



# Ambulatory Assessment Alcohol Drinking and Craving Prediction

Presented by Andrew Woods

# Outline

- Personal Experiences
- Project Overview
- Implementations
  - Python
  - MatLab
  - Machine Learning
- Results
  - Prediction of Drinking
  - Prediction of Craving
- Future Work
- Conclusion

# Personal Experiences

- Presentation Difficulties
- Application of Machine Learning
- Experience of Research
- Switch of Direction

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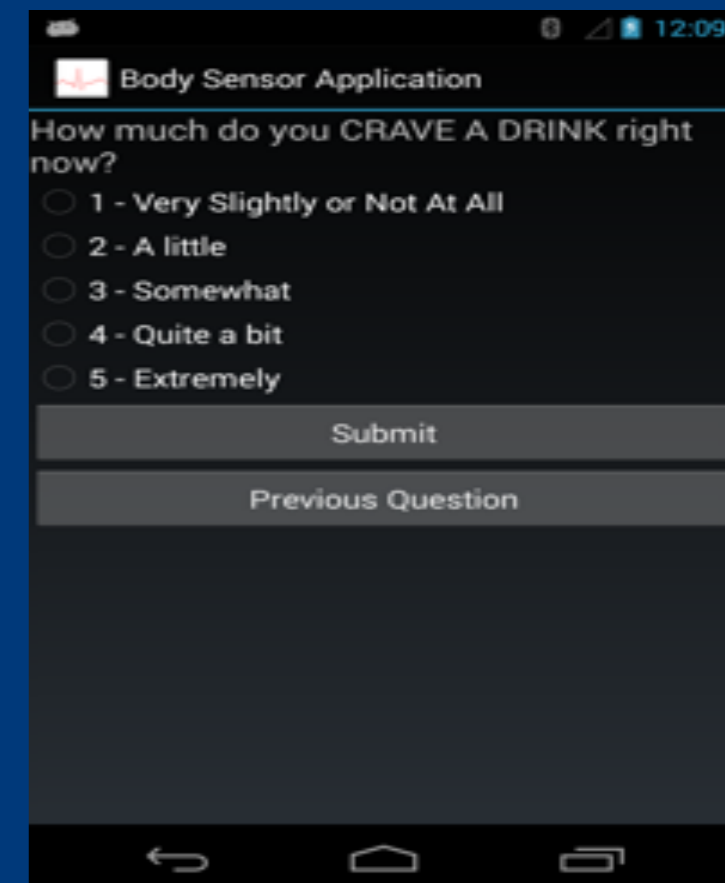
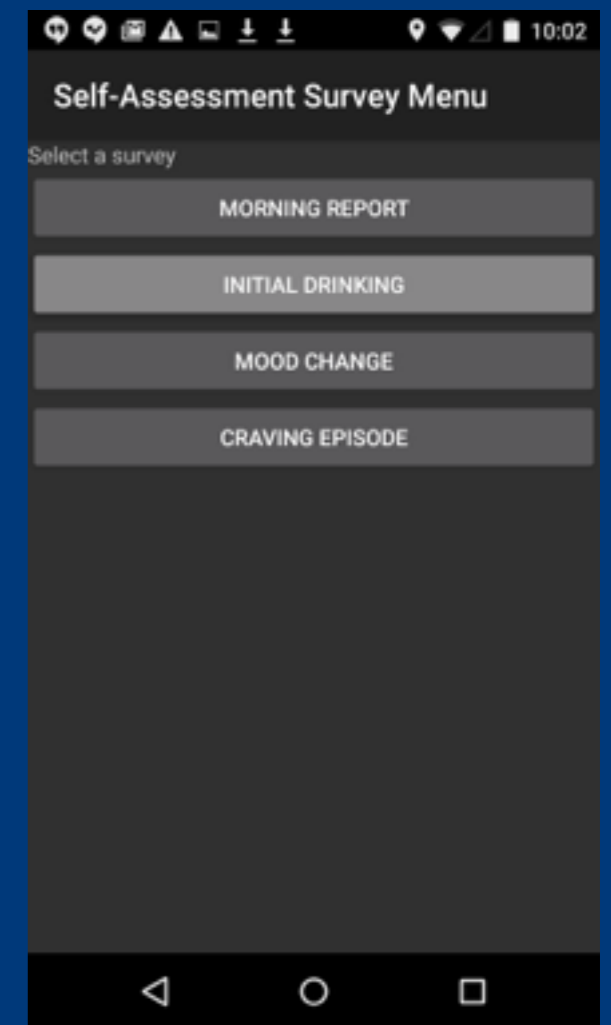
# Problem

