

Figure 1.

Since the data is raw, it must be processed into a format that is useable for analysis and visualisation:

- Clean the data - remove leading whitespace, rename columns, remove radio channels where impacts = 0 (as implies there are no RAMS figures for this station), deal with null values, remove nonsensical rows, and convert date/time column into the correct format.
- Create a subset of the data from 1 March 2020 - 31 May 2020.
- Employ statistical variance and mean comparison tests for periods before and after lockdown and before and after the launch of any releases by the artist to gauge the significance over different periods.

All data is extracted and used according to the Protection of Personal Information Act (POPI Act), the South African Equivalent of the General Data Protection Regulation (GDPR) in the UK. The data is not protected and is available for public sharing with permission from Radiomonitor.

Audience Requirements Analysis

The stakeholders for this project are the SAMRO relief fund team. Specifically, the initial visualisation tool target viewer is a person with secondary school education, a basic level of STEM disciplines and little to no charting experience. The viewers will use the tool to present findings to higher-level executives and the media, who are assumed as educated with visualisation fluency. Therefore, the visualisation needs to consider the viewer numeracy and visualisation familiarity level but be technically sound enough to hold weight with more advanced viewers.

An adapted version of the Delphi method (using questionnaires to reach a group consensus) was used to aggregate requirements for the visualisation and get an idea of what the users expect from the tool.

The SAMRO team decided to create a proof-of-concept dashboard focusing on one single famous artist's data with the potential to scale it to all artists if needed. In addition, the tool will serve an exploratory purpose.

Functional requirements:

- Visualise changes in spin data and radio impact data, enabling users to view changes over time.
- The tool should allow filtering individual radio stations or subsets of stations.
- Create a view to visualise the distribution of spins (measured in 'seconds played') across radio stations for individual titles to see the changes in radio support of titles.
- A view of summary spins per weekday to see how listenership is affected by the day of the week.
- Annotate visualisations with important dates such as lockdown start, new track launch dates.

Non-Functional requirements:

- Views should be easy to use and uncomplicated to understand.
- The visualisation should be secure and reliable for the reporting to be accurate.
- The tool should cover three months starting on 1 March 2020. The first South African lockdown began on 26 March 2021.
- The date range must be interactive.

A line graph mockup of one of the charts the viewers are looking for

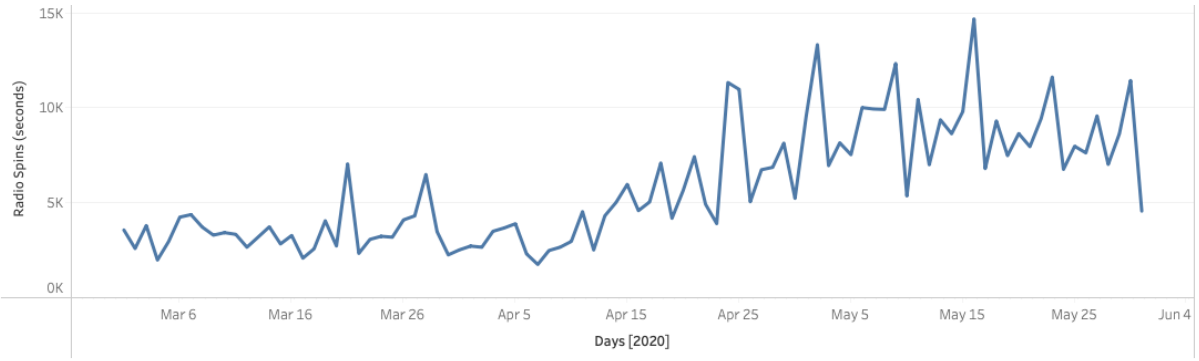

Figure 2.

Data storytelling and process design

Black Coffee is a well known South African DJ, record producer and songwriter. His music is played across the globe on high rotation, and he is considered a South African music celebrity and icon. He was selected as the case study for this experiment because he is well known, well-loved and has a large following with many data points to work with. In addition, most radio channels in South Africa support his music. However, for the layperson, these data points are difficult to analyse in their raw format and require a skilled data scientist to extract insights. On the other hand, if done correctly, visualisation will give top-level insights without the need for technical training.

