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Technology, Social Impact

Multi-modal approach for predicting the risk of depression using music streaming data

ABSTRACT

This research aims to investigate the association between the risk of depression and music preferences in terms of genres and emotions through different modalities, including social tags, acoustic features, lyrical features, artists, and user streaming statistics, using online music listening history from Last.fm. These features are being looked at in a static, overall fashion in addition to investigating dynamic patterns since underlying emotional states change over time and may be reflected in the kind of music consumed. We also intend to examine individual differences in terms of gender and personality traits as they might be indicative of underlying risk for depression. Collectively, the findings can aid the early detection and diagnosis of depression and could possibly be used to modulate the music recommendations provided to individuals at risk, to help alleviate their symptoms.

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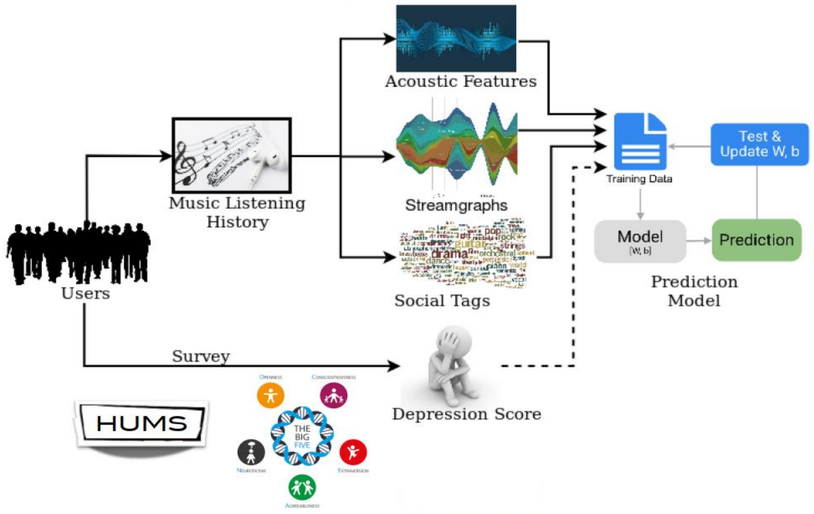
References:
1. Surana, A., Goyal, Y., Srivastava, M., Saarikallio, S, and Alluri, V. (2020) TAG2RISK: Harnessing Social Music Tags for Characterizing Depression Risk. In Proceedings of 21st International Society for Music Information Retrieval.
2. Surana, A, Goyal, Y, Alluri, V. Static and Dynamic Measures of Active Music Listening as Indicators of Depression Risk. In Speech, Music, and Mind with Audio Satellite Workshop, Interspeech 2020.

METHOD

- 541 Last.fm users categorized into At-risk and No-risk based on psychological distress score
- Clustering on genre and emotion tags from user listening histories and artist profiles
- Time-varying measures: repetitiveness, variability, inertia
- Acoustic features obtained from Spotify API
- Statistical Analysis for group differences



RESULTS

Current findings for individuals who are At-Risk:

- Their music choices reflect and resonate with their negatively-valenced states and this affinity is resistant to change over time.
- Ruminative music listening behavior
- Preferred genres have otherworldly/ethereal soundscapes which may be indicative of escapism

Ongoing work:

- Preliminary results from interaction between gender and risk indicate that females At-risk tend to prefer heavy-metal subgenres
- Classification accuracy of 80% obtained using artist information
- Building a multi-modal system for predicting depression risk

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