Universität Augsburg
Fakultät für Angewandte Informatik

Towards Personalised Prediction of PTSD From Speech

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Seminar Computational Intelligence

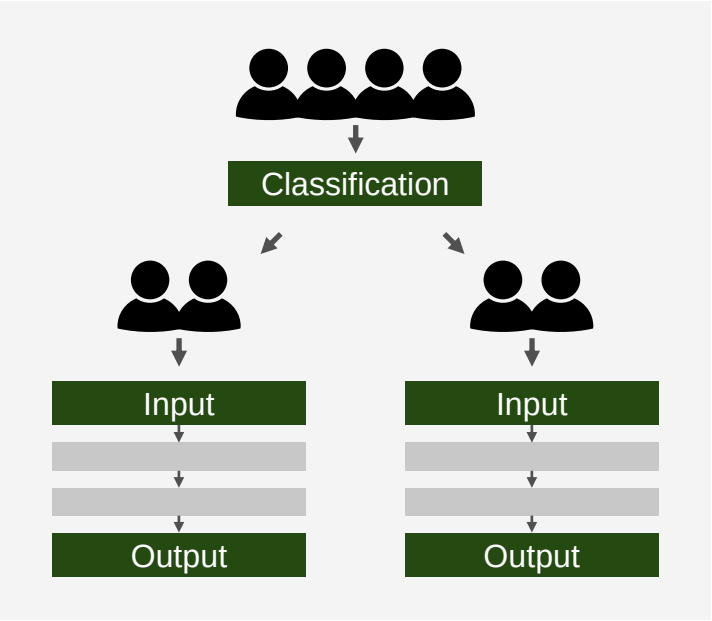
Agenda

1. Personalisation in Machine Learning
2. Used dataset
3. Data preprocessing and feature extraction
4. Experiments
5. Results
6. Discussion and conclusions

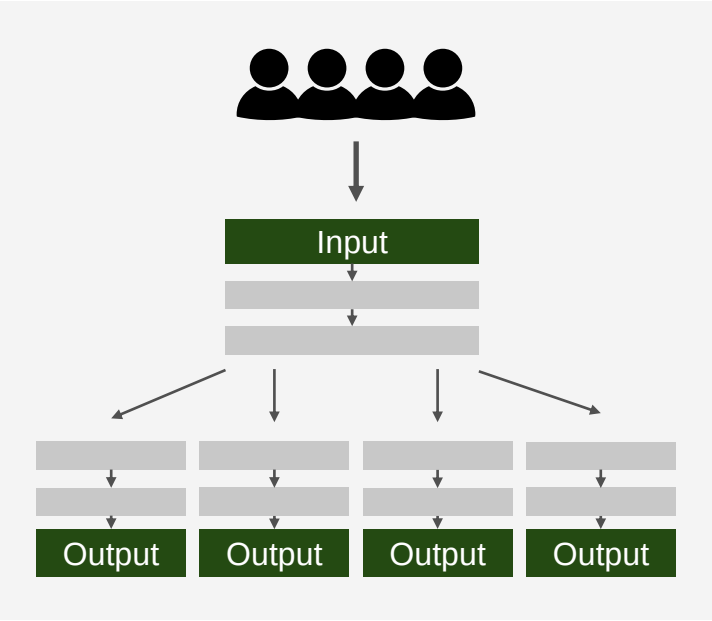
Personalisation in Machine Learning

customizing models and outputs according to specific user or subject characteristics to enhance performance

