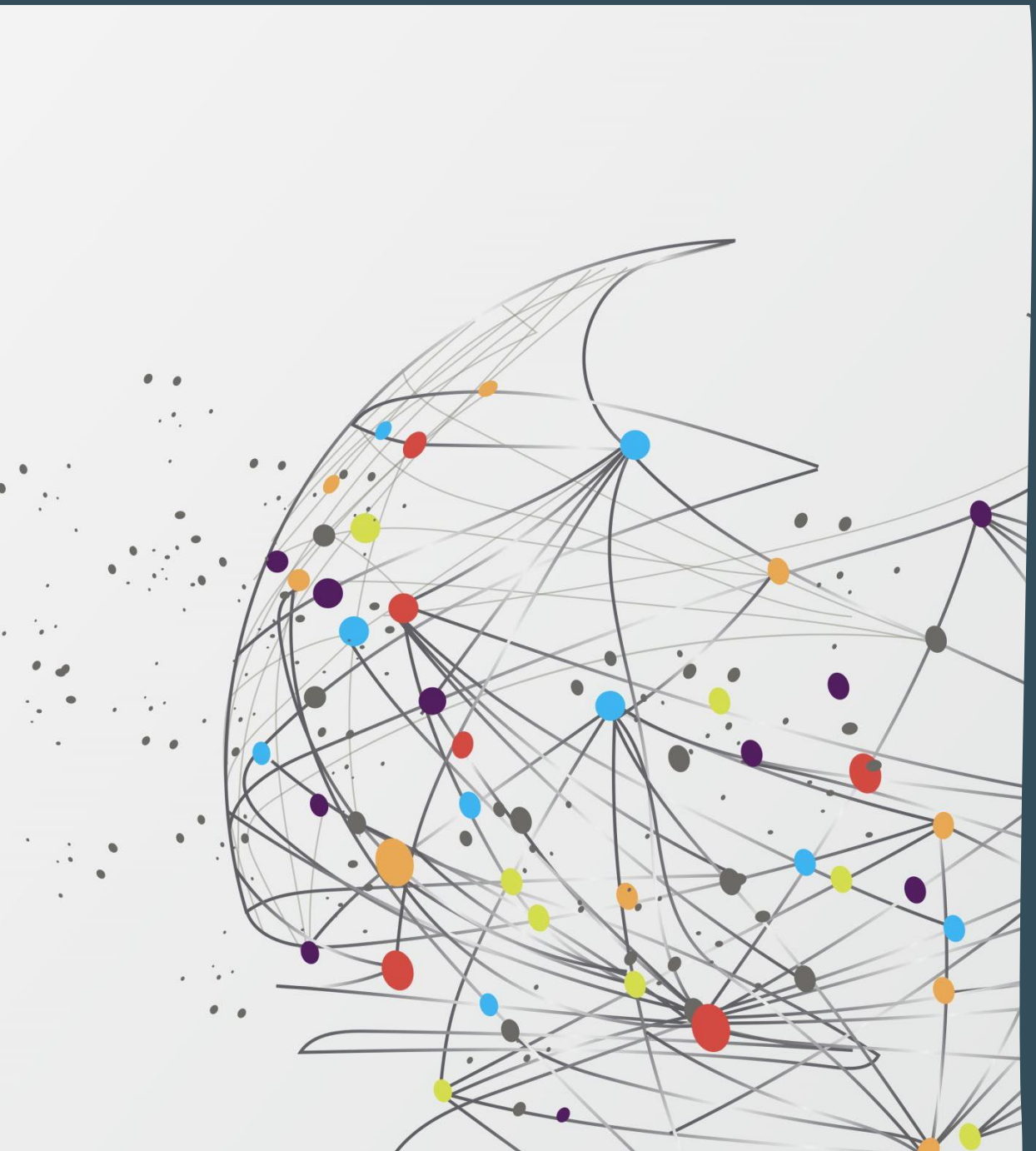

ActivPal Week 10

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WHAT HAVE WE DONE PREVIOUS WEEK?

WHAT ARE OUR GOALS FOR THE NEW SPRINT?

What have we done in the previous week?

