

**School of Computer Science and Statistics**

**Individual Assessment Submission Form**

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Any use of Chatbots/Generative AI tools in researching the materials research for this report is fully described at the end of the report. I confirm that no text produced by such tools has been directly used in the report.

Signed Annabella Doyle Date 30/03/2023

Description of use of Chatbots/Generative AI tools:

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**Investigating and Analysing Ethical Risks of a Digital Engagement application**

The audio streaming service, Spotify, provides a platform for users to engage with digital content provided by songs, podcasts, and audiobooks. The web-based streaming service was founded in 2006 and later launched in 2008[[1]](#footnote-1). When Spotify originally launched, the aim of the application was to be able to tackle the challenges of music distribution, where the radio, CD’s and iPods were the primary mode of music listening. Since then, Spotify has adjusted the services they provide by delivering a highly personalised experience to the users through their use of digital engagement to design algorithmic content and use AI in their playlist curations. Algorithmic playlists are automatically created for each Spotify user based on their listening habits. Examples of these playlists include *Discover Weekly*, *Release Radar,* and *Daily Mixes*. Additionally, Spotify creates *Genres & Moods* playlists which provides an alternative to users during *Workout*, *Children and Family*, and *Sleep*.

The company employs a freemium business model where the free version offers limited features of the app and in order for the user to avail of ad-free, downloadable and skippable music they must pay a monthly subscription to access the premium version. Spotify generates most of their revenue from their Spotify Premium users, and least from their data collection sold to advertisers. Spotify employs a behavioural marketing model for their advertisement clients, which is collected by the moods of the users through their use of the *Genres and Moods* playlists offered and created by Spotify which allows the tracking of the moods of users. However, data is also collected based on the listening behaviour of each user through the consumer segmentation of demographic and psychographic data. Spotify acts as a data broker by selling, or licensing, the data collected to marketers for ad targeting purposes. However, the majority of Spotify’s data is collected from its Premium users, in order to create algorithmic playlists and make predictions based on the users listening habits and sell targeted advertising presented to the users of the free version of Spotify’s application. Additionally, Spotify integrates a variation of data layers by combining different levels of data within Spotify’s recommendation system in order to create accurate personalisation’s which better align with the music preferences of the user. This contributes to a more refined and tailored experience for the user which encourages them to continue using the platform. Spotify uses a multitude of methods to keep its users constantly engaged. This allows for the ability to sell better targeted ads as the user is active on the app for longer, by skipping songs, choosing genres or moods and through other listening habits. However, this allows for easier user profiling and characterisation of consumers for marketers which creates many ethical considerations for Spotify’s use of data collection methods as well as their use of AI powered recommendations to better curate playlists for users. Spotify’s methods of data collection allow for the exploitation of users by creating ubiquitous listening habits. The application entices users to engage in constant, inattentive listening through the hybrid music recommendations. Through these techniques, as well as the AI powered recommendations, the ability to predict what users like allows for a more accurate and better-targeted advertisement to be created by marketers. The benefits which this can provide, on the other hand, enables hyper-personalised marketing messages and the ability to deliver better customer experience and help marketers to target their intended consumers more accurately. Continuous use of the app supports this benefit by creating a refined and more tailored experience for the user.

The key stakeholders which can be identified with Spotify and its governance involves the users, advertisers as well as the musical artists and other creators. Throughout the development, the stakeholder roles vary. Recent developments of Spotify have significantly changed the roles of the users. Users have been able to contribute to the majority of the data collection from Spotify in order to refine and enhance the quality of the data provided to the marketers. Spotify extracts listening data from the patterns and ways in which users listen to individual songs. The role of the user within the Spotify organisation provides many benefits which are derived from their involvement to which they are unaware of. For instance, users are tracked through the amount of time they spend listening to a particular song before it is skipped. This can also be shown depending on how long they listen to the song for and when the users decide to pause. Spotify is then able to combine this data into larger data entities to “make comparisons and produce tailored recommendations to users based on their tastes and preferences”, (Adenuga, 2022). Once this large data set is comprised of each users’ individual preferences, “taste profiles” are created and then compared against other profiles of users (Adenuga, 2022). However, the user’s ability to provide as much information as possible to Spotify, for their data collection, is also impacted by the playlists generated by Spotify. There are various sections on Spotify which allow users to discover different genres, cultural music, and moods. The temper of the user would often dictate the genre of music they listen to, if the user were in a happy mood, they would most likely choose *Happy Hits*, indicative of their current mental state where their current choice of music would reflect their mood. Another example can be highlighted through an entire section on Spotify being dedicated to *Workout* with playlists like *Beast Mode*. This infrastructure allows for users to be able to easily “classify themselves according to their activities and temper” which allows for Spotify to use their consumers as a “functional tool… to implicitly collect data on the state of mind” (Adenuga, 2022).

