

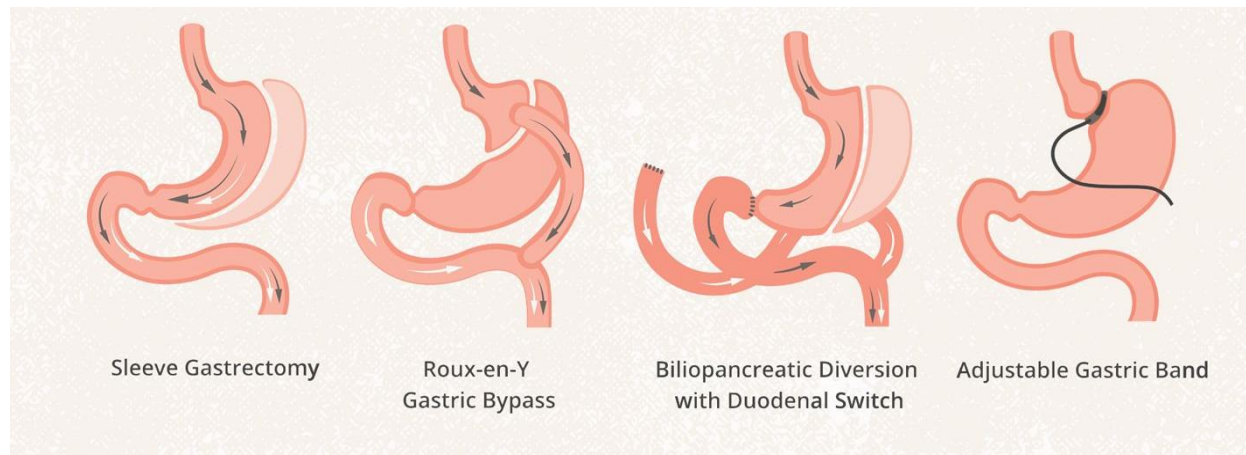


# AI Risk Prediction for Bariatric Surgery

Group Bariatric Surgery G1



# What is bariatric surgery?





# The problem with bariatric surgeries

# The problem with bariatric surgeries

South Africa: 23% overweight; 27% obese



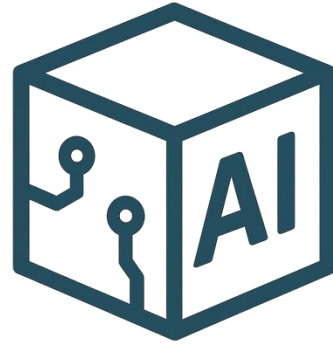
# The problem with bariatric surgeries

Not all patients benefit equally from the procedure

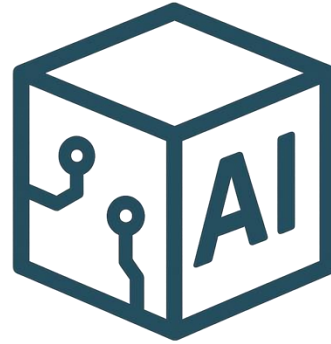
Some are more likely to receive future complications