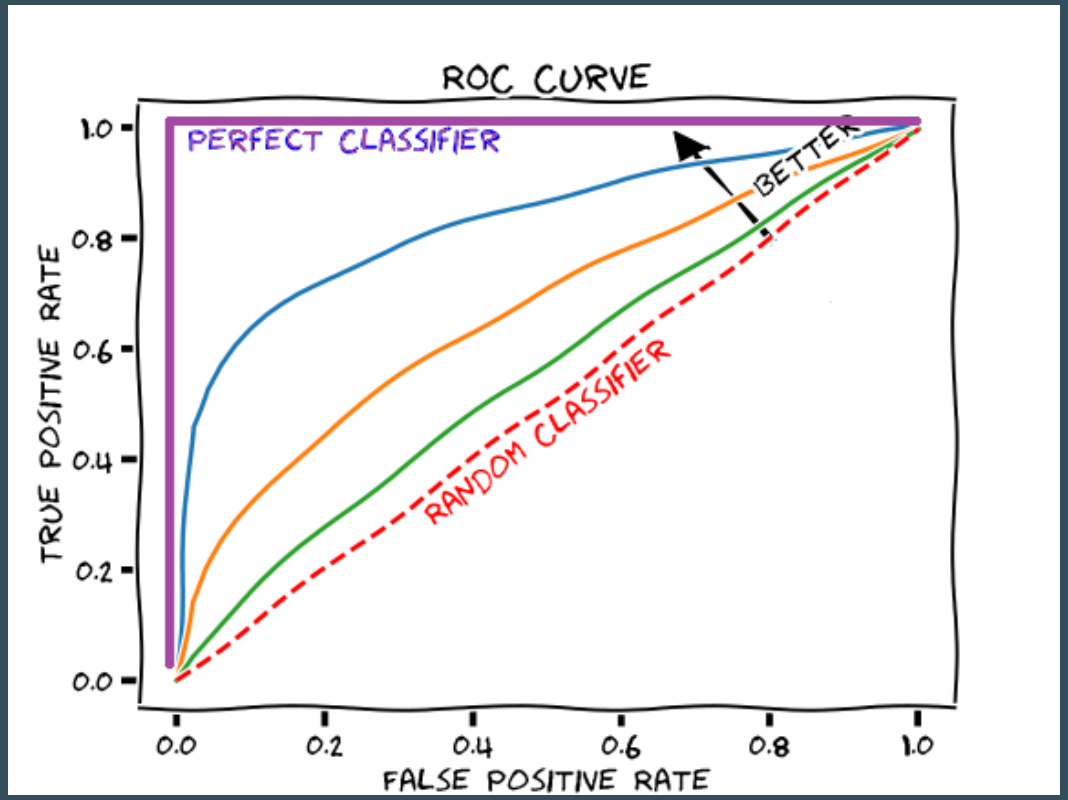
- Data cleaning
- Representativeness between training/validation and test sets
- Predicted the MET value using different models
- Compared these models to pick the best

Cleaning data

- In consultation with Annemieke, removed respondent 'BMR015' based on age (70+)
- After further analysis of respondents, removed 'BMR032' and 'BMR043' for the same reason
- Dataset exists of 23 respondents after cleaning

Representative training/ validation and test split

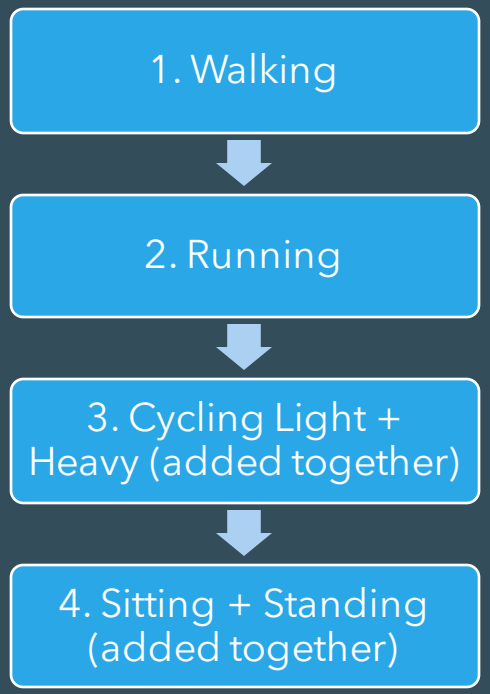
- Test respondents set size: 3
- Training/validation respondents set size: 20
  - Training: 80%
  - Validation: 20%
- Used Random Forest to assure representativeness between training and test set.
  - The model should not be able to make distinction between training/validation respondents and test respondents
  - So ROC should be as close as possible to 0.5