One of the roles which are indirectly affected by the application involves the ability to use Spotify as a social media platform. This can be seen through the ability to follow artists or other users, as well as to ‘like’ playlists. The number of follows or ‘likes’ on a playlist is also displayed which can provide a satisfactory and pleasing effect. Another feature users can avail of, is with the annually anticipated reveal of their listening habits, *Spotify Wrapped*. Users are able to share their *Top 5 Artists*, most listened to songs as well as the amount of time spent on the app, which is measured in minutes. By providing a quantitative, measurable figure to each user, this can prompt a competitive side where users will want to compare their results. This can also indirectly act as a method of free marketing for Spotify. When user’s share their results on other social media platforms, such as Instagram, it may encourage non-Spotify users to convert to using the digital audio streaming platform in order to feel included in the world-wide trend and dissuade from being left out. The adoption of Spotify’s social features and its effortless integration with other social media platforms, especially during the *Spotify Wrapped* releases, creates a competitive advantage against applications like Apple Music. There is a “streamlined user experience without pseudo-social clutter” that is also common with how Spotify has been able to prioritise its omnipresence in other markets, such as smart devices, cars and video game consoles like the PlayStation. This also encourages users to switch to using this application and therefore, contribute to Spotify’s data collection.

On the other hand, Spotify prompts psychological gratification in users which can arise from using Spotify’s features, such as those associated with discovering new music. It can often be related to “epistemic value” which often occurs from the ability to trigger “curiosity, offer novelty or satisfy a desire from knowledge” (Mäntymäki & Islam, 2015). However, in order for there to be continuous, intentional use of the application, and for Spotify to ensure retention of their user database, there must a high degree of enjoyment “followed by discovery of new music” (Mäntymäki & Islam, 2015). Through Spotify’s extensive database of audio, when users discover songs there can be a positive effect where there are “personal integrative gratifications” supported by the “users’ sense of self-efficacy” (Mäntymäki & Islam, 2015) which is supported by the ubiquitous access Spotify provides to its users.

Similarly, the effects ubiquitous listening has also impacted advertisers, where there is a direct correlation with the datafication of listening and the continuous, sustained use of Spotify from its users. Music streaming services use music as a means to understand psychological factors about users, due to people’s ability to use music as a way to “shape, reflect or process emotions and social situations” (Pedersen, 2020). Media has also become a useful and resourceful way to “access, understand and monitor people’s behaviour” (Dijck, 2014). The music which users listen to can provide useful insights which can result in efficient and highly effective advertisements, for those using the free version of Spotify. Additionally, this provides a great advantage to advertisers as this information can be used as “ideal tracking technology or … powerful surveillance technology” (Pedersen, 2020). The data which is collected on users can be monetised as a commodity and therefore it can be utilised by being sold to third party companies that will be able to effectively exploit the data in order to create high value data. Once data is collected based on the demographics and musical tastes of users, which can be measured and is not restricted to just one company – Spotify, the “value is multiplied when linked to specific activities or emotional states” (Pedersen, 2020). Spotify is uniquely able to collect such data where the activities and emotional states of users can be collected as one of the appeals of Spotify is to be able to provide unique personalised and contextual music recommendations. Therefore, Spotify is able to provide a platform for marketers to choose how to advertise to their target consumer base. This depends on the objectives of the marketers, “most brands do not micro-target their ads but instead opt for broad media reach” (Mähle & Vonderau, 2017), this is supported by the occasional ineffective ad targeting by Spotify where users complained about the lack of proper targeting where “location of user IP and user language” (Mähle & Vonderau, 2017) were not taken into consideration. Additionally, the effectiveness of Spotify’s algorithmic playlists and use of AI can be determined by the method of feedback it requires from its users. Spotify uses implicit feedback techniques which are gathered through the data collected based on their observable interactions, instead of explicit data which would require the user to participate in surveys, interviews or focus groups. This allows for Spotify to be able to automatically collect data to marketers which can effectively utilised to create advertisements.