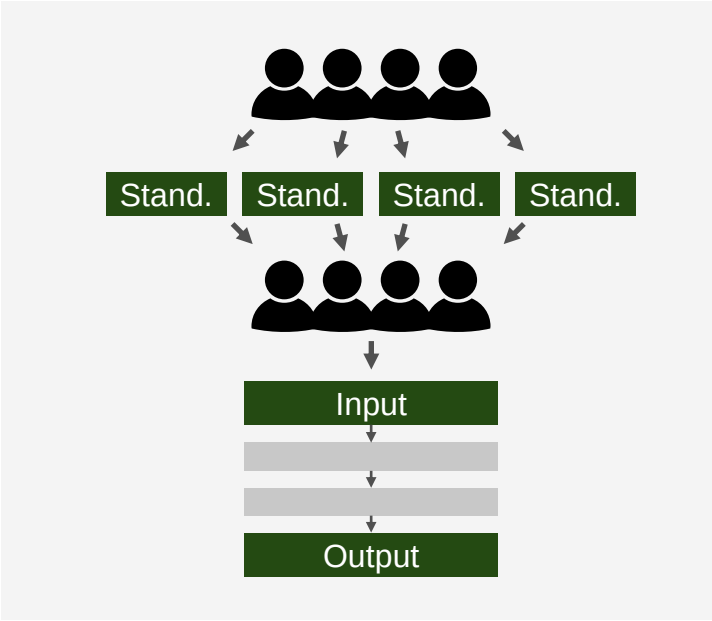
Subgroup learning



Multitask and transfer learning



Subject-dependend standardisation



Used dataset

Data from an ongoing study at LMU

Clinical intervention, with audio recordings before and after the intervention

Interview and read text

- 2 interviews, 3 questions each
- 2 read texts:
  - "*Der Nordwind und die Sonne*"
  - "*Das tapfere Schneiderlein*"