Src: https://glassboxmedicine.com/

Predicting MET values

PREDICT MET VALUES FOR DIFFERENT ACTIVITIES



OUR APPROACH

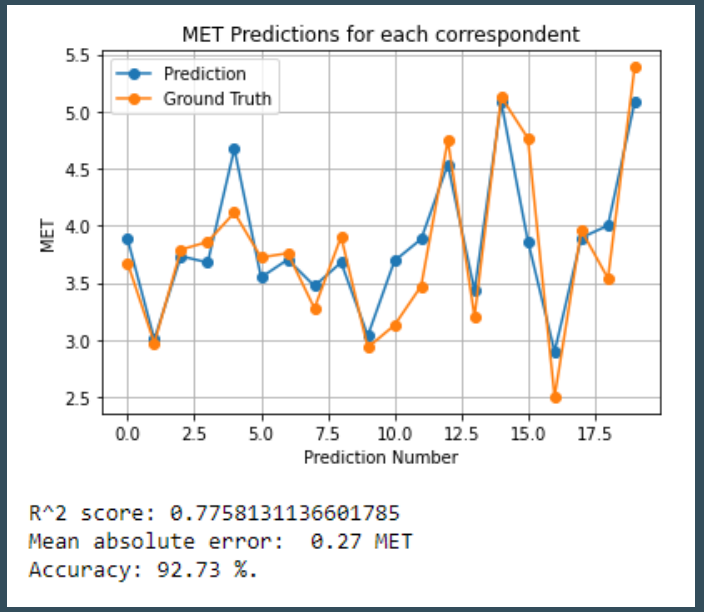
- - Random Forest Regression Model
- - Used data from 23 respondents
- - 3 used for testing
- - 20 used for Train (80%) / Valid (20%)
- - RFE Function that selects best features
- - The issue? Small dataset since every respondent has only 5 rows of data

Predicting Walking MET value

The 5 Features for this model

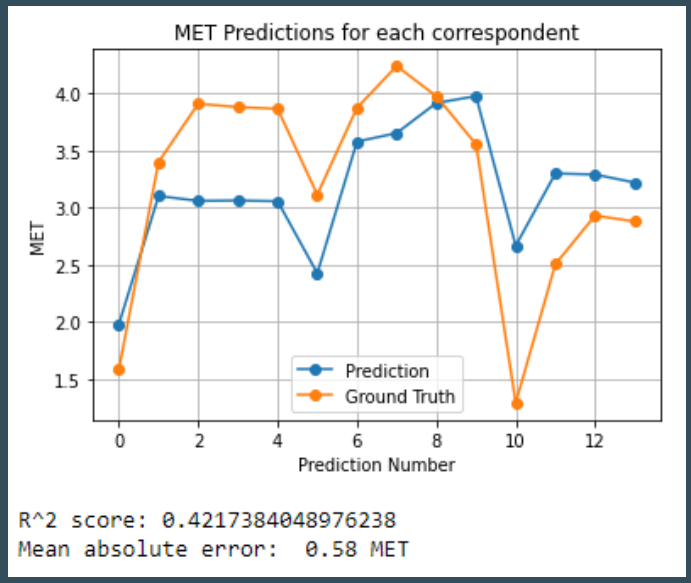
- - Sum of magnutide of acceleration
- - Weight in kilograms
- - Length in centimetres
- - Age Category
- - Meets Balance Guidelines

Applying Train + Valid Users




```
R^2 score: 0.7758131136601785
Mean absolute error:  0.27 MET
Accuracy: 92.73 %.
```