# The solution



# The solution



Which patients face a high risk of post-operative complications



Which patients are most likely to benefit



# Team members:

---



Robin



Wout



Tobias



AI Model

AI Model

Interface



# Why?

## **Avoids unnecessary surgeries for high-risk patients**

Saves operating room time

Saves staff effort

Lowers Equipment use

## **Reduces post-op complications**

Fewer ICU stays

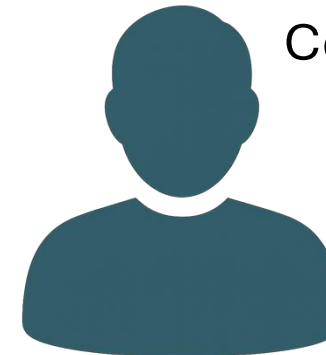
Fewer reoperations

Fewer extended hospitalizations

Lowers costs for **patients** while improving **hospital** efficiency



# The current solution



Comorbidities

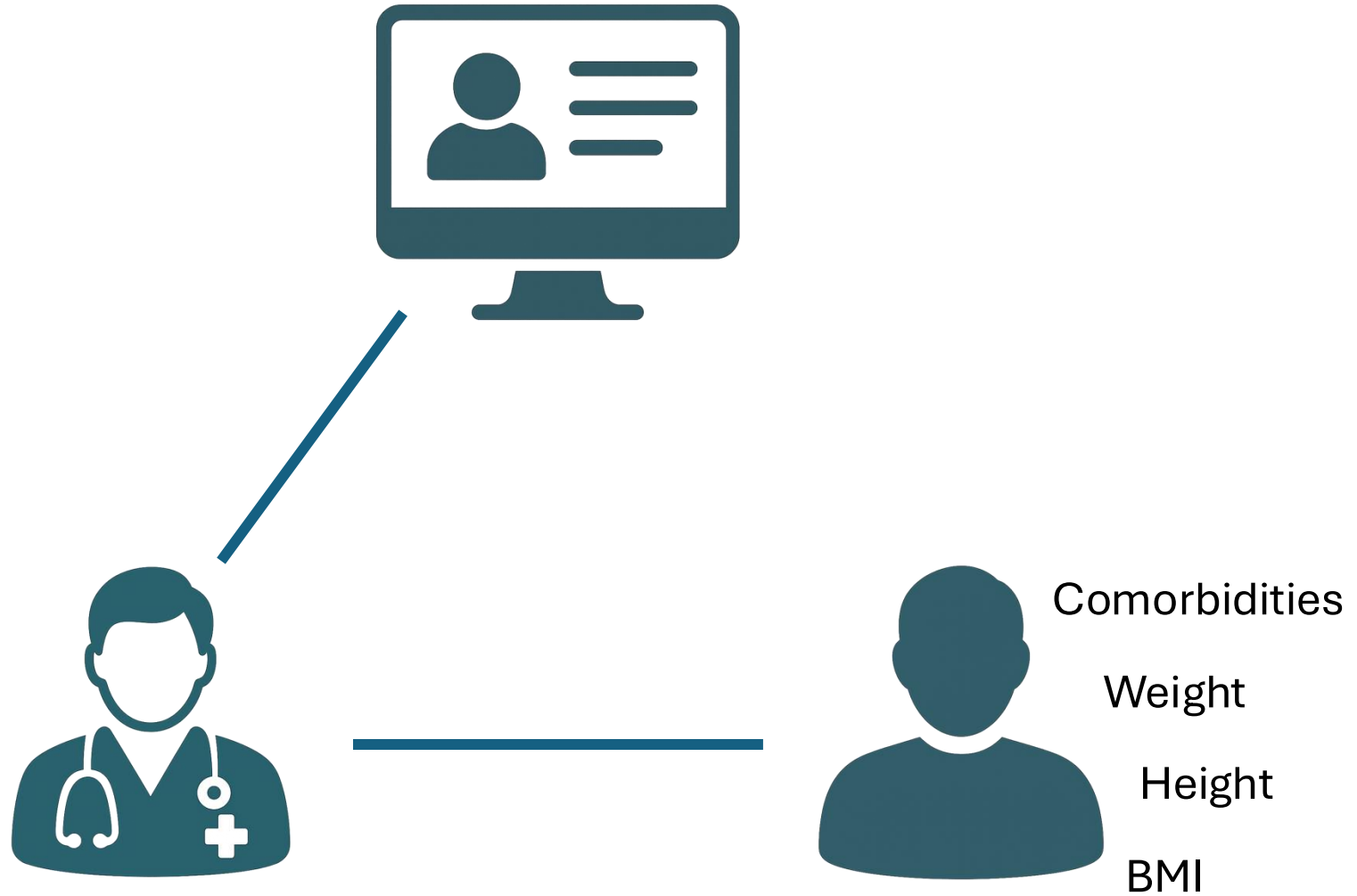
Weight

Height

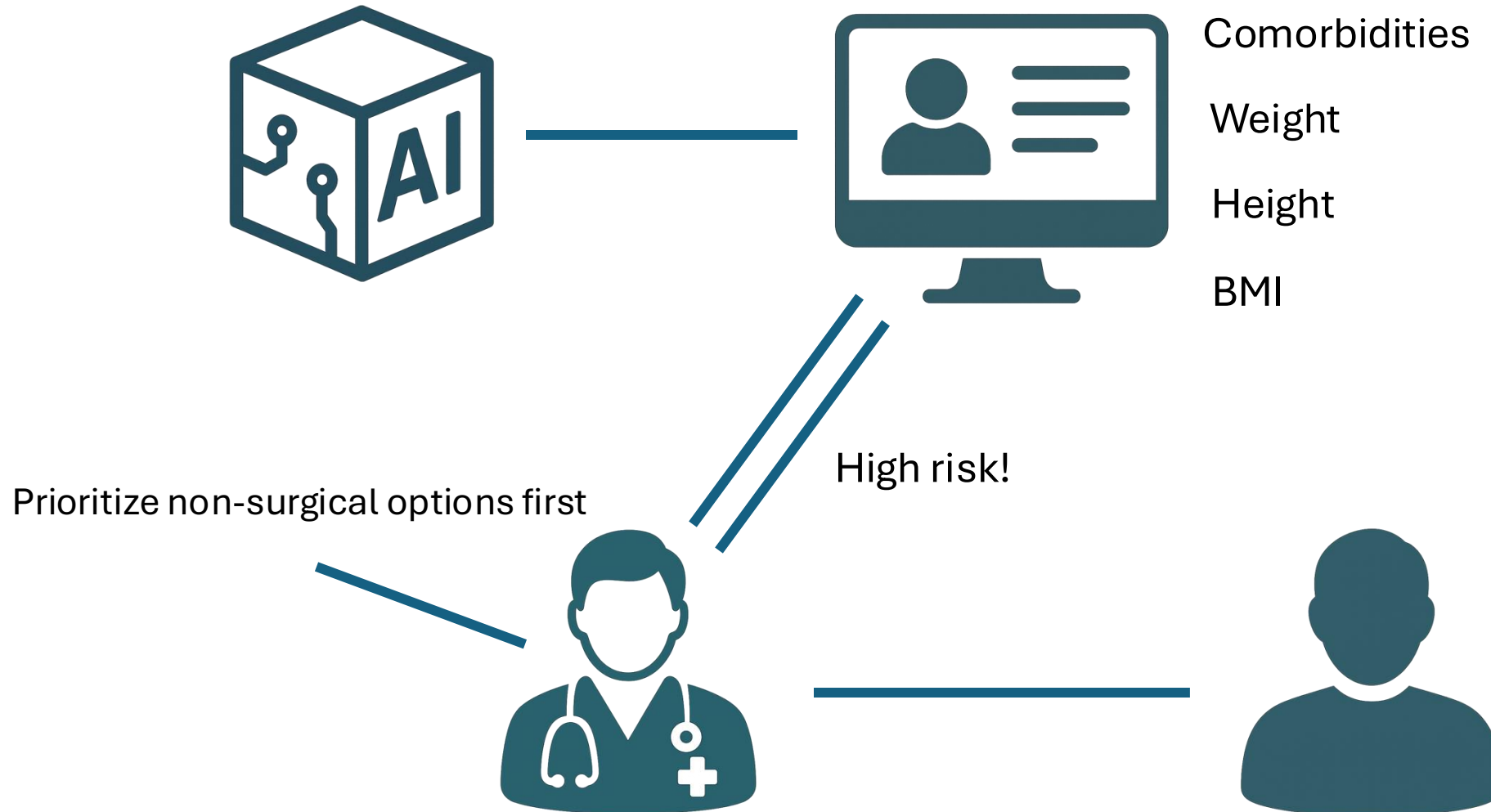
BMI

This patient should undergo surgery!

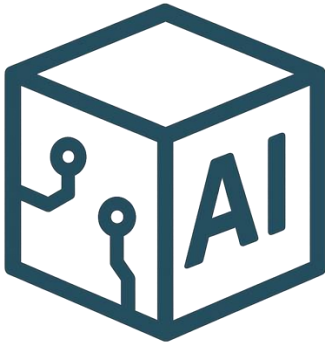
# The solution



# The solution



# What we have done

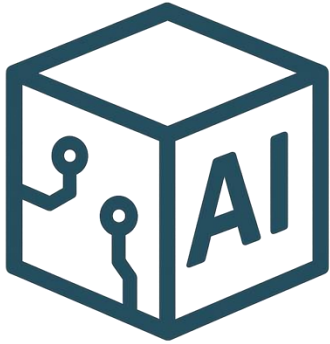


AI-model



Interface

# What we have done



AI-model

Logistic Regression

Simple classifier

```
Optimal threshold (0.702):  
Sensitivity = 85.7%, Specificity = 91.9%, F1 = 0.667  
Confusion Matrix (optimal threshold):  
[[57  5]  
 [ 1  6]]
```