- Manual Data Collection
- Want to Understand Alcohol Effects Better
- Laboratory Assessment



# Solution

- Ambulatory Assessment
- Automatic Pipeline for Detections
- Administer Survey from Detections
- Initial Drinking Survey



# Psychology

## Department (PD)

- Collaboration with Computer Science Department
- Understand Motives Behind Drinking
  - Craving
  - Alcohol Usage
- Automatic Survey Administration
  - Based on Drinking Prediction
  - When? Why?
    - My Goal is to Predict when
    - PD's Goal is to Understand Why

# Previous Work

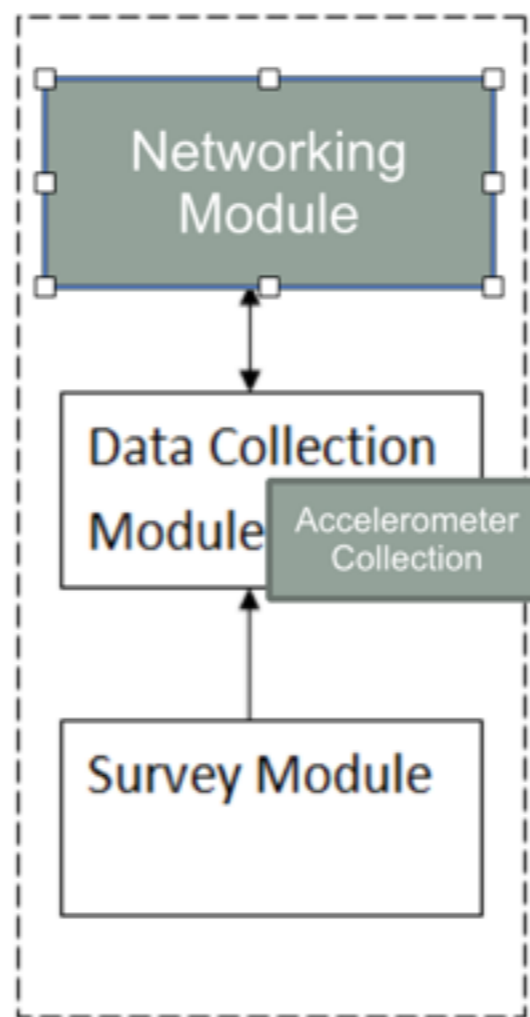
External Sensors



Equivital EQ02 Life monitor



Smart Phone



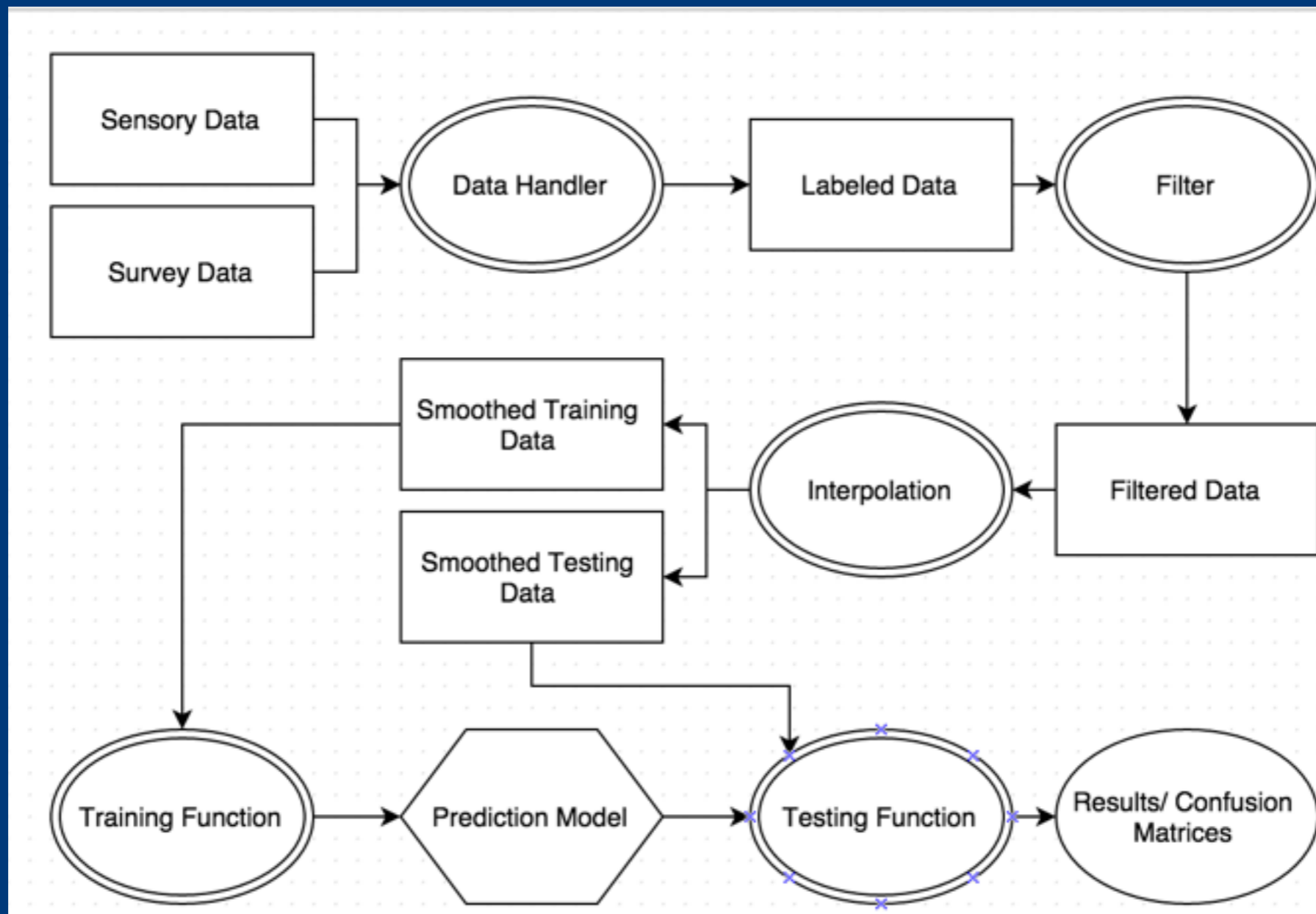
Internet



Server Program



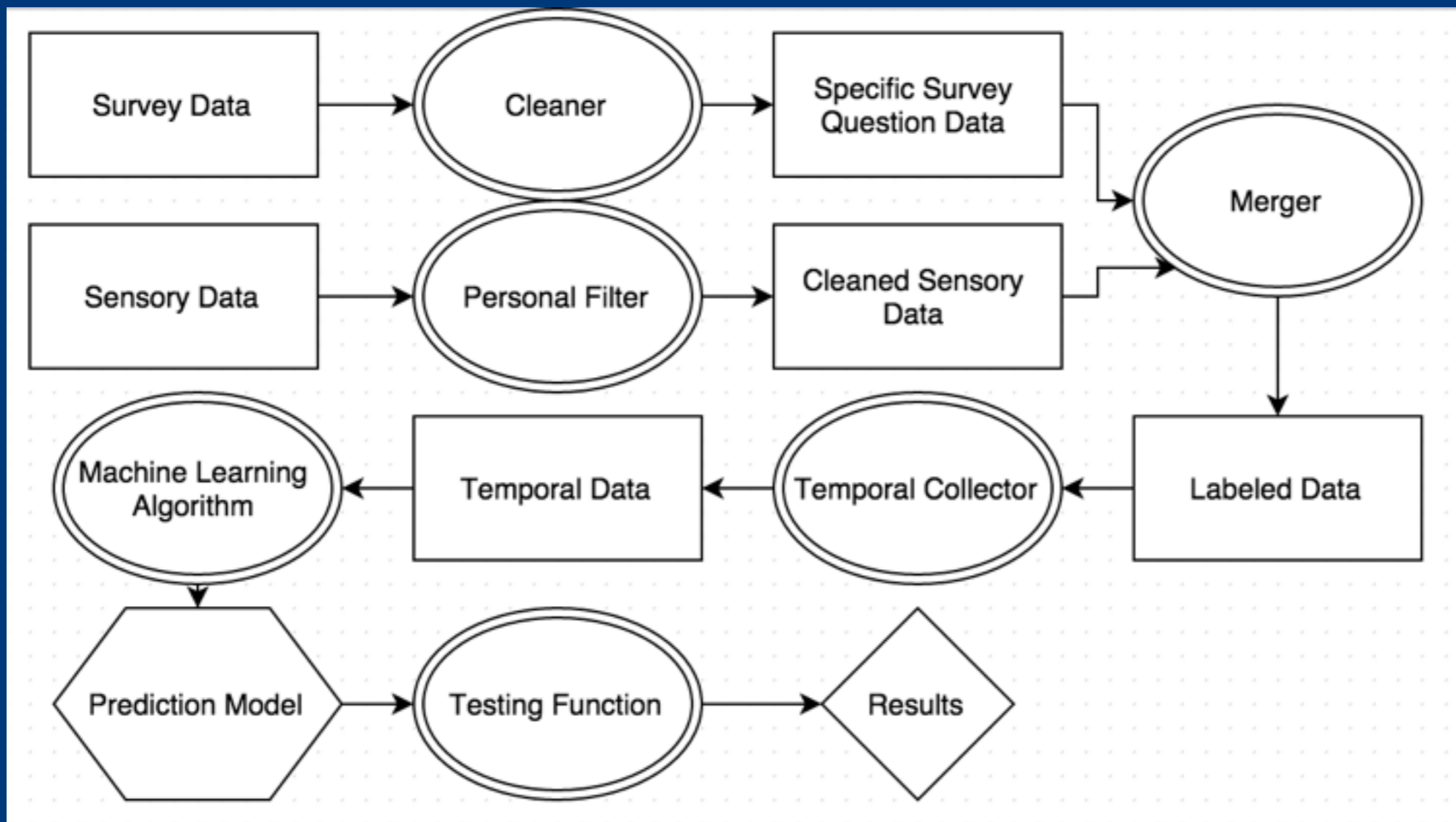
# My Contribution



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# Python Programs