Applying Test Users



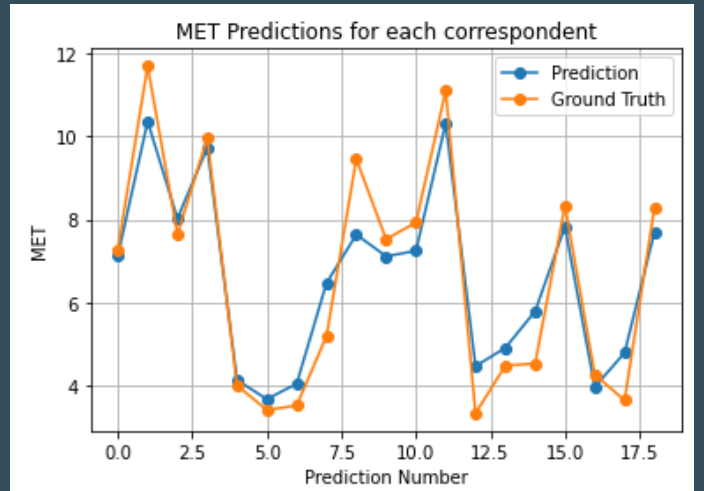

```
R^2 score: 0.4217384048976238
Mean absolute error:  0.58 MET
```

Predicting Running MET value

The 5 Features for this model

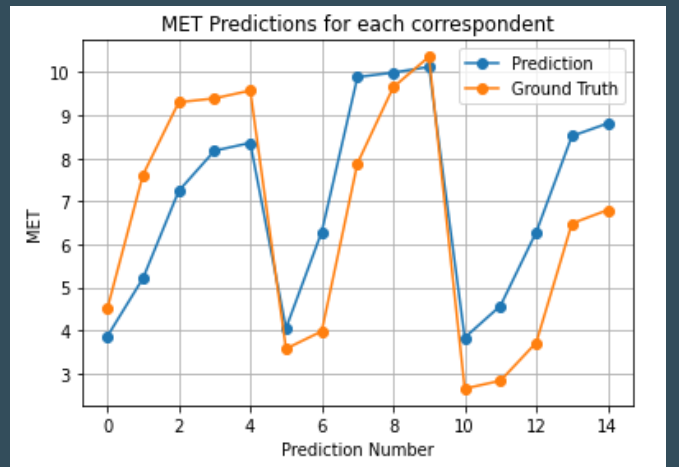
- - Sum of magnutide of acceleration
- - Weight in kilograms
- - Length in centimetres
- - Age Category
- **- Speed**

Applying Train + Valid Users




```
R^2 score: 0.901083655528726
Mean absolute error:  0.7 MET
Accuracy: 87.63 %.
```

Applying Test Users



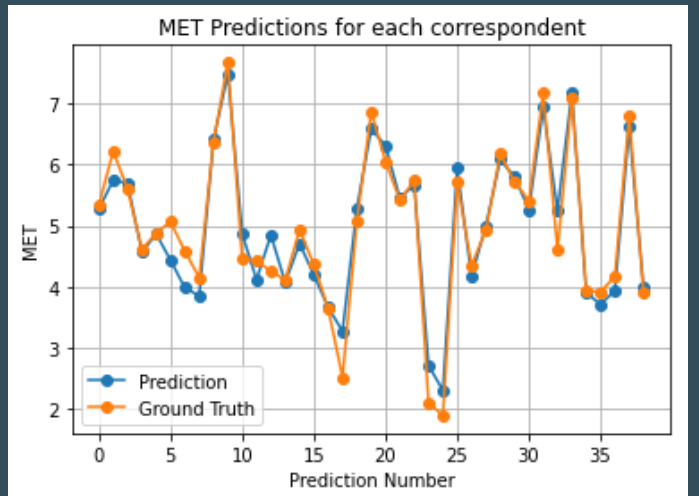

```
R^2 score: 0.6101151912596139
Mean absolute error:  1.5 MET
```