XgBoost

Advanced classifier

Confusion Matrix:

```
[[247  63]  
 [  2  32]]
```

Classification Report:

	precision	recall	f1-score	support
0	0.99	0.80	0.88	310
1	0.34	0.94	0.50	34
accuracy			0.81	344
macro avg	0.66	0.87	0.69	344
weighted avg	0.93	0.81	0.85	344

Confusion Matrix (hold-out):

```
[[20 12]  
 [ 0  3]]
```

Precision: 0.200  
Recall: 1.000  
F1 Score: 0.333  
ROC-AUC: 0.927

Classification Report (hold-out):

	precision	recall	f1-score	support
0	1.00	0.62	0.77	32
1	0.20	1.00	0.33	3
accuracy			0.66	35
macro avg	0.60	0.81	0.55	35
weighted avg	0.93	0.66	0.73	35

# What we have done



Interface

# What we have done



Interface



# What we have done

**Add New Patient**

What is the patient's full name?

How old is the patient?

Patient's height (cm)?

Patient's weight (kg)?

Previous number of family surgeries?

Number of chronic medications?

Procedure category

Antibiotic given

Cholecystectomy repair?

Hiatus hernia repair?

What is the patient's gender?



Interface

# What we have done



## Patient Details

**Name:** Bias Zuckerberg

**Age:** 21

**Gender:** male

**Height:** 180 cm

**Weight:** 199 kg

**Bmi:** 61.42

**Family Surgery Count:** 1

**Chronic Meds Count:** 2

**Procedure Category:** Sleeve

**Antibiotics:** Clindamycin

**Cholecystectomy Repair:** no

**Hiatus Hernia Repair:** no

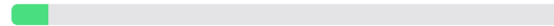
**Comorbidities**

**OSTARTH:** 2

**Patient Notes:** • No known allergies • Tonsillectomy at age 10 • Mild seasonal asthma (controlled) • No history of diabetes or hypertension

**BMI Class:** Obesity Class III

**AI Risk Prediction For Bariatric Surgery:** 6.66%



Mild Risk – Likely a good candidate for surgery.

[Back to Dashboard](#)

[Edit File](#)

[Delete Patient](#)

