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Measuring crowd mood at parties

Research Proposal

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by

Benedikt Holland

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Student ID, Course	8778697, TINF2019AI
Reviewer	Prof. Dr. Andreas Mahr

1 Artificial intelligence in the music industry

As artificial intelligence is conquering the world by storm more and more application areas are opening up. Especially online content-based platforms like YouTube and Netflix profit considerably from this development. The infamous recommendation algorithms are taking more control over our lives every day. As the largest streaming service in the world even Spotify introduced its own recommendation algorithm in 2015 called *Spotify's Discover Weekly*. This algorithm is based on collaborative filtering which works by recommending music that other users with a similar profile listen to. Other recommendation algorithms have also been proposed like knowledge-based, asking the user directly for their preferences, content-based, looking at content information and labels of tracks the user liked and of course hybrid systems based on the above methods. (see p.2 l.7 [Wan20])
Although effective at optimizing the single user experience the mentioned algorithms struggle to address multiple users or even crowds. Music after all is not only a personal entertainment method, but also particular effective at mass entertainment like in the form of a party.

2 Research proposal

Whether at a private event or in a club, the success of a party always depends on the mood of the guests. Since the financial success of the celebration often depends on this mood, everything is done to maximize it. Offers, mottos and especially a very good and therefore expensive DJ. Although the DJ brings more skills than simply selecting songs, the selection alone makes a lot of difference (see p.2 l.23 [SDP12]). Given this expensive investment, the question of whether or not this activity can be optimized or even automated falls. Companies like Spotify have now developed very sophisticated algorithms to tailor auto play to individual users, though not to an entire crowd like you find at a party.
This study will aim to answer the question if it is possible to automate crowd entertainment by analyzing sensor data from a single party location and investigating the following assumptions. Firstly, it is possible to measure subjective crowd mood with sensors by reducing noise levels to generate a reliable and statistically significant measure. Secondly, there are clear trends visible when comparing the measured crowd mood with the songs played. Thirdly, a single party location keeps the same milieu that only changes slowly over time.
If these assumptions can be verified this study will enable future studies to develop a system for autonomous crowd entertainment based on e.g., Reinforcement Learning.

3 Approach

To make the subjective mood at a party measurable a Raspberry Pi and a selection of sensors is used, which must be determined first.

3.1 Hypotheses

The mood needed for a successful party is energetic in nature, this means we are basically trying to measure human activity. When a human body is actively singing and dancing it affects the environment in various ways. These measurable effects on the environment must be determined and suitable sensors have to be selected. Hypotheses have to be made about the possible relation between the selected measurements and crowd mood.

3.2 Hardware setup

The selected sensors must be calibrated and installed on the Raspberry Pi. Python programs must be written to correctly store the measured data locally. For later analysis the local data must be sent to a database server periodically. The whole system has to be designed to run reliable with minimal interference in order to avoid data loss.

3.3 Data collection

The sensor data must be placed in relation to the environment to generate a meaningful key figure.
Initial data collection is necessary to determine which sensors generate usable data. First test runs will be done without guests to measure base values and base fluctuations. Also, the impact of noise sources like the sound system, open doors and the installed smoke machine must be investigated. Based on this data first attempts at noise canceling can be made using outdoor temperature, smoke machine activity and music input.

3.4 Data analysis

Once a large enough data set has been generated statistical analysis can begin. The data must be cleaned, removing duplicate or faulty data, dealing with stray bullets, etc. The before stated assumption must be disproven or proven and depending on the result of the analysis new findings might be investigated.

Bibliography

[SDP12] Yading Song, Simon Dixon, and Marcus Pearce. "A Survey of Music Recommendation Systems and Future Perspectives". In: (2012). URL: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.414.6614&rep=rep1&type=pdf.

[Wan20] Yu Wang. "A Hybrid Recommendation for Music Based on Reinforcement Learning". In: (2020). URL: https://link.springer.com/chapter/10.1007/978-3-030-47426-3_8.