Predicting Cycling MET value

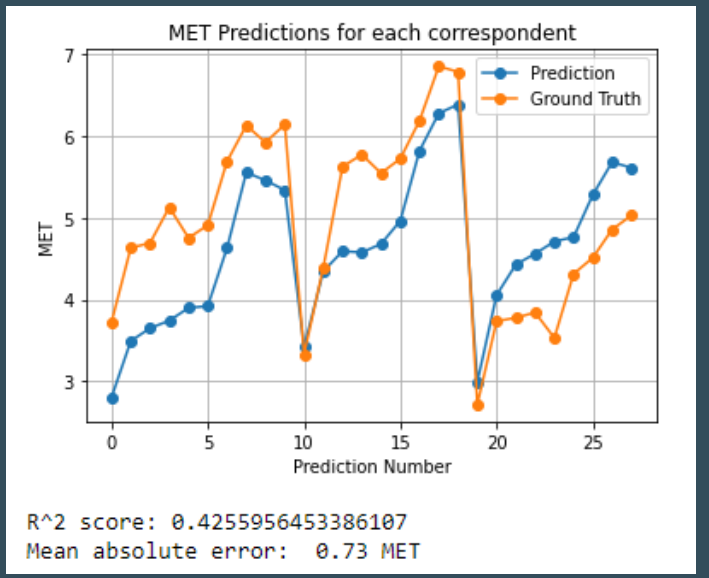
The 6 Features for this model

- SUM OF MAGNUTIDE OF ACCELERATION
- WEIGHT IN KILOGRAMS
- LENGTH IN CENTIMETRES
- BMI (CALCULATED FROM WEIGHT AND LENGTH)
- SPEED
- MEETS BALANCE GUIDELINES

