ActivPal External Presentation #3

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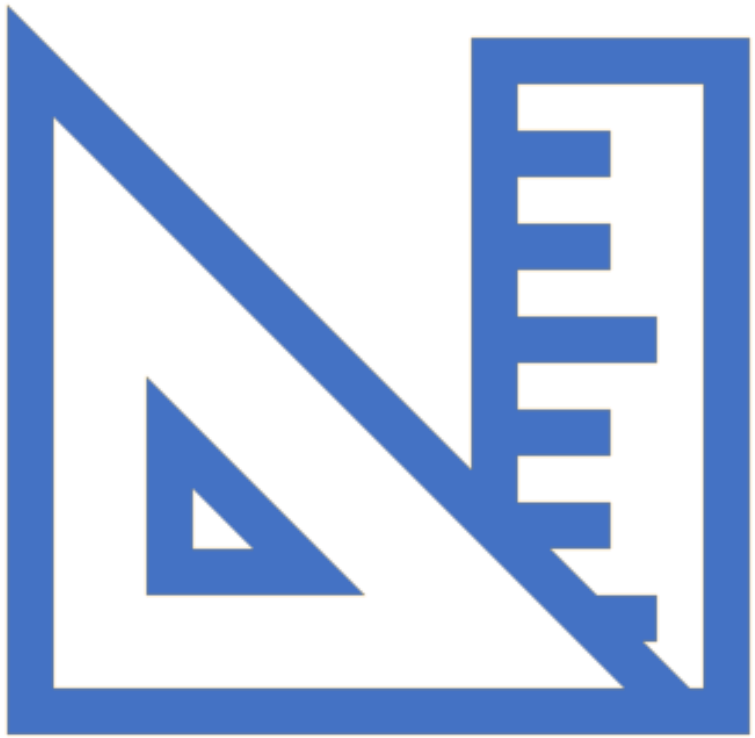
Topics

- Our progress
- Problems
- Next steps
- Questions



What have we been working on

- Activity recognition
- MET prediction models
  - Walking
  - Running
  - Cycling
  - Standing
  - Sitting
- Synchronizing models
- Improving dataset
- Application that implements our models

Activity recognition

Model and dataset configurations

- Random Forest Model
- Segment time in 9.4S
- Features of all axis
  - Standard deviation
  - mean

Scores

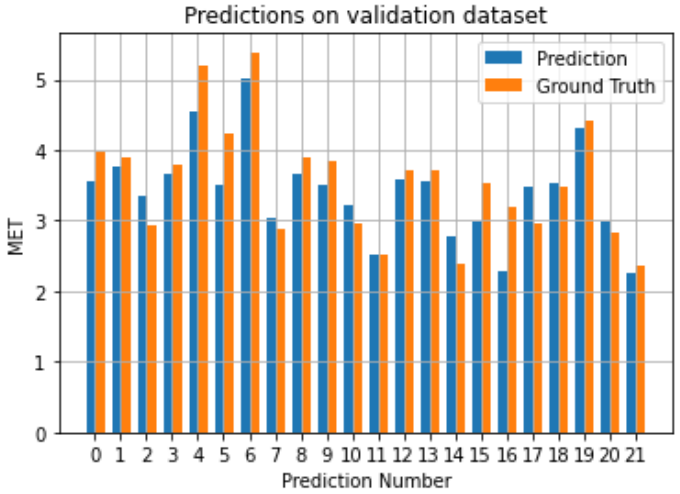
dataset type	Accuracy	Precision	Recall
Validation	98.46%	98.70%	98.59%
Test	98.46%	98.63%	98.46%

K-fold cross validation score

Accuracy	Precision	Recall
96% (+/- 3%)	97% (+/- 2%)	96% (+/- 3%)

