

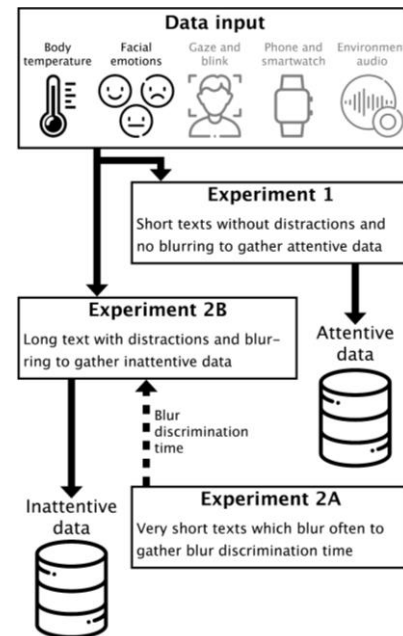
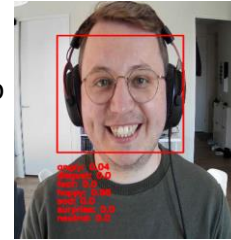
1. Background

- Sustained attention in Remote Learning Context
- Using sensors that are not commonly used in previous research to detect if learner is losing attention.
- Cheap hardware used such as a laptop web camera or simple Infrared Temperature sensor
- **“To what extent can camera-based face and infrared temperature sensing of a learners affective state in the remote learning context be used to indicate a loss of sustained attention?”**



2. Methodology

- User study with 3 participants, all male 20-24
- Two experiments conducted to gather attentive and inattentive data.
- Facial emotional recognition using Python package FER.
- Multiple Machine Learning models trained to select best performing model.

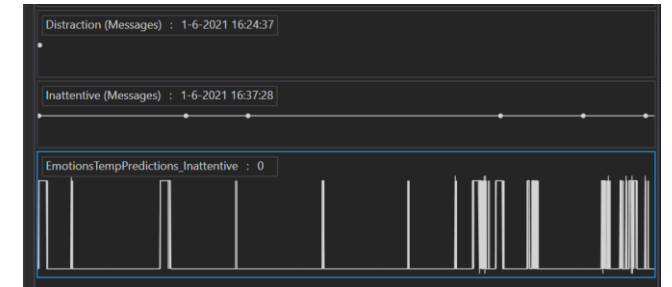
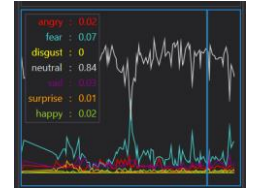


- Gradual blur to detect loss of sustained attention as described by Huang et al. (2019)
- Time windows of 10, 20 and 30s, labeled attentive or inattentive
- Statistical features
- 10-fold cross validation



3. Results

- 27 datasets
- 18 different model variations
- High Matthews Correlation Score in synthetic validation
- When applied in practice, the models were very spiky and mislabeled many of the frames
- Assumed overfitting due to low amount of data and low variety in participants



4. Conclusions & Future Research

- Overfitted models due to low amount of data and possible environmental change between experiment 1 and 2B.
- Nonetheless, results are promising.
- Temperature increases accuracy in combination with emotional values.
- Random Forest ML model most promising.
- Future research should investigate repeating experiments with more participants and remove possible variations between experiment 1 and 2B.

5. Acknowledgements & References

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