

Automatic Detection of Mind-Wandering Based on Body and Hand Movements from "Mementos" Dataset

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1. What is Mind-wandering?

- Mind-wandering - state of mind, when an individual starts producing task-unrelated thoughts, without external stimuli[1].



2. Introduction

- The aim of this research is to discuss if it is possible or feasible enough to detect Mind-wandering of individuals using their hand and body movements.
- The basis for this research is "Mementos"[2] data set, containing over 2000 recordings of people watching music videos.



3. Research questions

- Are body and hand movements **useful** for detection of Mind-wandering?
- What **features** of hand and body movements are most significant towards detection of Mind-wandering?
- Are body and hand movements **self-sufficient** indicators for reliable detection of Mind-wandering?

5. Results

Algorithm \ Score	Precision	Recall	F1 score	σ_{F1}
Dummy	0.4737	0.0055	0.0108	0.0052
KNN	0.2274	1.0	0.3653	0.0947
DecisionTreeClassifier	0.212	1.0	0.3395	0.1331
SVC	0.3078	0.0241	0.0446	0.014
LOF	0.1315	0.1826	0.1453	0.0745
OneClassSVM	0.7746	0.0085	0.0167	0.0035
IsolationForest	0.0246	0.0261	0.025	0.0415

6. Conclusion

- There is enough evidence that head and body movements are **useful** for Mind-wandering detection.
- Movements of **head boundaries, nose and shoulders** were recognized as most valuable features.
- Body and hand movements are **not self-sufficient** factors for reliable detection of Mind-wandering.

References

- [1] J. Smallwood and J. Schooler. The science of mind wandering: Empirically navigating the stream of consciousness. Annual review of psychology, 66, 2014.
- [2] B. Dudzik, H. Hung, M. A. Neerincx, and J. Broekens. Collecting mementos: A multimodal dataset for context-sensitive modeling of affect and memory processing in re-sponses to videos. IEEE Transactions on Affective Computing, (01):1-1, 2021.

4. Methodology

