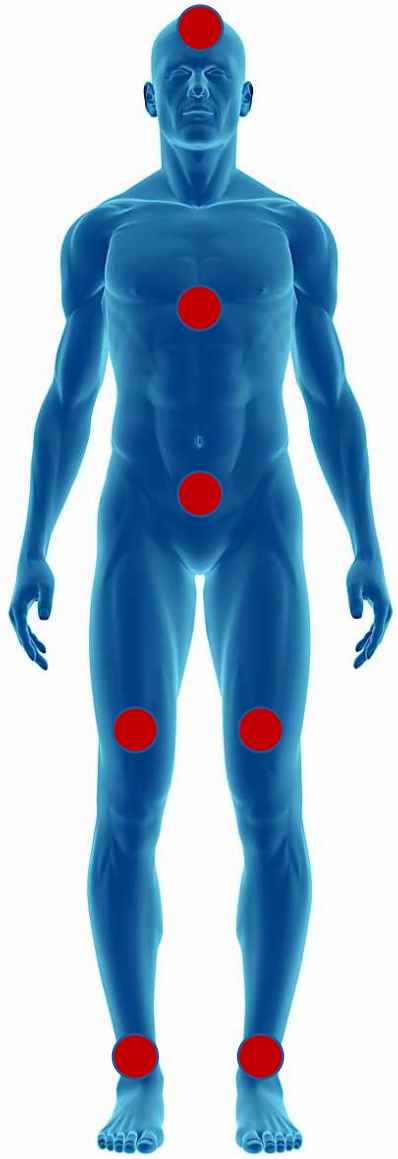
Fall Detection using wearable sensor data



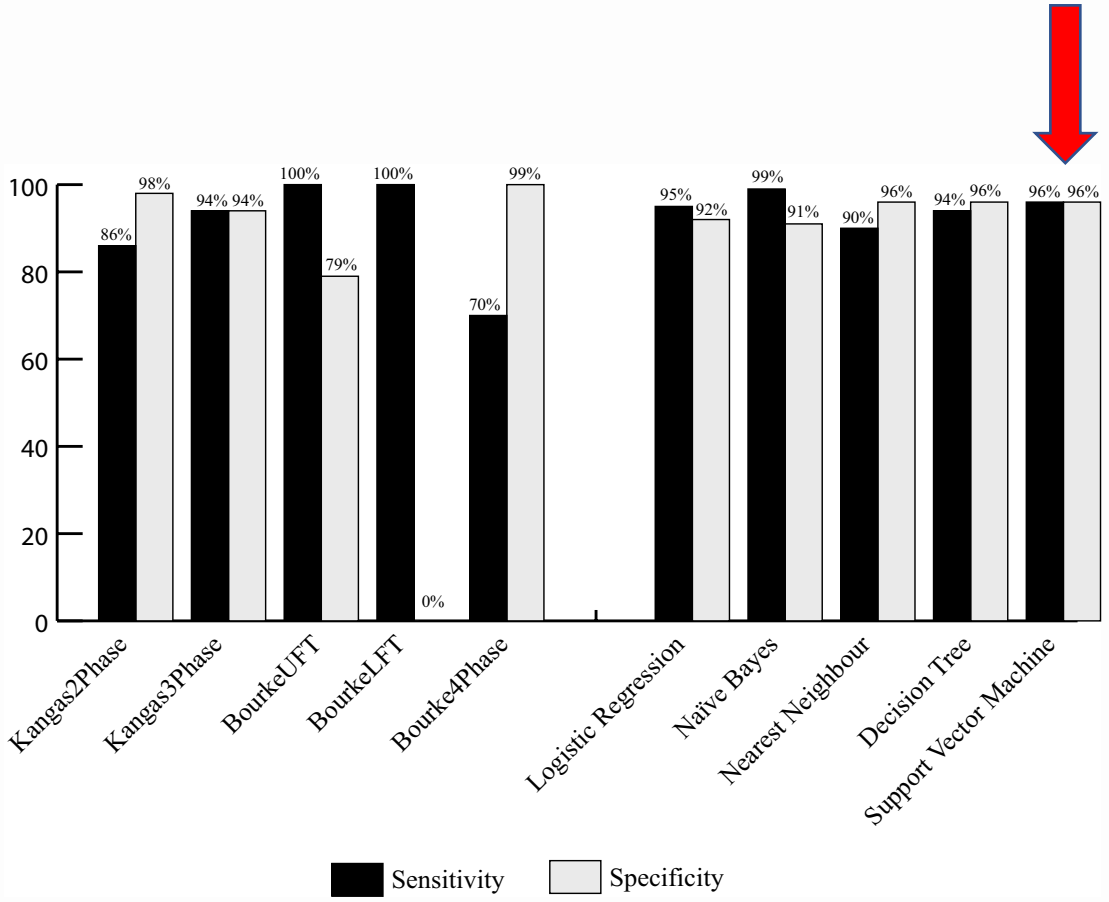
Motivation

- Falls are the second leading cause of accidental or unintentional injury deaths worldwide (behind only of road traffic injuries)
- Almost 50% of older adults who fall experience a minor injury
- 25% will experience a more serious injury such as a fracture
- Less then 50% who fell tell their doctor they have had a fall
- Each year, 2.8 million are treated in emergency departments for fall injuries