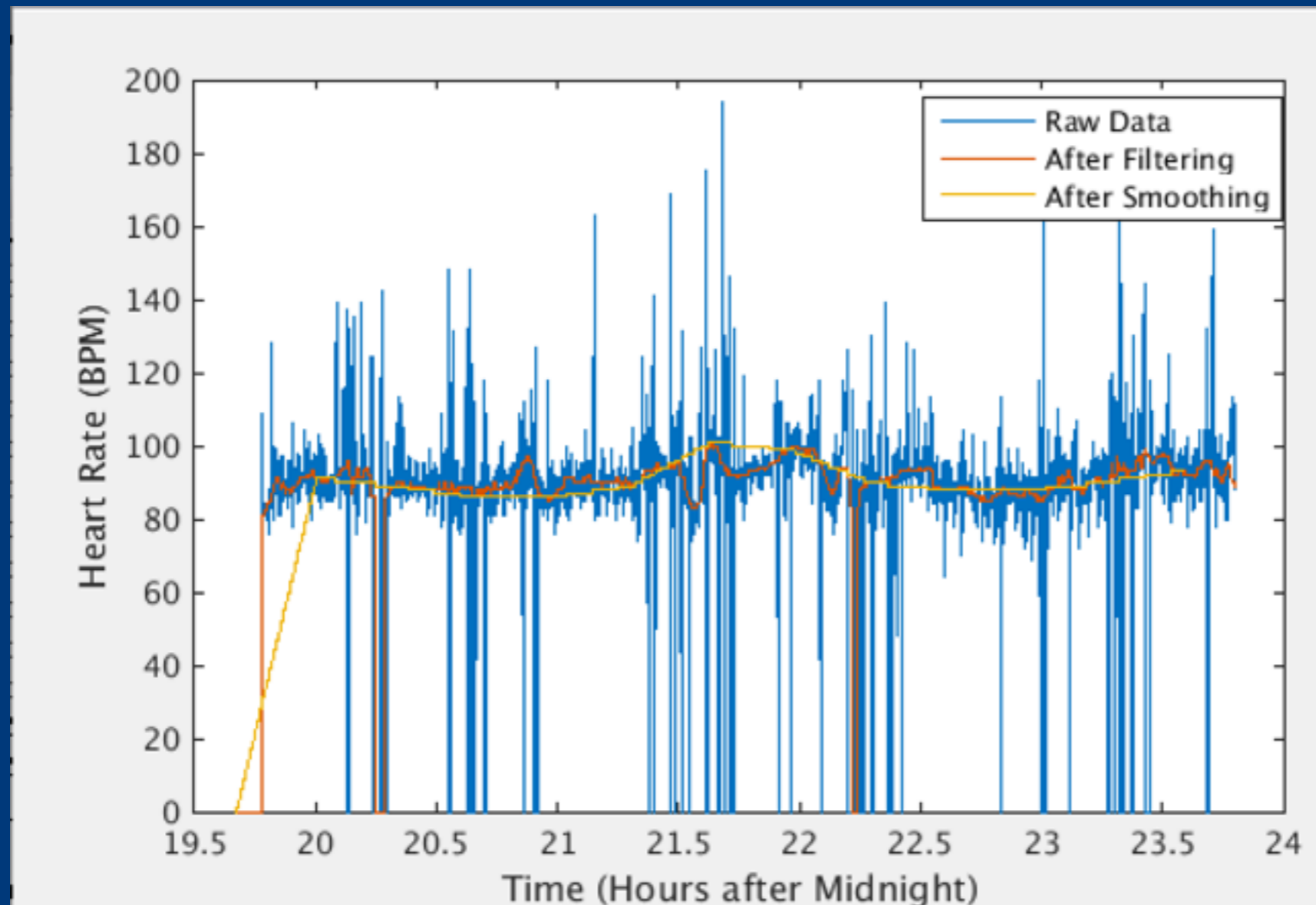
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# New (Automatic) Pipeline

- Did not want to waste Python Programs
- MatLab
  - Better Filters
  - Better Smoothing
- Predict Drinking as well as craving
- Labeling

