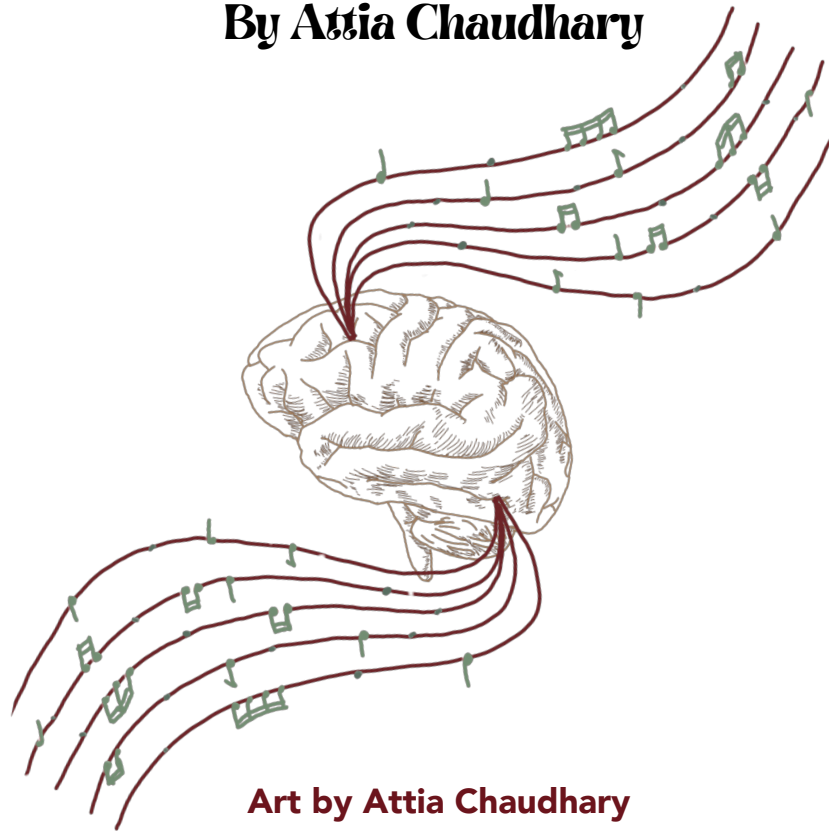# Neuroforecasting: Revolutionizing Music Prediction with AI and Neurophysiology

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Art by Attia Chaudhary

From Vance Joy's Riptide to Billie Eilish's Bad Guy, society has been captivated by the world's greatest music hits, inspired by the incredible work of these musical masterminds. Scientists are exploring the science behind these big hits and have been working toward predicting music success with greater accuracy. In a recent study, researchers combined neurophysiology and artificial intelligence to predict hit and flop music.

Until now, the accuracy of these predictions has been relatively low. However, this study suggests a more efficient approach that predicts hit songs with 97% accuracy. This profound breakthrough opens opportunities for underpaid artists and allows radio stations to better understand their listeners, making it easier to stream the best music. If it lives up to this standard, this new technology may

be able to foresee the next worldwide sensation.

The process of predicting outcomes using neural data is referred to as neuroforecasting, where brain activity patterns are harnessed to predict future outcomes or behaviors. By capturing neural activity from a small group of people, neuroforecasting allows for predicting population level outcomes without needing to measure the brain activity of hundreds of people (Pirchner, 2023). In a study published in Frontiers in Artificial Intelligence, participants listened to a set of songs while equipped with cardiac sensors. Since music is known to evoke emotional and attentional responses, the study aimed to predict neural states from cranial nerve activity, focusing on dopamine and oxytocin—neurotransmitters associated with attentional response and emotional resonance, respectively (Merritt, Gaffuri, and Zak, 2023). The rationale for measuring both attentional and emotional responses stems from the well-established relationship between music and emotion (Coutinho and Cangelosi, 2011). Previously, predictions relied solely on attentional responses and a single machine learning tool, yiel-

ding an accuracy of only 69%. However, by incorporating emotional responses and applying a bagged machine learning model, accuracy improved to 97%, underscoring the impact of music on human emotion.

To determine whether neural data is a better predictor of hit songs than participant self reports, the study compared the accuracy of neuroforecasting with Likert self-report scales. The results revealed a key limitation in self-reporting: participants who had already heard a song before were more likely to label it as a hit, as repeated exposure increases an individual's likelihood of selecting a familiar song (Merritt, Gaffuri, and Zak, 2023). This raises an important clarification: Were participants asked to impartially predict a song's commercial success, or were they reporting their own level of enjoyment and immersion? If the former, the inaccuracy of self reports could stem from procedural flaws rather than an inherent limitation of the Likert scale. If the latter, the same issue could apply to neuroforecasting, as immersion-based predictions might also be influenced by prior exposure. Since music activates brain regions involved in pro-

cessing emotions (Koelsch et al., 2006), neuroforecasting remains a more direct and unbiased method for prediction compared to subjective self-reports.

Ultimately, neurophysiology and artificial intelligence have propelled music prediction to new heights, achieving 97% accuracy in forecasting hit songs. This groundbreaking development promises more equitable opportunities for rising artists and simplifies decision-making for music streaming platforms. The application of machine learning to neural data significantly increases classification accuracy, paving the way for predictive analytics beyond the music industry. As research advances, neuroforecasting may revolutionize the way industries anticipate consumer behavior, transforming entertainment, marketing, and beyond.

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