The stakeholder roles of artists allow for Spotify to be able to generate content for its users in order to support its goal of becoming an application which houses a large data base of songs, podcasts as well as audiobooks. The success of an artist is determined by the number streams, saves and playlists their songs are featured in, as well as how many followers the artist has and their number of monthly listeners (Lindner, 2023). Spotify also tracks how long the user takes before they skip a song, for instance, if the user skips a song within the first thirty seconds, then it would be recorded and not be counted as a stream for the artist (Loudlab, 2024).

The benefits which artists can derive from, other than being able to create music that can be accessed by everyone on one platform, is with the multiple features Spotify offers. Spotify is not only an audio streaming service application, but it also follows the design of a social media platform. Users can not only follow artists, but they can use Spotify as a platform to find tickets, concert dates and merchandise of their favourite artists. Spotify acts as a middleman between the users and artists where users can access concert and ticket information on upcoming shows and then be redirected straightaway to the appropriate website. This is also applicable to artist merchandise. This is beneficial to artists as it allows for users to be able to access everything through one platform, many artists will have separate websites which would need to be accessed via another platform which the user would need to be active on. This would be costly for the artist and time-consuming for the user. When a user follows an artist on Spotify, they can be notified on when the artist releases their concert dates as well as for other updates. This instantly removes the time-consuming aspect as the platform is already used to listen to music, in this instance, and therefore accessing this information is highly efficient. Artists would not need to create additional promotional advertisements for their tours, in order to inform their audience, and could instead rely on the seamless and unified design of the platform. Spotify has been able to transition into other industries without disruption and has been able to prioritise partnering up with produces of other devices in order to embed its software everywhere (Adenuga, 2022).

Additionally, artists are able to create a more tailored experience for their audience through Spotify. In anticipation of the yearly ‘event’ of *Spotify Wrapped*, artists are able to send personalised video messages and emails to their dedicated fans. The excitement which surrounds *Spotify Wrapped*, allows for artists to be able to reward their fans through video messages thanking the user for their devoted loyalty, this can only be done if the user is found to be in the top percentage of fans. There are also other added benefits to being a constant fan. Users can also receive emails from the artists where they are gifted a discount code for their merchandise or upcoming concert shows, or there can also be an early access website for users to purchase tickets before they are officially released to the general public. This benefits artists as they are able to access a wide range of users easily and they can benefit from further publicity and attention from users.

The use of algorithmic playlists within Spotify, as well as AI, in order to create unique and personalised playlists, can be considered both a major benefit and limitation. Algorithmic playlists can benefit artists as it increases their chances of being discovered by users and acts as a way to expand their audience. When artists are featured in playlists, they are able to have a higher chance of discovery. This coupled with the psychological gratification users receive when they discover music, acts as an efficient way to expand their user base. Music recommendations which are generated when a user plays their own playlists also have the same benefit. However, one of the limitations which are created by algorithmic playlists is that smaller, less known artists have become more inclined to create music to fit the algorithms on Spotify. Artists have begun generating music that is considered more “algorithmically attractive” (Hodgson, 2021). This is due to the widespread music recommendation system and fear that many artists possess. Artists should be able to create music they feel inspired to make, however, when the algorithms and recommendation systems are unable to include their music as it may not fit in with the current trends and mass enjoyed genres, it can be destructive. The creativity has been reduced to more “constrictive than empowering” (Hodgson, 2021) due to the algorithms Spotify employs. Therefore, artists that are trying to expand their user base will not benefit from this system and instead create music that follows a more standardised rhythm.