31 persons in total

- 10 PTSD patients
- 21 control group

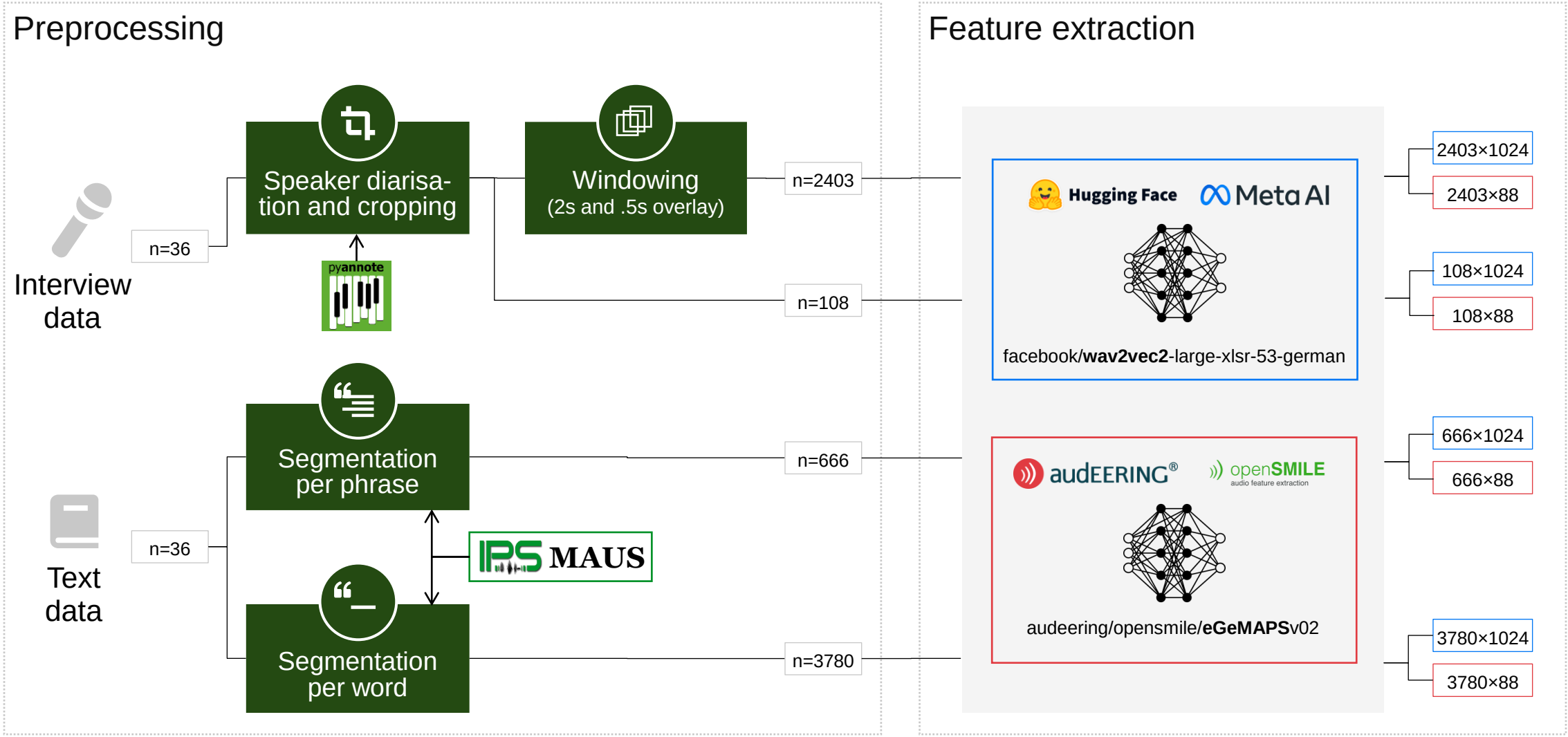
Post-Traumatic Stress Disorder

anxiety disorder caused by very frightening or distressing events

After data cleaning:
9 PTSD patients and 9 control group
with interview and read text audio data

Goal:
Detecting PTSD

Data preprocessing and feature extraction



Experiments | General

Setup

Nested cross-validation

- Outer: Leave-one-person-out cross-validation
- Inner: 3-fold cross-validation

Grid search for hyperparameter optimization

- Search space individual per model
- Strong focus on generalization

Evaluation

- Accuracy per unit
- Accuracy per session (most frequently occurred value in the units per person)