Applying Train + Valid Users



Applying Test Users

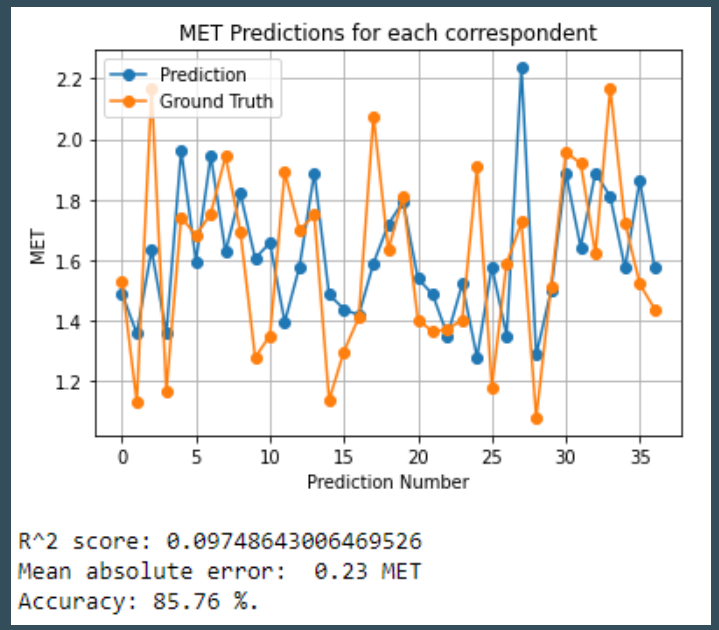


Predicting Sitting + Standing MET value

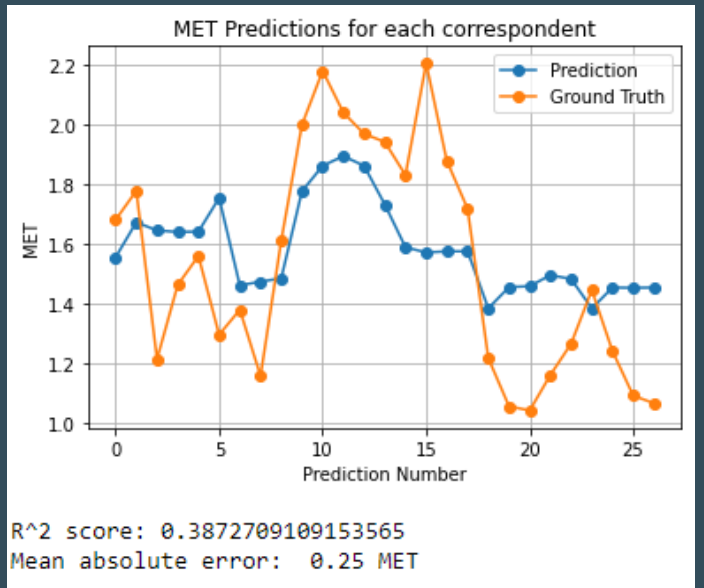
The 5 Features for this model

- SUM OF MAGNUTIDE OF ACCELERATION
- WEIGHT IN KILOGRAMS
- LENGTH IN CENTIMETRES
- AGE CATEGORY
- ESTIMATED LEVEL

Applying Train + Valid Users

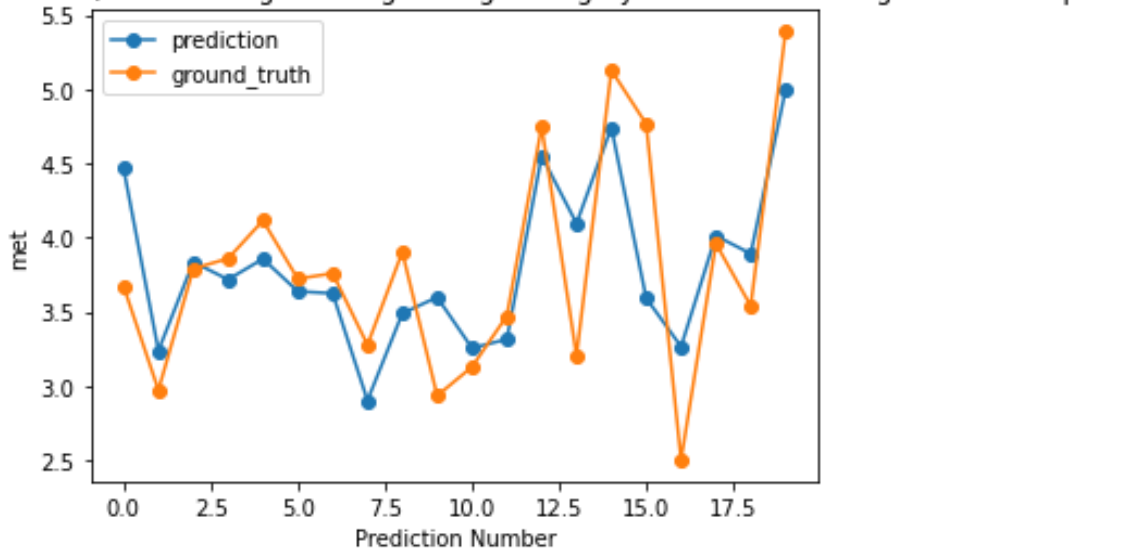


Applying Test Users

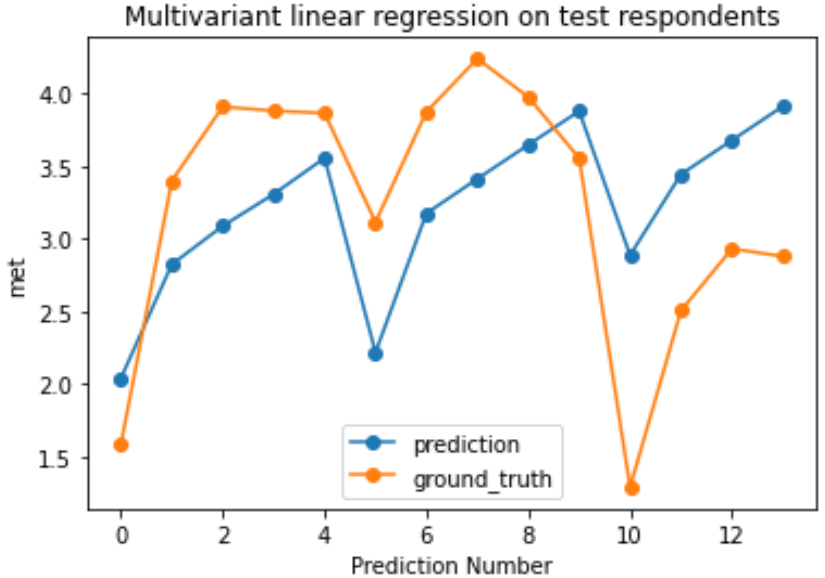


Predicting MET walking – Multivariate Linear Regression

```
mean squared error = 0.2414637142149028
r squared = 0.6412909673633584
```