The ethical risks raised by Spotify’s use of data collection methods and algorithmic playlists violate various human rights principles, labour practices and environmental policies. The human rights principles which are violated involves the data collection methods and the datafication of listening. Spotify’s music streaming platform began as a way for users to easily be able to access music and connect based on their tastes with other users, however, since one of the main goals of Spotify is to maximise shareholder value, they also sell the user’s data to support the freemium business model. The value of the data which Spotify collects increases due to the nature of the data. Users listen to music during certain activities and moods, this “serves to consolidate the economic and cultural power” (Pedersen, 2020) which Spotify holds. The severity of the data collection is determined to be high. This is supported by the chances of a user’s personal data being exposed or leaked in a data breach which violates the safety of data security. The data collected that can be exposed in a leak, can be used in very harmful ways. It can increase the user’s risk of being a victim to identity theft (Cross, 2023). The likelihood of this risk being incurred is considered to be medium. Spotify has rigorous and comprehensive security policies in place which reduces the chances of data leaks from happening, which is also supported by “approximately 2.77% of companies reported a data breach over the past 15 years” (Truta, 2020). However, due to how much data Spotify collects from users, and the nature of it, it is still a prevalent risk especially as it is likely to happen to anyone using the application.

A mitigation for this risk would be to create policies which limit the nature of data that is being sold. One of the competitive advantages of Spotify’s data collection is that the moods and mental states of the user are being tracked alongside the activities they are partaking in. This can be seen as exploitative and predatory to be collecting and selling this data which is considered to be highly personal. Marketers can take advantage of these states and advertise products or services that are tailored to that demographic. If this data is found in a data leak, then it can be harmful as it may expose some users personal details. The mitigation strategy would be to create better and more effective human rights policies and ensure there is a strict compliance with privacy regulations. Additionally, the marketing policies and regulations would need to be revaluated.

Another way which human rights are being violated is with the economic, social and cultural rights of users. The wellbeing of users are being put at risk due to the ontology and epistemology of a user’s listening habits and the ways that this is affected. Spotify’s algorithmic playlists take advantage of a user’s hedonistic gratification where discovering novel music acts as a capacity to “arouse curiosity” (Mäntymäki & Islam, 2015). This violation, however, also has a secondary effect within the environment. The severity of this impact would be high for users as it alters the way users interact with their day-to-day environment, where music is constantly sought after. This, however, does benefit artists and marketers greatly and therefore would be considered a low risk. This is advantageous for both stakeholders as artists are able to increase the chances of their music being discovered and their user reach, for marketers it allows for an increase in the quality of the data being collected from the user.

Similarly, this also ties in with the environmental policies which are being violated. When users are increasing the length of time they spend on the application, the number of songs they download and playlists they save, it increases the level of pollution created. Each stage of music streaming requires electricity, whether it be from the data centres, server farms or even from the device of the user, fossil fuels are burned in order to sustain this demand (Peirson-Hagger & Swindells, 2021). The songs that Premium users download on Spotify are stored as cache files. These files are then stored on active and cooled servers which require copious amounts of energy, “On average, an individual streams approximately 5 hours of content daily. This results in releasing up to 1.57 million tonnes of CO2 emissions, or 0.57 billion tonnes annually.” (Tachev, 2022). However, Spotify does not own their data centres and instead rely on Google Cloud’s infrastructure. This does not alleviate the effects and would still be considered a high risk. This is due to its contribution to pollution and therefore climate change which is a high priority. The likelihood of this risk being incurred is also high since this will affect every stakeholder and even those who do not use Spotify, which would also include the free users that do not download any songs.

In order for this high risk to be mitigated, the measures which could be put in place involves the revaluation of the sources of energy used to power and cool the data centres. There would need to be proper sustainability practices put in place, this can involve altering the type of energy used. For instance, instead of fossil fuels, renewable energy sources can be used instead, like solar energy. There should be a concrete and distinct plan put in place in order to reduce any non-sustainable energy sources. Additionally, Spotify can seek inspiration from other companies such as Google, where they use rain water to help cool their data centres.

Therefore, to conclude, the audio-streaming platform Spotify, uses various methods of data collection to further improve their music recommendations system. AI-driven algorithms analyse and track the behaviours of users through demographic and psychographic data, but also through their activities and moods which are made trackable through Spotify’s playlist genres. This allows for AI powered recommendations to create better personalised playlists for users. However, Spotify has been able to develop and expand their services by becoming a private data broker, where they sell user’s data to third-party marketers to use in their advertisements. The stakeholder roles involved with this process experience the benefits and limitations of this. Spotify is able to curate unique playlists that retain the attention of the users which also benefits marketers as they are able to purchase specific and useful data that can be used in advertisements. Whereas, users are at risk of data leaks and identity theft and artists are pressured to create algorithm friendly music. However, a risk which affects all stakeholder groups is with Spotify’s environmental practices and the ways they power and cool their data centres. These risks can be mitigated with more thorough and strict policies alongside a general revaluation of their operations.