MET prediction - walking

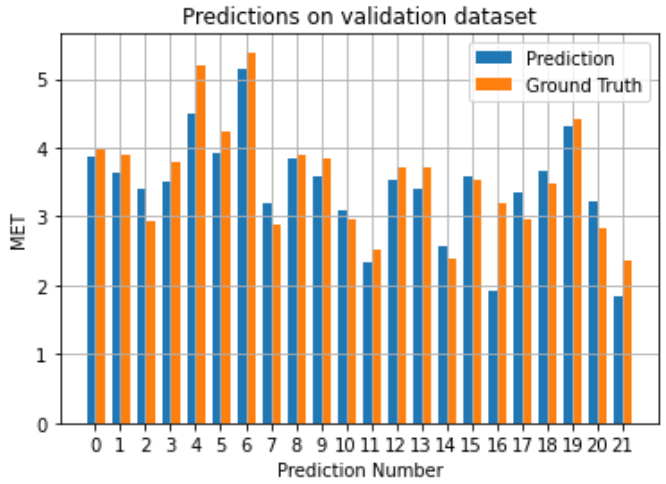
Random Forest Results



6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- meets_balance_guidelines
- mean_speed

```
R2 Score: 0.7543008354314606
Mean Squared Error: 0.3937928212223972
```

XGBoost Results

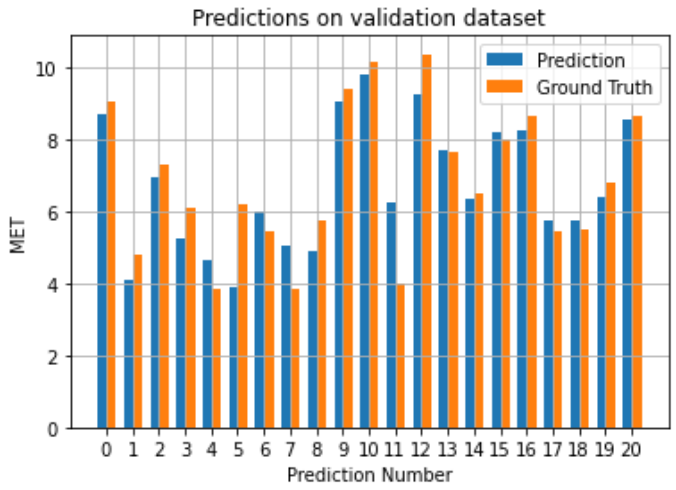


6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- meets_balance_guidelines
- mean_speed

```
R2 Score: 0.7350981667031118
Mean Squared Error: 0.40889183352854425
```

MET prediction - running

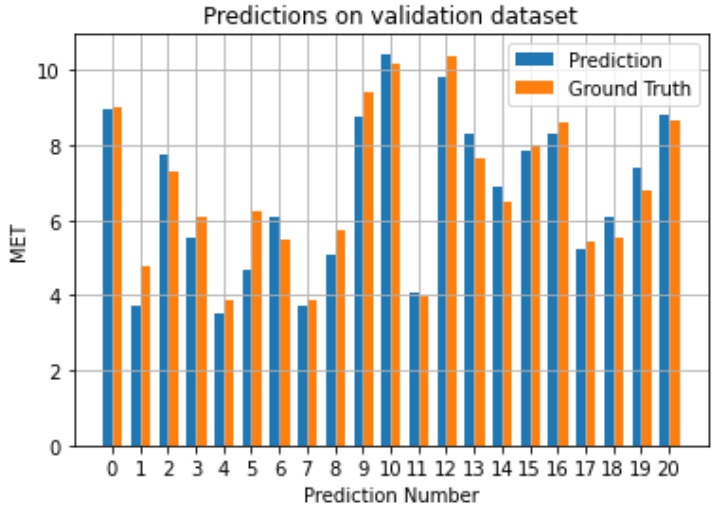
Random Forest Results



6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- estimated level
- mean_speed

```
R2 Score: 0.7882770675946017
Mean Squared Error: 0.9056281308509639
```