Applied models

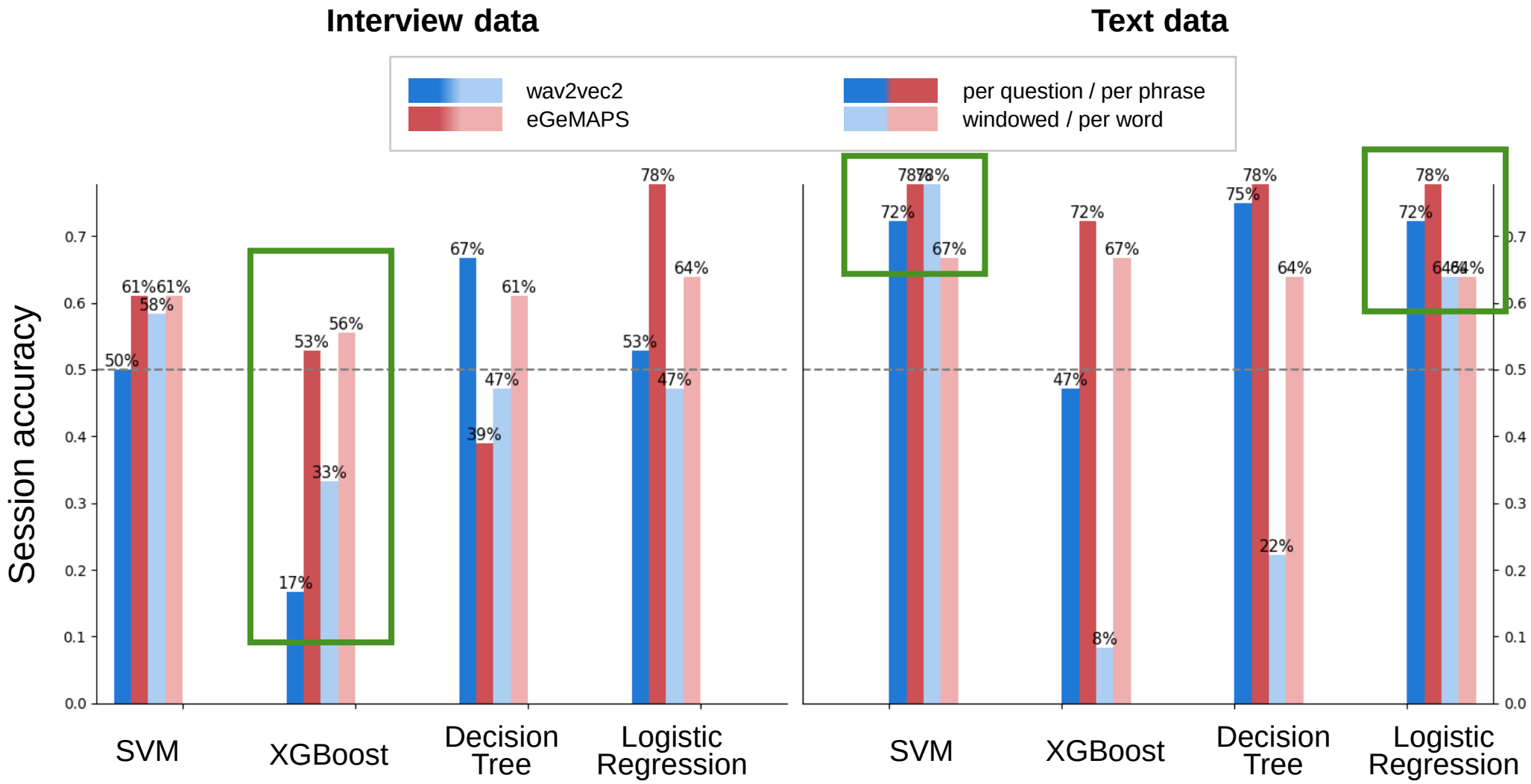

SVM


XGBoost


Logistic Regression

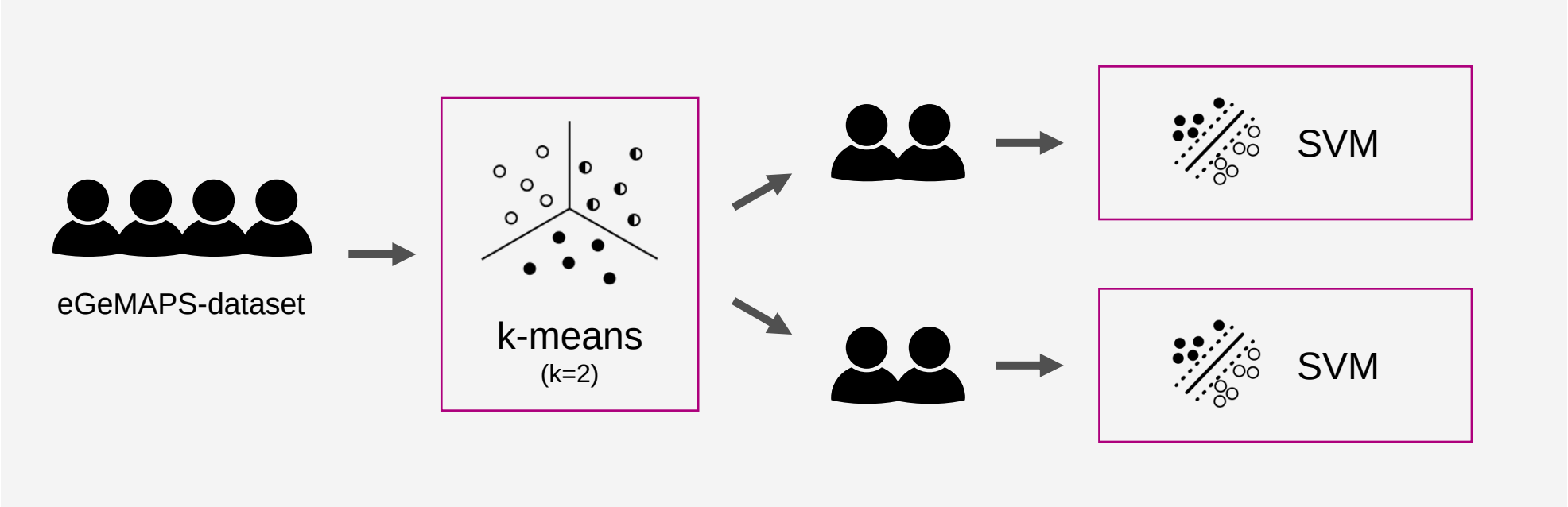

Decision Tree