# Filtering and Smoothing



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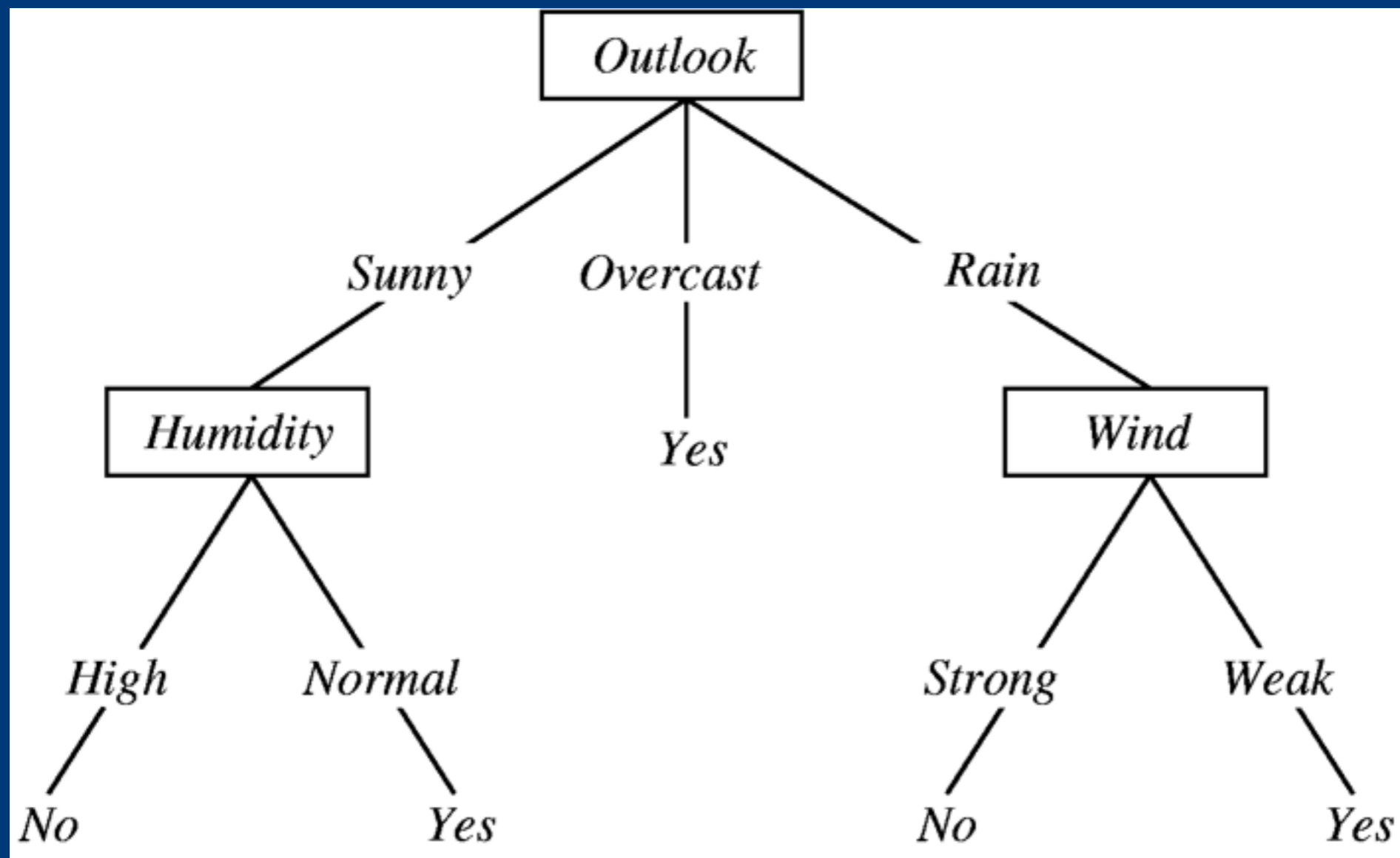
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# Machine Learning

- MatLab Built in Function
- Decision Trees
- K-NN
- Develop Model using Smoothed Data
- How to Prevent Bias Models



# Decision Tree



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# Drinking Prediction

Patient 1008 Training Result	Positive Prediction	Negative Prediction
Actual Positive	360	0
Actual Negative	0	8101

Patient 1008 Testing Result	Positive Prediction	Negative Prediction
Actual Positive	350	10
Actual Negative	10	12556

Patient 1008 Training Result	Positive Prediction	Negative Prediction
Actual Positive	0	360
Actual Negative	0	53932

Patient 1008 Testing Result	Positive Prediction	Negative Prediction
Actual Positive	0	360
Actual Negative	0	115744

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# Craving Prediction

- Beginning of Summer
- Different Pipeline (Mentioned Earlier)

	Predict Positive	Predict Negative	Total
Actual Positive	966	65	1031
Actual Negative	641	5257	5898
Total	1607	5322	6929

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# Future Work

- Craving Prediction Development
- Test Pipeline on Field
- Improve the Speed of the Pipeline
- Test on more patients and check results

# Possible Future Work

- This system can be used for mood prediction
  - Understanding Depression
  - Anger
- Dangerous Impulses based on Mood



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# Conclusion

- Pipeline Automatically Develops Prediction Model
- Tests Prediction Model
- The Results are very good

# References/ Acknowledgements

- Tom M. Mitchell. Machine Learning. [1] McGraw Hill. 1997. Chapter 3. (Decision Tree)
  - <http://jmvidal.cse.sc.edu/talks/decisiontrees/allslides.html>
- Ruiqi Presentation for Pictures of Device and Lab
- Thanks for the Help Nick!

# Questions