XGBoost Results

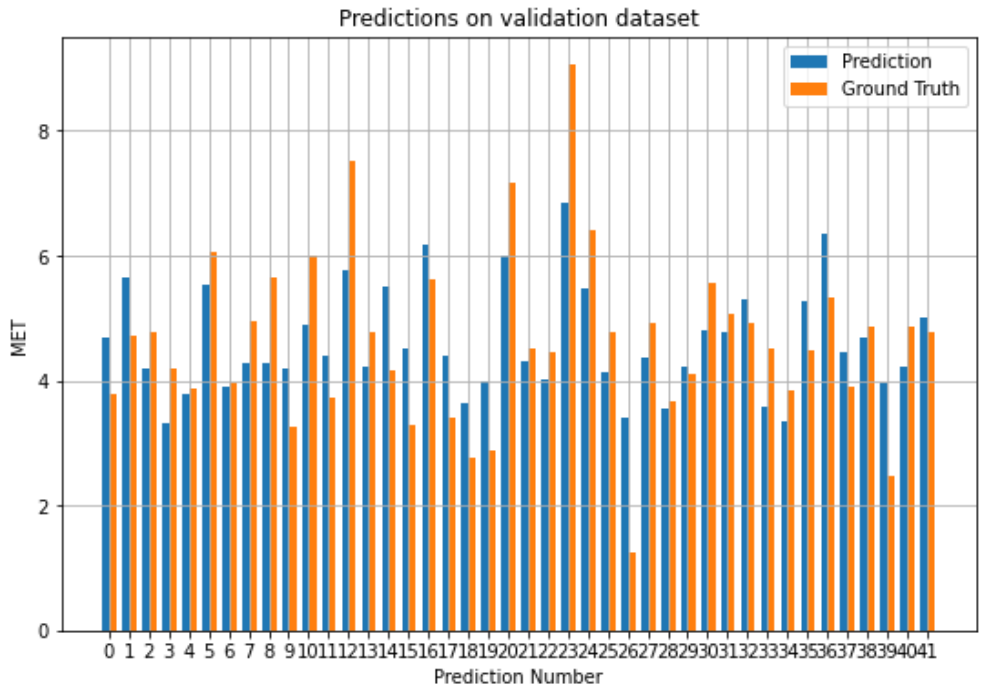


6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- is_sporter
- mean_speed

```
R2 Score: 0.9109705050868462
Mean Squared Error: 0.5872633643040999
```

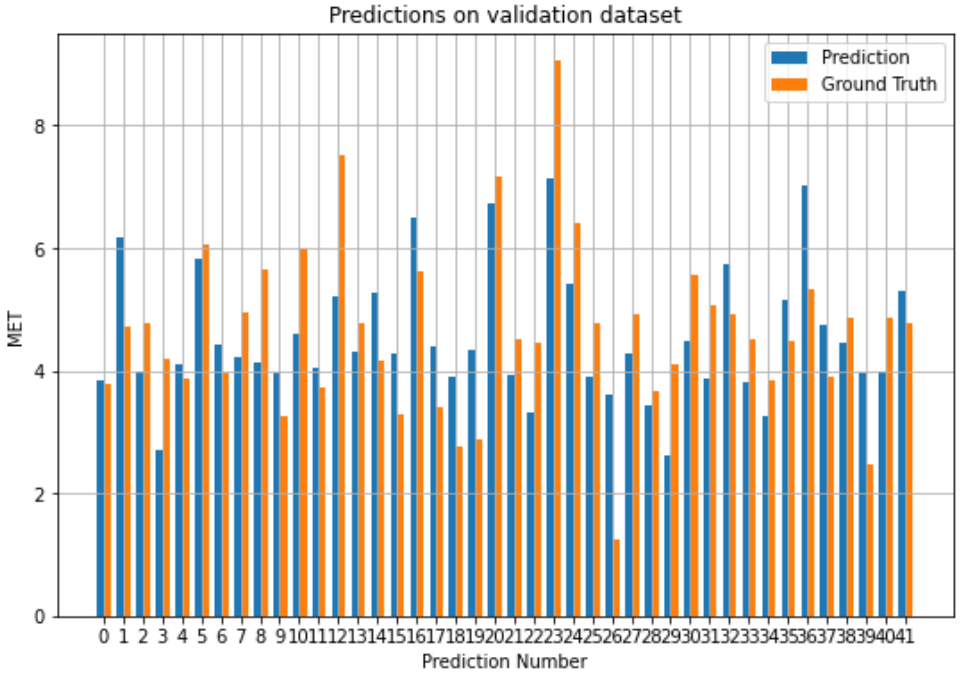
MET prediction – cycling (light + heavy)