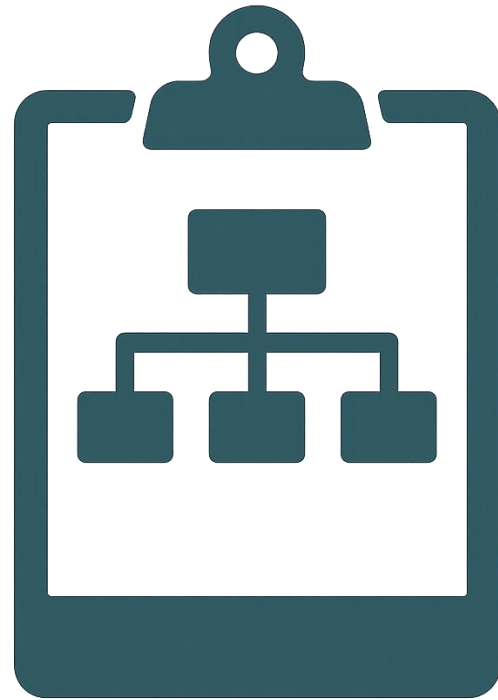


Interface



Demo

# Project Management



# Project Management

1<sup>st</sup> client meeting

Dr. Breytenbach

General introduction to project

Access to historical surgery dataset

Overview of expectations

Try tradition methods first and compare

Web-based interface to predict patient's risk

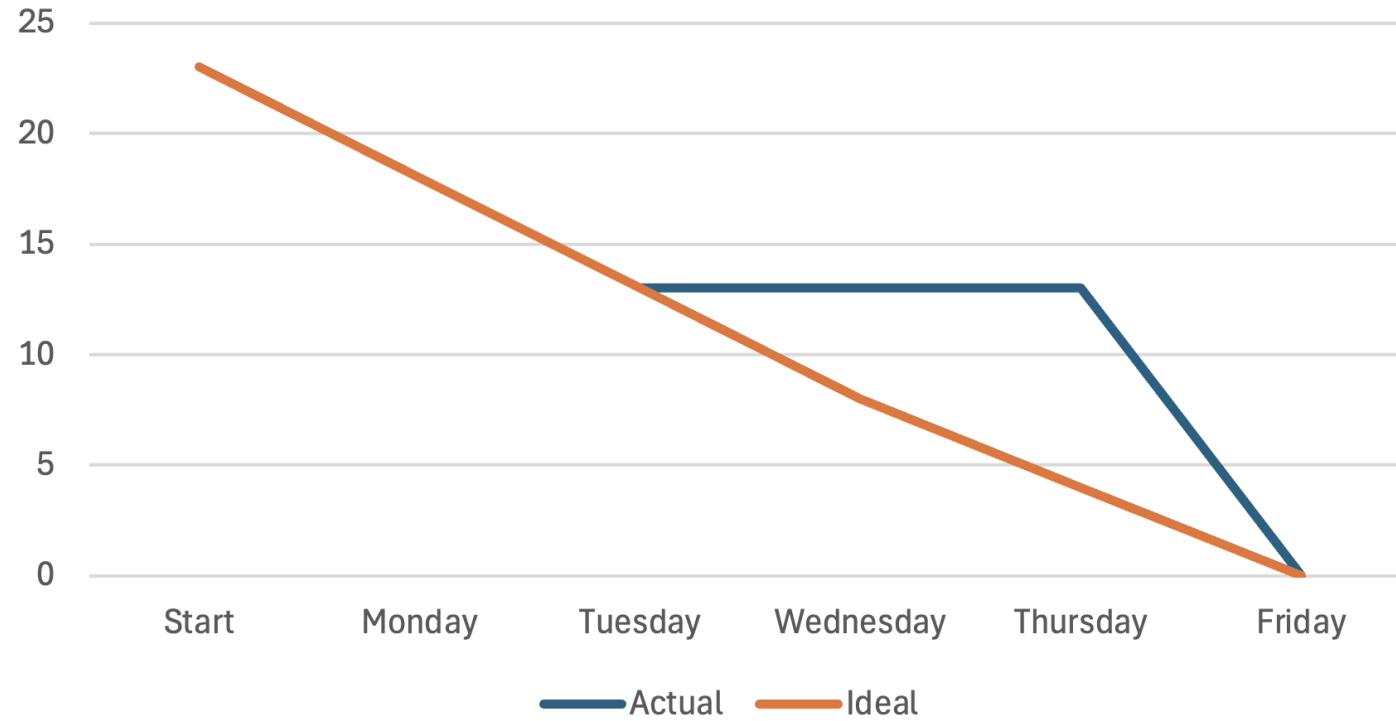


**EXPECTATIONS**



# Project Management

Burndown Chart Sprint 1



# Project Management



**DATASET**

2<sup>nd</sup> client meeting