The narrative around this project will follow Black Coffee's radio and impact data for three months, starting just before the first South African pandemic lockdown period. The tool will visually explore how radio impacts and the seconds played of music change in light of the coronavirus and lockdown periods. In addition, it will answer questions such as:

- Has Black Coffee's listenership changed in the initial months during and after the first lockdown?
- Which radio stations supported his music more or less during that time?
- How did Black Coffee's impact on radio change over the selected date range?
- Is the data sufficient for making accurate inferences, or are there additional features that impact it?

Software architecture design

Python is a powerful high-level programming language. It is widely used in Data Science and analysis for processing and interpreting datasets. It is free and open-source and supports many external libraries that cover almost all needs and applications; for this application, Numpy, Pandas, Seaborn, Matplotlib, Scipi and Statsmodels libraries are sufficient for data exploration, exploratory visualisation and pre-processing.

Jupyter Notebook is a web-based development environment that supports multiple programming languages. It allows for mathematical analysis, images, code, rich text, and visualisations to combine into a single document. It is excellent for reproducible experiments and data exploration and easy to share and convert into other formats. For this proof-of-concept, I will be using Jupyter to house my Python code and do any exploratory data analysis and any pre-processing that may be needed before creating the visualisation tool.

Tableau is an interactive data visualisation software package used for business intelligence for big data projects. It is excellent for creating beautiful visualisations and dashboards with large

amounts of data. It is easy to use, supports multiple scripting languages, and is mobile-friendly. The public version of Tableau will host the initial dashboard and any visualisation views needed.

Software Architecture

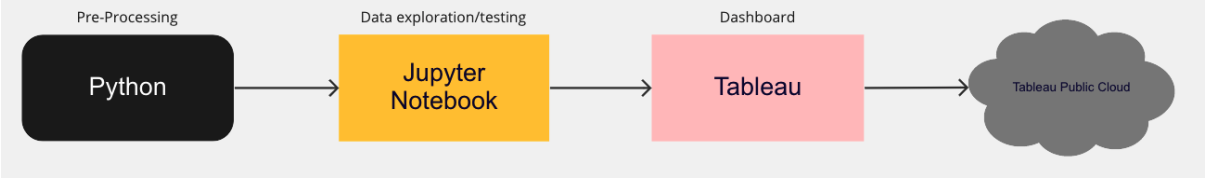

Figure 3.

Product use case specifications

This visualisation tool aims to create an easy-to-use dashboard that will assist stakeholders in making decisions regarding the state of the music industry in South Africa concerning radio airtime and the impact of that music in the first Covid 19 pandemic lockdown.

The final output will be an interactive web-based dashboard that will be useable by any of the viewers with access to a computer or a mobile device with internet capability.

The tool will convey easy to interpret information such as:

- The total number of seconds played over the given three-month period for all Black Coffee's music. See a mockup example in figure 2 below: {Insert figure 2 line graph}
- The total impact over the given three-month period for all of Black Coffee's music is measured as the 'number of people impacted'. Data obtained from official Radio Audience Measurement(RAM) figures.
- The distribution of Black Coffee's plays over days of the week.
- Breakdowns of the top ten radio stations and the seconds played on each station.
- Breakdowns of the top ten radio stations and the impact for each station.
- Annotations of actual dates in the analysis, e.g. lockdown start dates, release dates for new Black Coffee music in that period.
- An overall view of the status of Black Coffee's radio support and impact over the period given.

Conclusion

Lockdowns, curfews and event regulating have rendered the bulk of the music community jobless. It will be exciting and valuable to track the changes in radio support for various artists over time when live events are not an option. The outcome could help understand the value of

radio support to the growth of an artist's career. It can also show the change of radio support by listeners when locked down in their homes. Depending on the results and insights, the SAMRO team may action a useful result to assist these struggling musicians.

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