Random Forest Results



R2 Score: 0.5266932329173457
Mean Squared Error: 0.9415929952899956

XGBoost Results

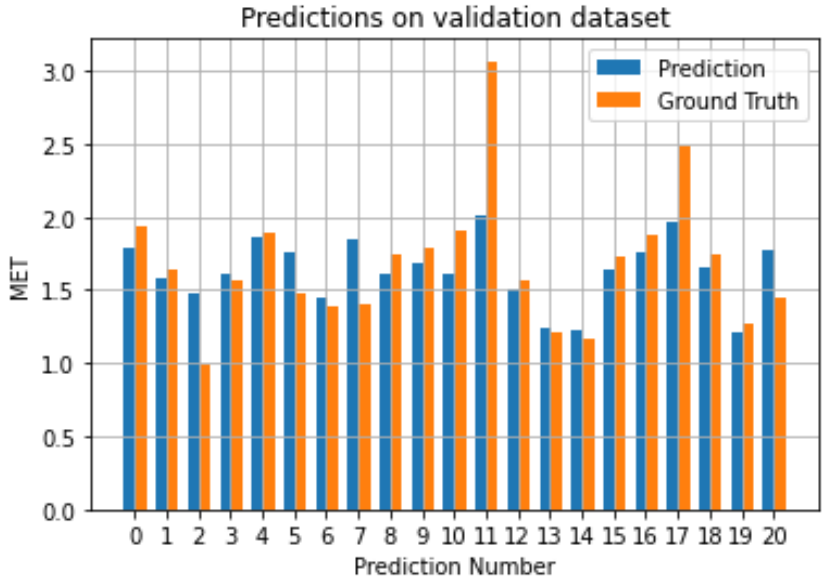


R2 Score: 0.3576245403010052
Mean Squared Error: 1.0969487380798402

6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- meets balance guidelines
- mean_speed

MET prediction - standing

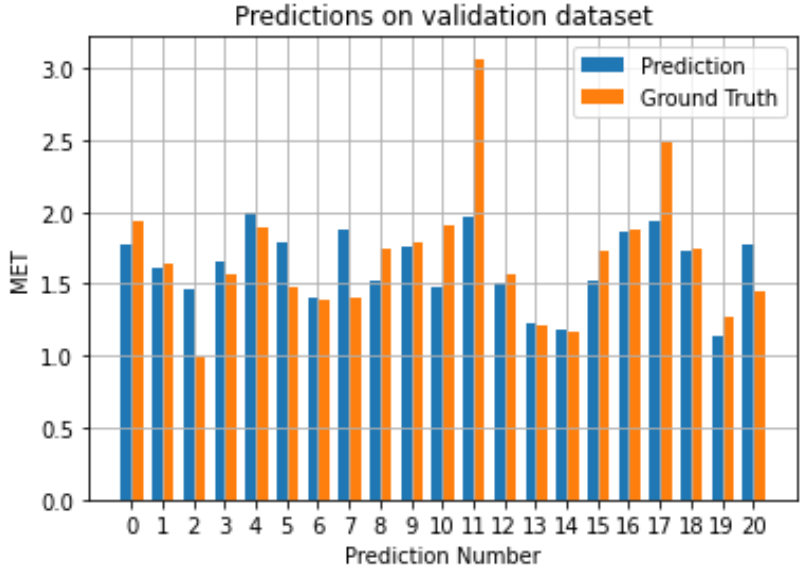
Random Forest Results



7 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- meets balance guidelines
- gender
- mean_speed