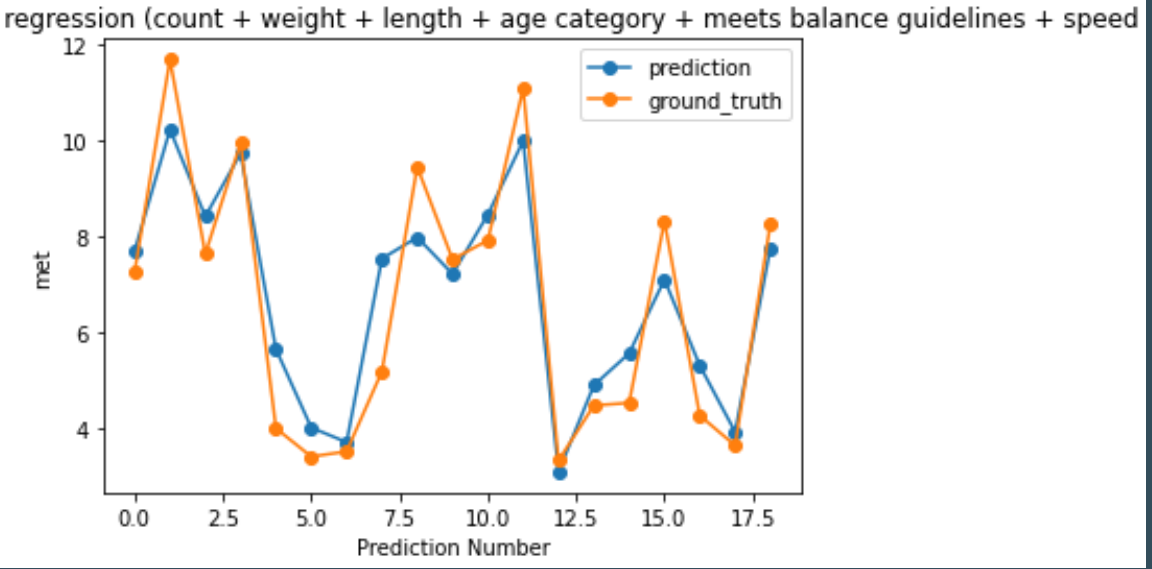



```
mean squared error = 0.6343506298414107
r squared = 0.16438004180188526
```

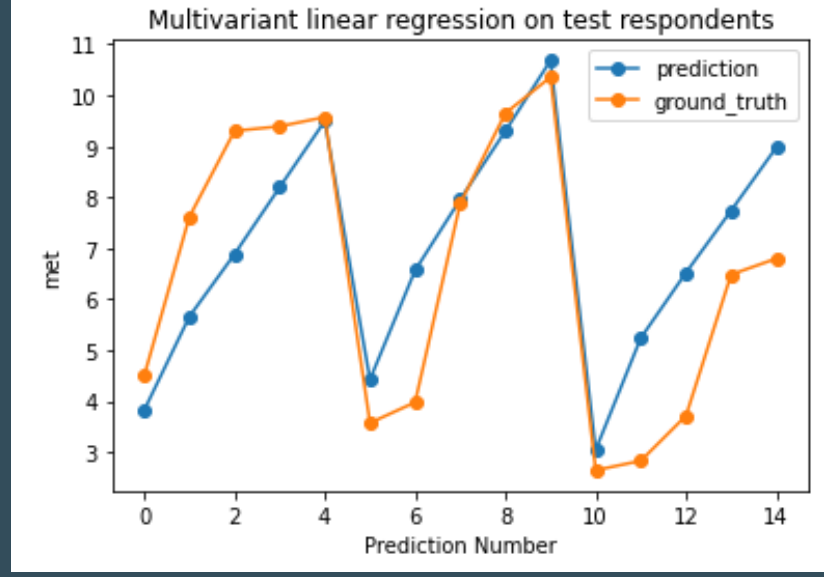


Predicting MET running – Multivariate Linear Regression

```
mean squared error = 1.0346172651452363
r squared = 0.7297953859532382
```




```
mean squared error = 2.624703985402816
r squared = 0.6374654696855826
```



What are our goals for the new sprint?

- Begin to write the paper
- Validate correctness of our models with teachers and CBS


QUESTIONS?