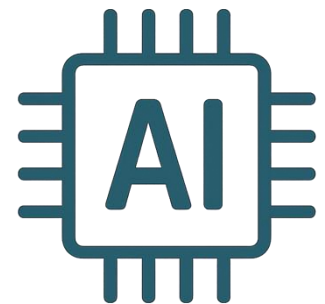
Review of dataset

Removal of unnecessary data

Explanations of data types

Selection of most important features

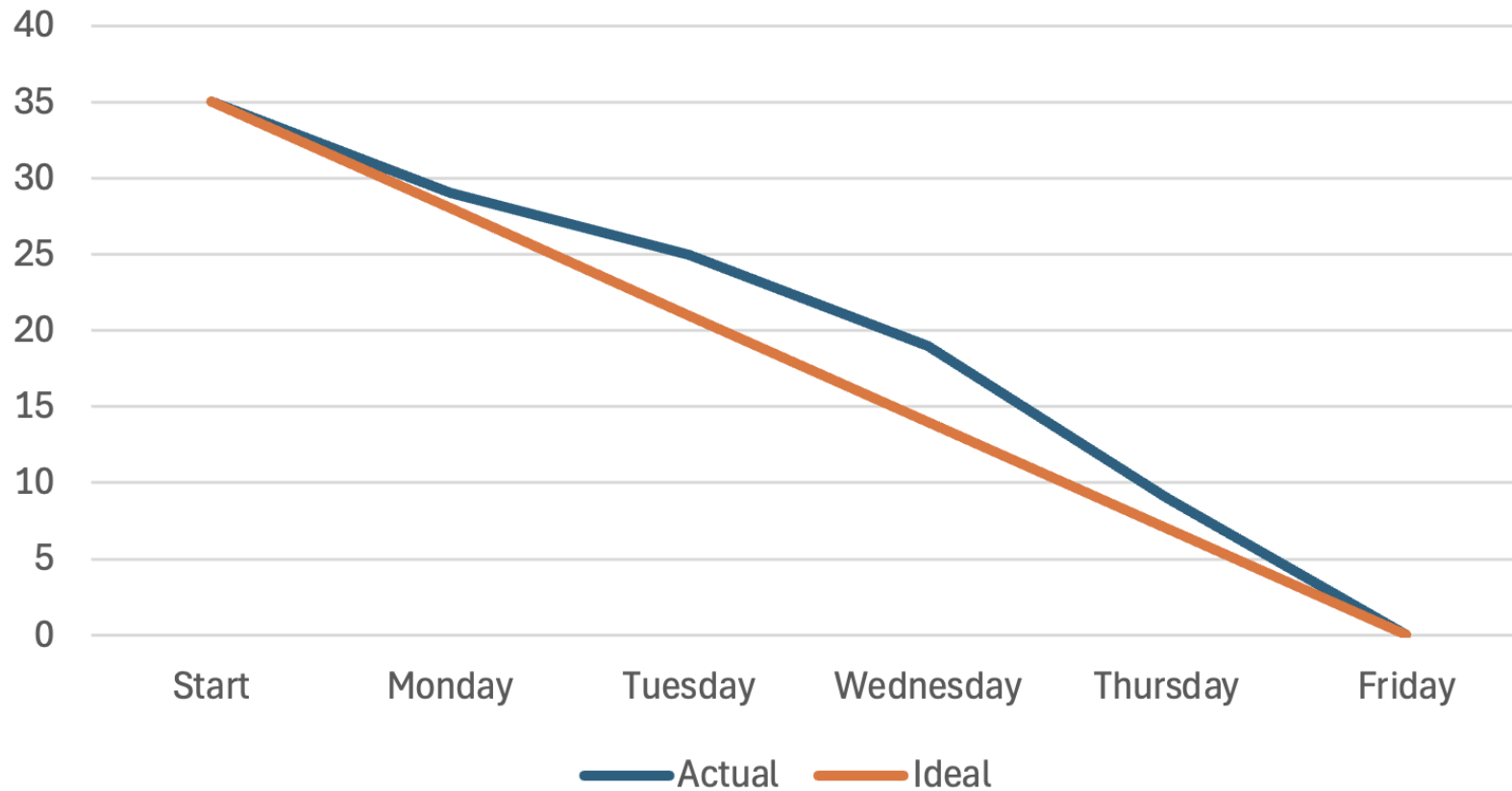
Ready for model building



**AI MODEL**

# Project Management

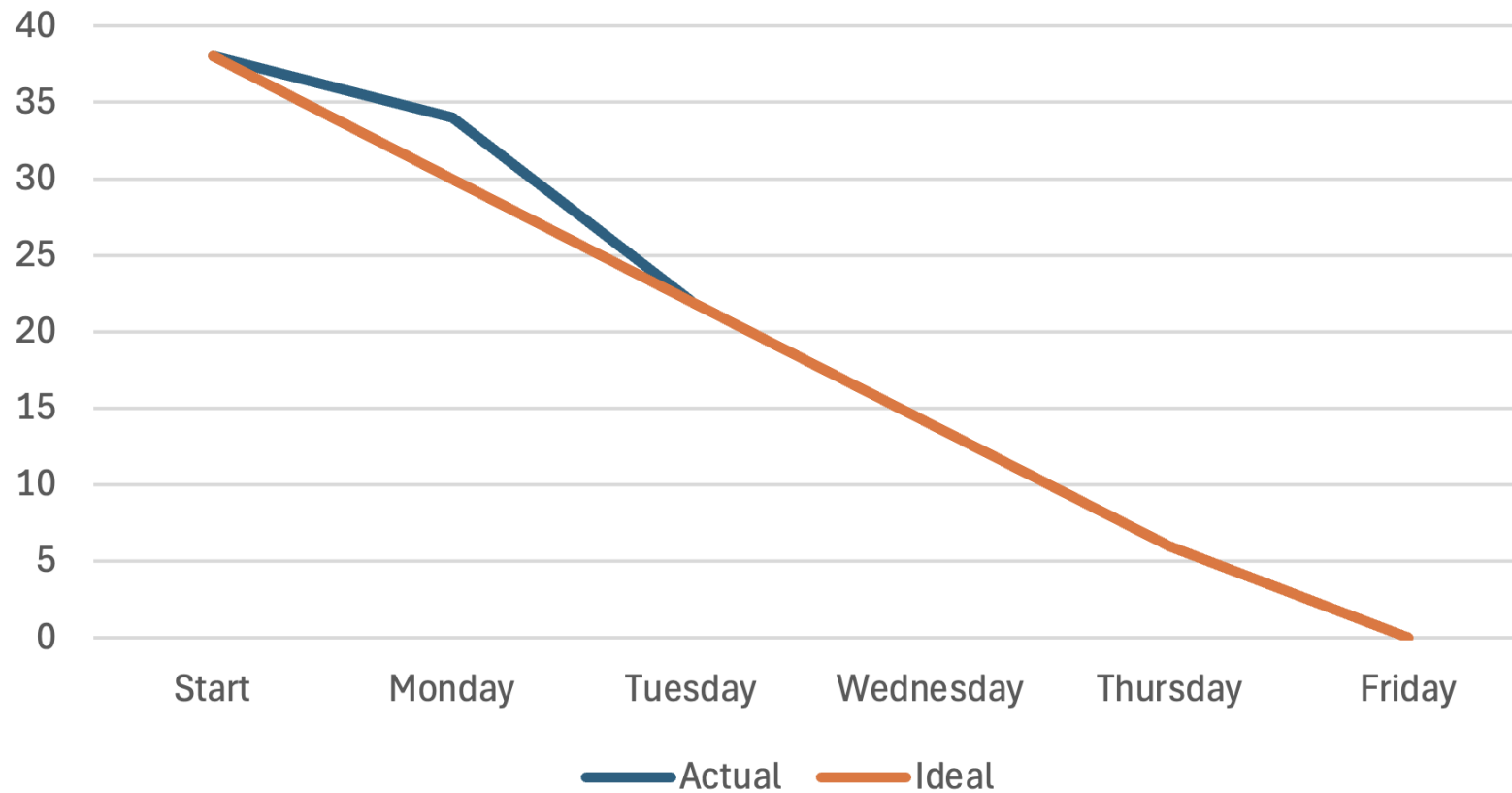
Burndown Chart Sprint 2





# Project Management

Burndown Chart Spint 3



# Time Management



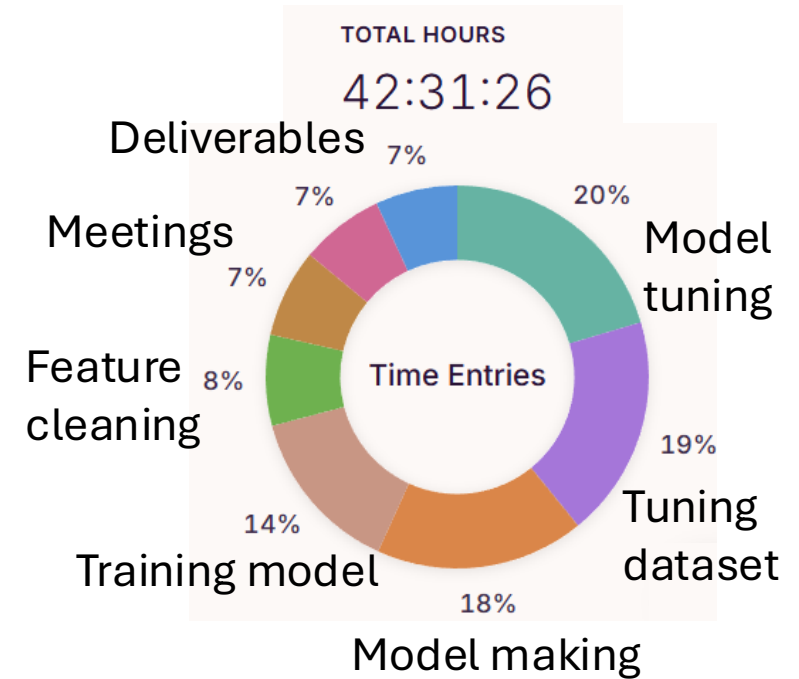
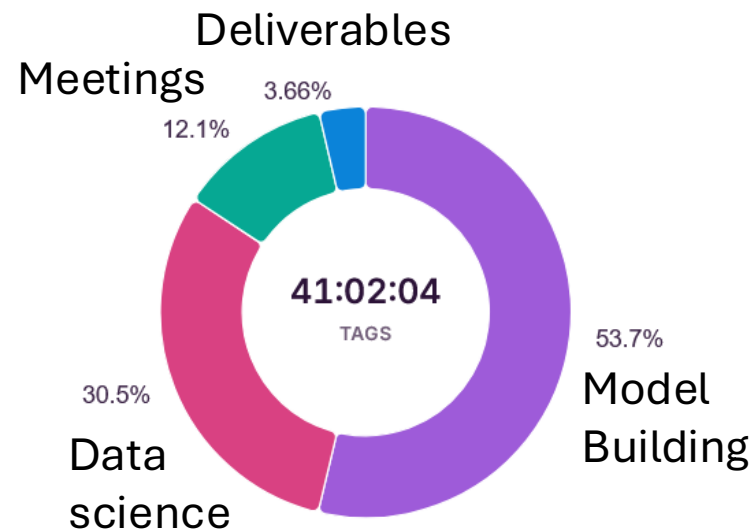
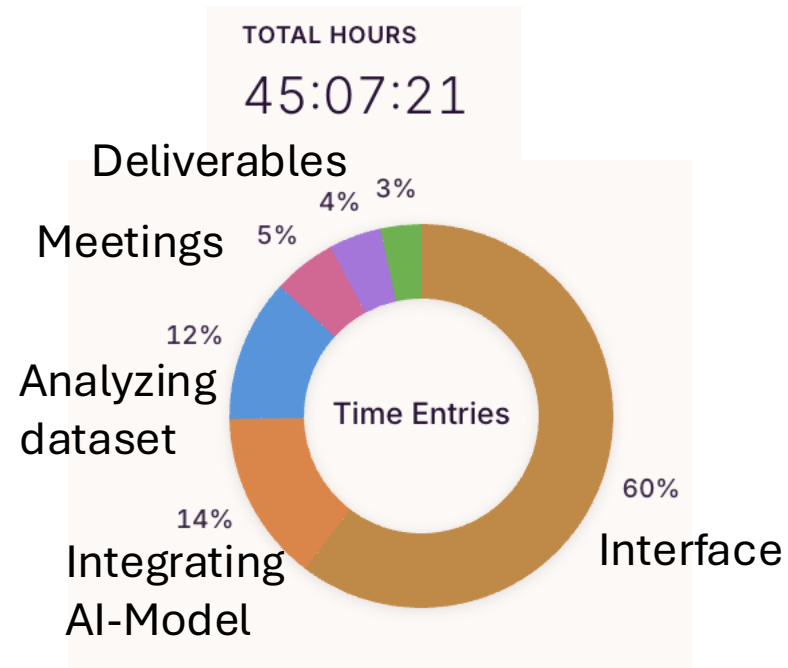
Tobias



Robin



Wout





# Retrospective

# Retrospective

## **Team**

Trello could've been more organized sooner

Distribute tasks for every team member earlier

## **Project**

Too little data

Unbalanced data

Miscorrelations between features

# Looking Forward

Split data into minor/major complication classification



MINOR MAJOR

Try to cluster patients together and review if certain clusters/characteristics have higher risks



**Sprint Backlog**

- external-dev work** **Sprint3**  
Meeting with Client interim status update  
👁️ **P 2** **TP** **RM** **WC**
- Frontend** **Backend** **Sprint3**  
Add support for new models/cluster techniques in the interface  
👁️ **P 5** **TP**
- Sprint3** **Data Processing**  
Creating dataset for minor/major complication models  
**P 3** **RM** **WC**
- Sprint3** **AI**  
Building minor/major complication model  
**P 5** **RM** **WC**
- Sprint3** **AI**  
Try first iteration of clustering patient model  
**P 5** **RM** **WC**

+ Add a card



Thank you for listening!