R2 Score: 0.4799613242295476
Mean Squared Error: 0.3240706791000897

XGBoost Results

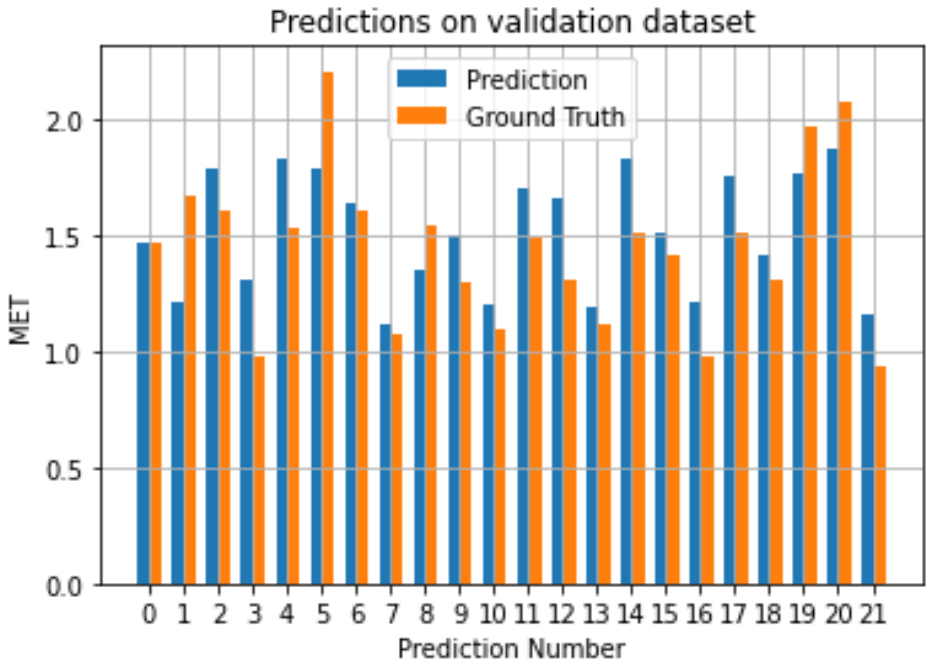


6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- meets activity guidelines
- mean_speed