Results | General

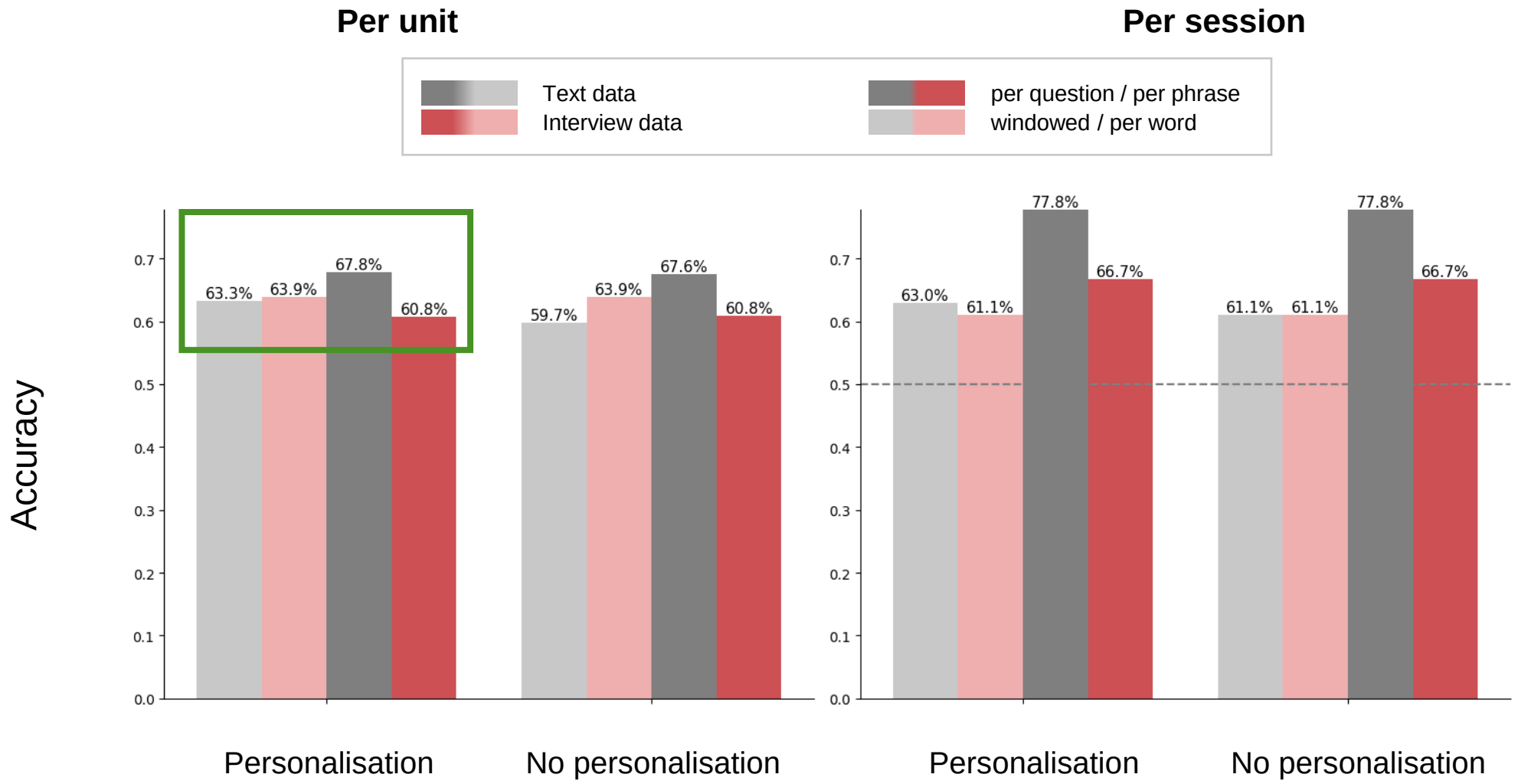


Experiments | Personalisation

Subgroup learning



Results | Personalisation



Discussion and conclusions