TOWARDS MULTIMODAL MIR: PREDICTING INDIVIDUAL DIFFERENCES FROM MUSIC-INDUCED MOVEMENT

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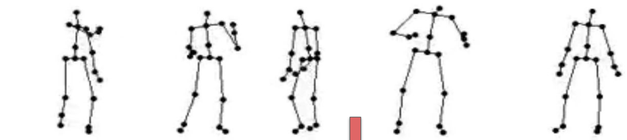
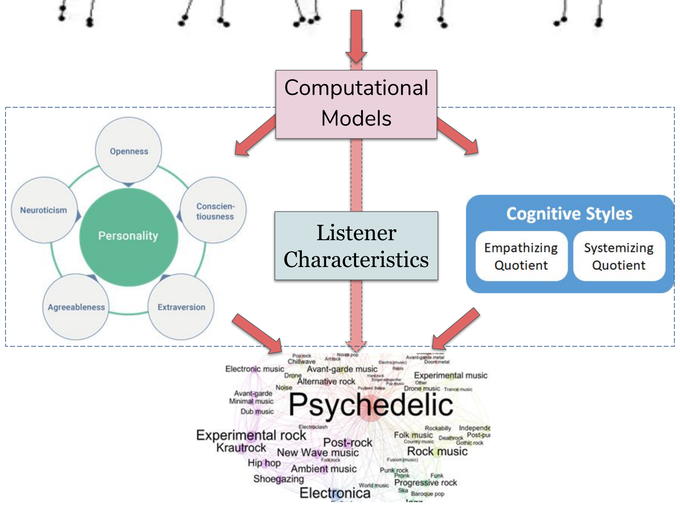
Aim & Motivation

To predict individual traits given participants' music-induced movements while listening to various genres

- Music experiences are highly embodied, making it necessary to consider individual embodied responses to music in developing more advanced personalized user experiences.
- Musical preferences have been associated previously with Personality[1] and cognitive styles of thinking[2].
- The current study is the first of its kind to use computational methods to predict individual traits from participants' free music-induced movements.

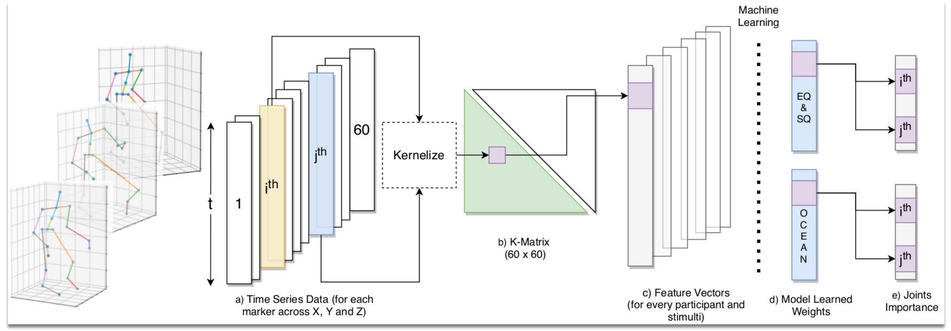




References

1. P. J. Rentfrow and S. D. Gosling, "The do re mi's of everyday life: the structure and personality correlates of music preferences." Journal of personality and social psychology, vol. 84, no. 6, p. 1236, 2003.
2. D. M. Greenberg, S. Baron-Cohen, D. J. Stillwell, M. Kosinski, and P. J. Rentfrow, "Musical preferences are linked to cognitive styles," PloS one, vol. 10, no. 7, 2015.

Approach



- *Motion capture data* of participants (73 university students :54 females, mean age =25.74 years, Std. = 4.72 years) moving to music excerpts from 8 genres.
- ***Pairwise Correntropy*** calculated between *time series of joint markers'* data resulting in covariance matrix.
- Train regression model on the feature vectors to get the weight vector.
- Calculate ***joint-importance*** from learned vector from the proposed algorithm.

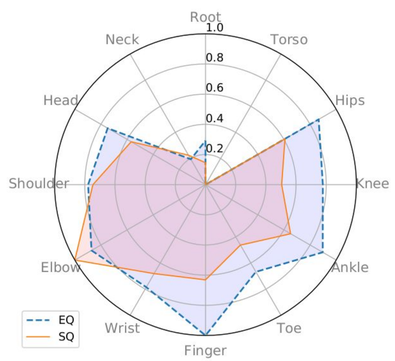
Results (EQ & SQ)

Empathizing Quotient

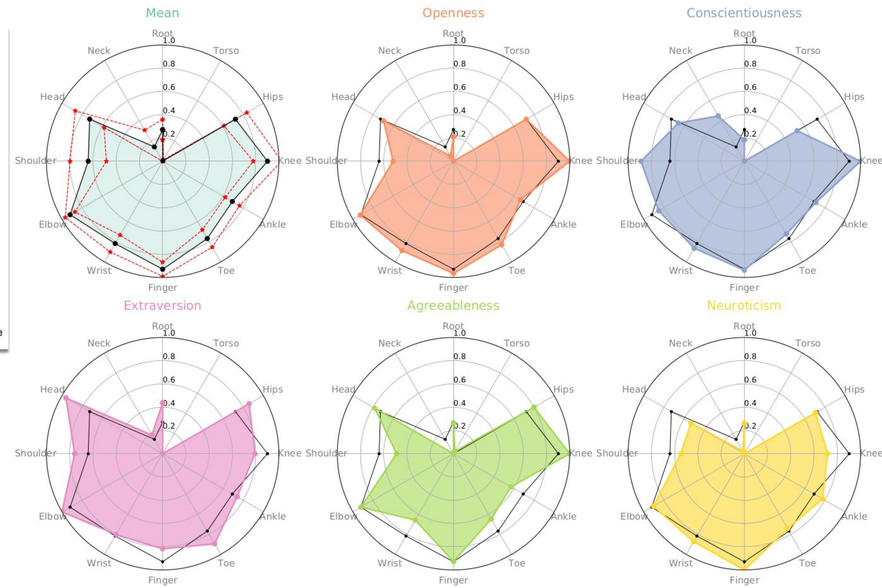
Input	PCR R^2	Bayesian Ridge R^2
Position	0.708	**0.771**
Velocity	0.249	0.423

Systemizing Quotient

Input	PCR R^2	Bayesian Ridge R^2
Position	0.781	**0.867**
Velocity	0.252	0.469



Results (Personality)



Input	Openness R^2	Conscientiousness R^2	Extraversion R^2	Agreeableness R^2	Neuroticism R^2
Position	**0.776**	**0.760**	**0.743**	**0.776**	**0.758**
Velocity	0.464	0.415	0.523	0.335	0.483

Conclusion

- Proposed a new approach to predict individual traits, with an average R^2 scores for *Personality, EQ, and SQ* of **76.3%**, **77.1%**, and **86.7%** respectively.
- Introduced a novel method to evaluate the relative importance of joints in predicting these traits.
- Further extension of this work could help to make music recommendation systems more ***Multi-modal*** to take embodied processes into account, resulting in more personalized experiences. Also, this approach can be made applicable to ***personalized gesture-based retrieval systems***.