R2 Score: 0.40412086966475813
Mean Squared Error: 0.34689736817510897

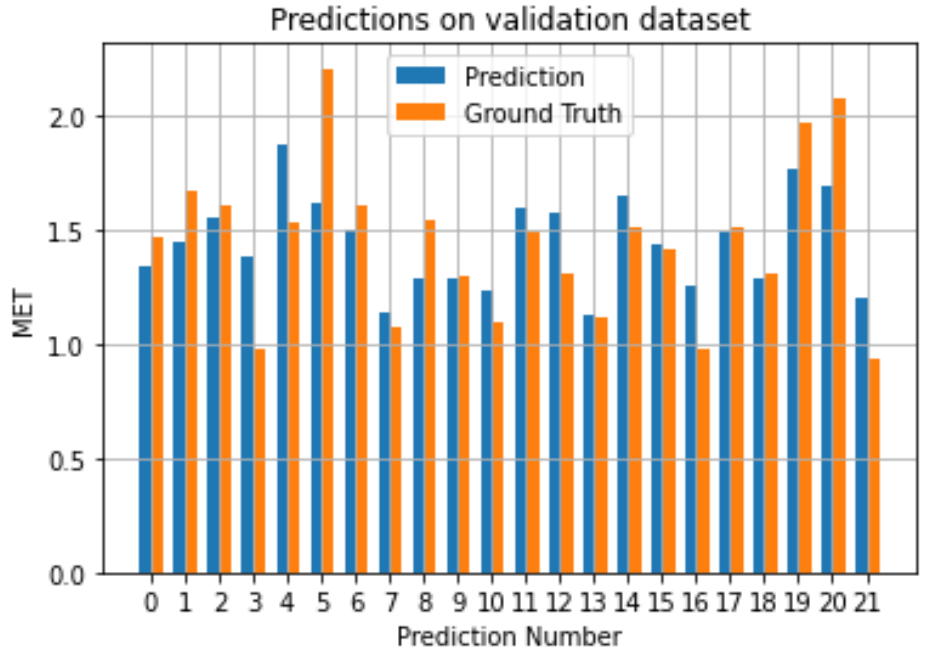
MET prediction - sitting

Random Forest Results



R2 Score: 0.4968670411242766
Mean Squared Error: 0.23890652388300682

XGBoost Results



R2 Score: 0.5098750604253595
Mean Squared Error: 0.23579795068550574

6 features used:
- sum_mag_acc
- weight_kg
- length_cm
- age_category
- is_sporter
- mean_speed

Application

Functionalities

Recognizing activities

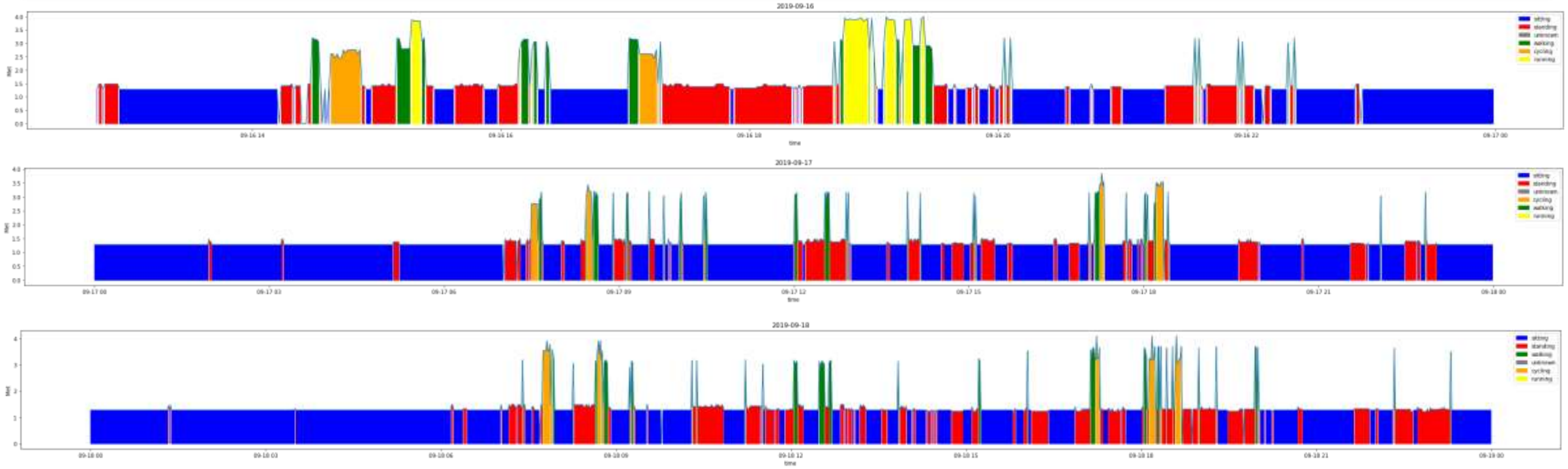
Predicting MET-values

Plotting week data

Calculating if user has done it's 150 min moderate activity

Application – plot week data

- Each color represents a activity



Application – recommended moderate activity

- User has done its recommended amount 150 minutes of moderate activity
- Moderate activity is all activity with MET-value equal to or higher than 3 until 6. The application also takes met value higher than 3 in to account in its calculation

Problems

- Application is slow
- Speed calculation bug in the application

Next steps

- Try to fix the speed calculation bug in the application
- Find similar papers for inspiration for our own paper
- Write the general layout of the paper
- Think of a good way to visualize our findings in the paper

Questions?