Research

- A comparison of accuracy of fall detection algorithms (**threshold-based vs. machine learning**) using waist-mounted tri-axial accelerometer signals from a comprehensive set of falls and non-fall trials (SFU, 2015)
- Waist sensor
- Tri-axial (X, Y and Z) Acceleration data
- Collected data, but not used:
  - Six other sensors (head, sternum, left and right tights, left and right ankles)
  - Tri-axial measurements: Gyro and Magnetic Fields

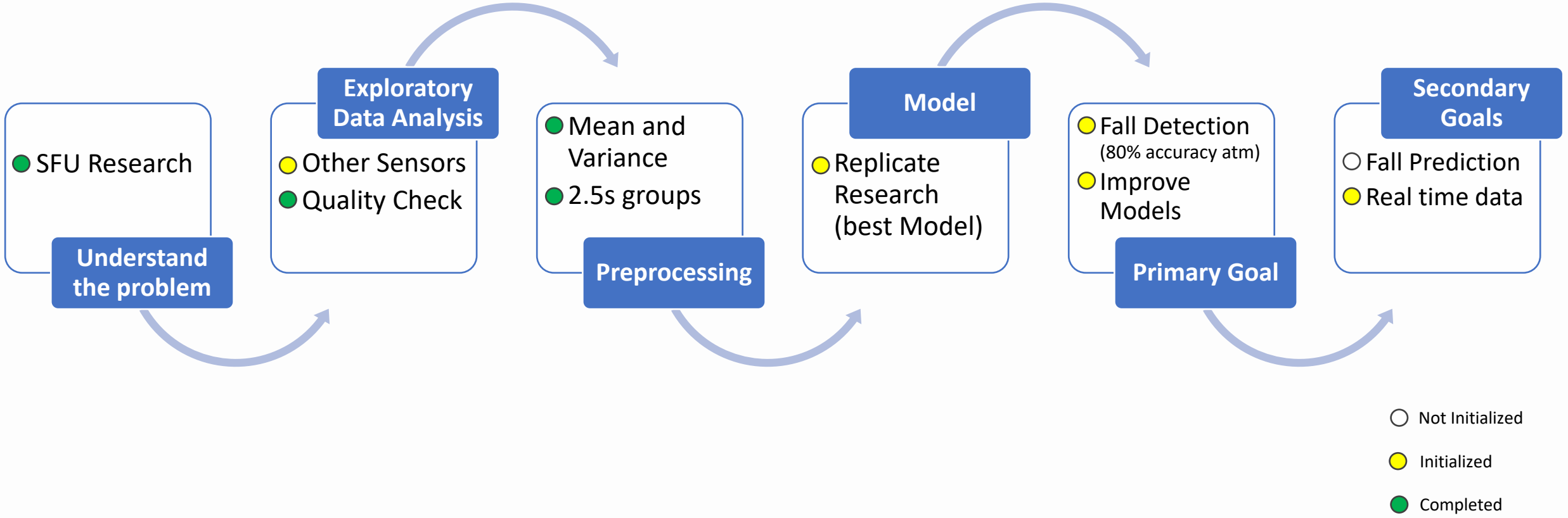
