Algorithm-generated music recommendations may be least accurate for hard rock listeners

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Listeners of high-energy music such as hard rock and hip-hop may be given less accurate music recommendations by music recommender systems than listeners of other non-mainstream music, according to research published in the open access journal *EPJ Data Science*.

A team of researchers from Graz University of Technology, Know-Center GmbH, Johannes Kepler University Linz, University of Innsbruck, Austria and University of Utrecht, the Netherlands, compared how accurate algorithm-generated music recommendations were for mainstream and non-mainstream music listeners. They used a dataset containing the listening histories of 4,148 users of the music streaming platform Last.fm who either listened to mostly non-mainstream music or mostly mainstream music (2,074 users in each group). Based on the artists music users' listened to most frequently, the authors used a [computational model](#) to predict how likely music users were to like the music recommended to them by four common music recommendation algorithms. They found that listeners of mainstream music appeared to receive more accurate music recommendations than listeners of non-mainstream music.

The authors then used an algorithm to categorize the non-mainstream music listeners in their sample based on the features of the music they most frequently listened to. These groups were: listeners of music genres containing only acoustic instruments such as folk, listeners of high-energy music such as hard rock and hip-hop, listeners of music with acoustic instruments and no vocals such as ambient, and listeners of high-energy music with no vocals such as electronica. The authors compared the listening histories of each group and identified which users were the most likely to listen to music outside of their preferred genres and the diversity of music genres listened to within each group.

Those who mostly listened to music such as ambient were found to be most likely to also listen to music preferred by hard rock, folk or

electronica listeners. Those who mostly listened to high-energy music were least likely to also listen to music preferred by folk, electronica or ambient listeners, but they listened to the widest variety of genres, for example hard rock, punk, singer/songwriter and hip-hop.

The authors used users' listening histories and a computational model to predict how likely the different groups of non-mainstream music listeners were to like the music recommendations generated by the four common music recommendation algorithms. They found that those who listened to mostly high-energy music appeared to receive the least accurate music recommendations and those who mostly listened to music such as ambient appeared to receive the most accurate recommendations.

Elisabeth Lex, the corresponding author, said: "As increasing amounts of music have become available via music streaming services, music recommendation systems have become essential to helping users search, sort and filter extensive music collections. Our findings suggest that many state-of-the-art music recommendation techniques may not provide quality recommendations for non-mainstream music listeners. This could be because music recommendation algorithms are biased towards more popular music, resulting in non-mainstream music being less likely to be recommended by algorithms."

"Further," added Elisabeth Lex, "our results indicate that the music preferences of those who mostly listen to music such as ambient can be more easily predicted by music recommendation algorithms than the preferences of those who listen to music such as hard rock and hip-hop. This means that they may receive better music recommendations

The authors suggest that their findings could inform the creation of music recommendation systems that provide more accurate recommendations to non-mainstream music listeners. However, they

caution that as their analyses are based on a sample of Last.fm users their findings may not be representative of all Last.fm users or users of other music streaming platforms.

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