Bootcamp

Data Science

Project title

Does music have an impact on the levels of anxiety, depression, insomnia or compulsive disorders in people?

Analist

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Descriptive manual

Introduction

For scientific bases of this project, hypotheses and main questions were made based on a medical investigation. There is a study made by Dr. Emma Gray of the British CBT and Counseling Service in collaboration with Spotify to investigate the benefits of different types of music on people's mental states. The part of that research important for this project as well as the part tried to confirm is the one based o the next statement:

"Gray's research found that musical tempo in the range of 50-80 beats per minute can help induce the alpha state in your brain. Your mind becomes calm, alert, and concentration is heightened. Alpha waves have also been associated with the 'eureka moment'--a flash of unique insight that triggers when you enter a relaxed, yet focused state of mind."

As a counterparty to those benefits are considered different pathologies, the most common are: anxiety, depression, insomnia and obsessive compulsive disorder (OCD).

The object of this project is to confirm Dr. Emma Gray’s conclusion about benefits of music below 80 BPM and compare the results with a number of pathologies to see if there is a correlation.

About the project

The dataset selected for this project has much more information that can be used to get many more interesting insights, however, I decided to stay focused on medical research so I removed many columns. The real deal of this project for me was reading and looking for instructions of the methods I needed to use in the official documentation in every step. I felt like spending much more time reading than coding but that was also the funniest part due to the fact that I learned a lot and I discovered some new functionalities.

The main visualization of this project is contained in the developed streamlit app contained in the repository. That visualization has the summary of the main charts crafted as well as some interactions with the machine learning prediction models coded.

Main questions

1. What music genres do people with high levels of anxiety, depression, insomnia and OCD listen to more frequently?

2. Which BPM rank has more listeners?

3. Considering 90 BPM as high level music regarding Dr. Emma Gray's investigation, Can we confirm that people listening to music over 90 BPM presents higher levels of anxiety, depression, insomnia and OCD than people listening to music under that level?

4. Create a model to predict whether a person with certain features would improve their mental health or not.

Dataset variables

Column	Description
Timestamp	String. Date the respondent submit the survey.
Age	Numerical. Age of the respondent
Primary streaming service	Categorical. Music service platform the respondent listens the most.
Hours per day	Numerical. Total hours by day the respondent listens to music.
While working	Boolean. Whether the respondent listens to music while working or not.
Instrumentalist	Boolean. Whether the respondent plays any musical instrument or not.
Composer	Boolean. Whether the respondent composes music or not.
Fav genre	String. Favorite music genre of the respondent.
Exploratory	Boolean. Whether the respondent used to search for new music or not.
Foreign languages	Boolean. Whether the respondent listens to music in different languages than their own.
BPM	Numerical. Beats per minute tempo the respondent listens the most.
Frequency [Classical]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Country]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [EDM]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Folk]	Categorical. Frequency which the

	respondent listens to this music genre.
Frequency [Gospel]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Hip hop]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Jazz]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [K pop]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Latin]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Lofi]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Metal]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Pop]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [R&B]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Rap]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Rock]	Categorical. Frequency which the respondent listens to this music genre.
Frequency [Video game music]	Categorical. Frequency which the respondent listens to this music genre.
Anxiety	Numerical. From 1 to 10 measures of the level the respondent suffers this pathology.
Depression	Numerical. From 1 to 10 measures of the level the respondent suffers this pathology.
Insomnia	Numerical. From 1 to 10 measures of the level the respondent suffers this

	pathology.
OCD	Numerical. From 1 to 10 measures of the level the respondent suffers this pathology.
Music effects	String. Confirmation of the effects the music has in the respondent on mental healthiness.
Permissions	String. Confirmation to use the information provided for scientific purposes.

Insights

What music genres do people with high levels of anxiety, depression, insomnia and OCD listen to more frequently?

Rock, Pop and Metal are the common genres between people with pathology levels higher than 5 points. This insight could mean two statements.

1) Rock, Pop and Metal are just the most popular music genres and that fact makes them easy to be chosen between people with any type of disorder.

2) Rock, Pop and Metal has a negative impact in people mental health.

Which BPM rank has more listeners?

Most of the people listen to music over 90 BPM, related to Rock, Pop and Metal music.

Considering 90 BPM as high level music regarding Dr. Emma Gray's investigation, Can we confirm that people listening to music over 90 BPM presents higher levels of anxiety, depression, insomnia and OCD than people listening to music under that level?

Anxiety, depression, insomnia and OCD are not related to the BPM of the music people listen to. Both variables have similar means in every pathology case and are below the limit with exception of anxiety, so, probably Dr. Emma Gray’s research was based on the unique pathology of anxiety, which makes sense considering anxiety as the most popular pathology of the current generation.

Conclusion

Metal health is hard to measure due to the amount of pathologies that could affect it, in this case, anxiety is the one that fulfilled with the medical study proposed, so, a better conclusion is that music over 90 BPM is a common factor between people with anxiety, but that does not mean that is the main cause of the pathology neither the only factor to take in count given that old people could listen to music of more than 90 BPM and have low anxiety levels and young people on the same conditions with high anxiety levels.

Bibliography

Dataset of the project - Kaggle

https://www.kaggle.com/datasets/catherinerasgaitis/mxmh-survey-results?rvi=1

Dr. Emma Gray's - Profiles and medical post

https://harleypsychologygroup.com/dr-emma-gray/

https://www.youtube.com/channel/UCxVy6w2y7XIn3HzG4feDLWw

https://sites.psu.edu/siowfa15/2015/09/15/does-music-help-you-study/

Damian Lazos - Github repository

https://github.com/damicodedotpy/Bootcamp-Data-Science-Final-Project