Research



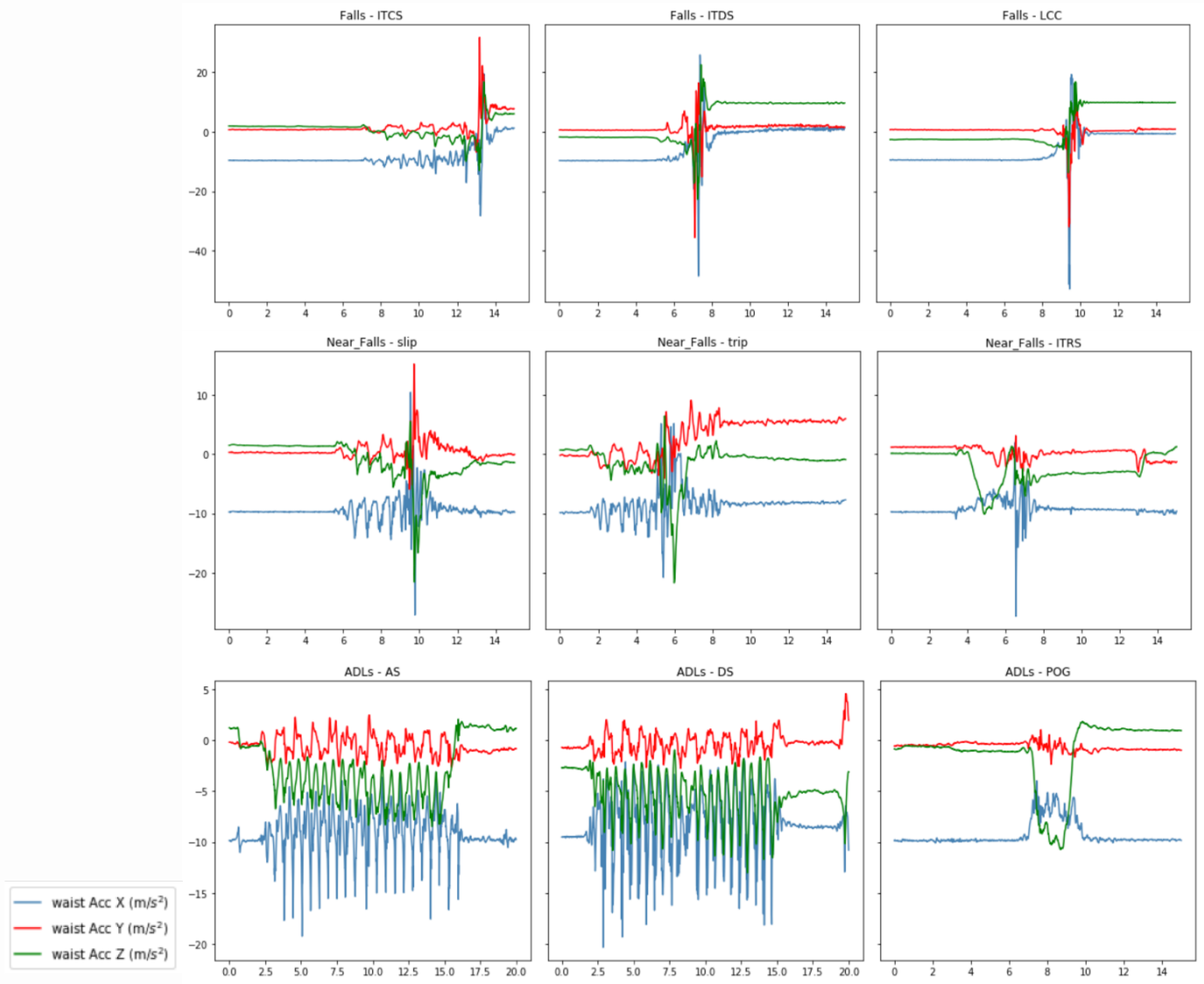
$$\text{Sensitivity (Recall)} = \frac{True\ Positive}{True\ Positive + False\ Positive}$$

$$\text{Specificity} = \frac{True\ Negative}{True\ Negative + False\ Positive}$$

Project Plan



Exploratory Data Analysis

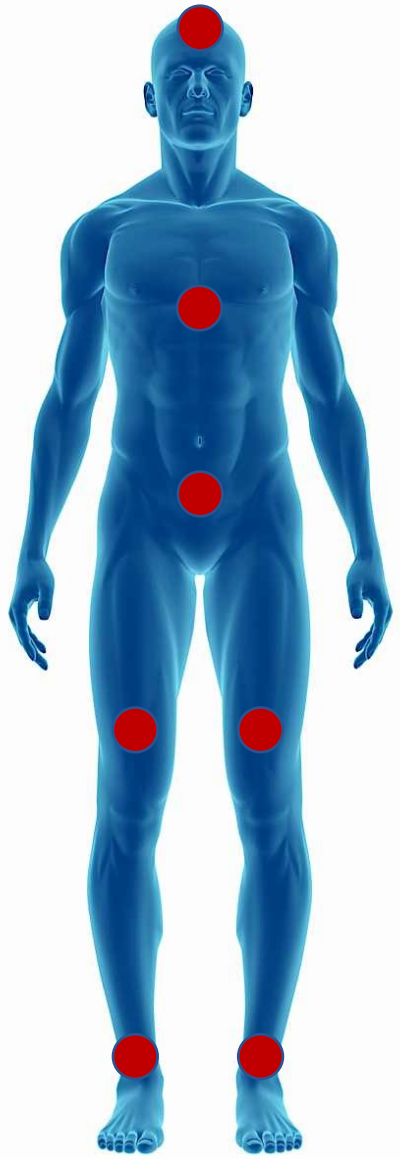


Falls

Near Falls

Activities of Daily Life

Fall Detection using wearable sensor data



Thank You!

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