# Works Cited

Adenuga, A. (2022). *The Information Systems Student Journal*, 3-11.

Cross, R. (2023, September 20). *Don’t Sell My Data* . Retrieved from U.S. Pirg : https://pirg.org/edfund/articles/dont-sell-my-data/#:~:text=Data%20security,the%20victim%20of%20identity%20theft.

Dijck, J. v. (2014). Datafication, dataism and dataveillance: Big Data between scientific paradigm and ideology . *Surveillance & Society*, 197-208.

Gingerich, J. (2022). Is Spotify Bad for Democracy? Artificial Intelligence, Cultural Democracy, and Law. *Yale Journal of Law and Technology*, 227-316.

Hann, M. (2019, May 2). *How Spotify’s algorithms are ruining music* . Retrieved from Financial Times: https://www.ft.com/content/dca07c32-6844-11e9-b809-6f0d2f5705f6

Hodgson, T. (2021). Spotify and the democratisation of music. *Popular Music*, 1-17.

Kaput, M. (2024, January 26). *How Spotify Uses AI (And What You Can Learn from It)*. Retrieved from Marketing Artificial Intelligence Institute: https://www.marketingaiinstitute.com/blog/spotify-artificial-intelligence#:~:text=Spotify's%20Discover%20Weekly%20is%20a,each%20user's%20specific%20listening%20preferences.

Lindner, J. (2023, December 16). *Essential Spotify Metrics* . Retrieved from Gitnux: https://gitnux.org/spotify-metrics/#:~:text=The%20main%20Spotify%20Metrics%20to%20monitor%20for%20artists%20are%20streams,the%20artist's%20profile)%2C%20and%20monthly

Loudlab. (2024, March 30). *Why is my track getting skipped on Spotify?* . Retrieved from Loudlab: https://www.loudlab.org/blog/why-is-my-track-getting-skipped-on-spotify/#:~:text=Spotify%20'skips%20rate'%20or%20',the%20action%20as%20a%20skip.

Mähle, R., & Vonderau, P. (2017). Studying Ad Targeting with Digital Methods: The Case of Spotify. *Culture Unbound*, 212-221.

Mäntymäki, M., & Islam, A. N. (2015). Gratifications from using freemium music streaming services: Differences between basic and premium users. *International Conference on Information Systems*, 1-15.

Matthew N. O. Sadiku, T. J.-M. (2021). Artificial Intelligence in Social Media. *International Journal of Scientific Advances*, 15-20.

Pedersen, R. R. (2020). Datafication and the Push for Ubiquitous Listening in Music Streaming. *Journal of media and communication research* , 71-89.

Peirson-Hagger, E., & Swindells, K. (2021, November 5). *Is Spotify bad for the environment?* . Retrieved from The New Statesman: https://www.newstatesman.com/environment/2021/11/how-environmentally-damaging-is-music-streaming

Tachev, V. (2022, July 11). *Music and the Environment: How are Streaming Companies Impacting the Climate?* Retrieved from Energy Tracker Asia: https://energytracker.asia/music-and-the-environment-how-are-streaming-companies-impacting-the-climate/

Tarobi, N. (2023, August 28). *The Inner Workings of Spotify’s AI-Powered Music Recommendations: How Spotify Shapes Your Playlist*. Retrieved from Medium: https://neemz.medium.com/the-inner-workings-of-spotifys-ai-powered-music-recommendations-how-spotify-shapes-your-playlist-a10a9148ee8d

Truta, F. (2020, July 27). *Poor Privacy Practices Sharply Boost Likelihood of a Data Breach, Study Shows* . Retrieved from Bite Defender: https://www.bitdefender.com/blog/businessinsights/study-finds-stark-correlation-between-poor-privacy-practices-and-likelihood-of-experiencing-a-data-breach/

1. <https://newsroom.spotify.com/company-info/> [↑](#footnote-ref-1)