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
My Contribution
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Python Programs

Diagram:

- Survey Data → Cleaner → Specific Survey Question Data → Merger
- Sensory Data → Personal Filter → Cleaned Sensory Data → Merger
- Machine Learning Algorithm → Temporal Data → Temporal Collector → Labeled Data
- Prediction Model → Testing Function → Results
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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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Machine Learning

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

Decision Tree:

**Outlook**
- Sunny
  - Humidity
    - High
      - No
    - Normal
      - Yes
- Overcast
- Rain
  - Wind
    - Strong
      - No
    - Weak
      - Yes
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## Drinking Prediction

<table>
<thead>
<tr>
<th>Patient 1008 Training Result</th>
<th>Positive Prediction</th>
<th>Negative Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Positive</td>
<td>360</td>
<td>0</td>
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<tr>
<td>Actual Negative</td>
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</tr>
</thead>
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<tr>
<td>Actual Positive</td>
<td>350</td>
<td>10</td>
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<td>Actual Negative</td>
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<tbody>
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<td>Actual Negative</td>
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<tbody>
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<td>360</td>
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<tr>
<td>Actual Negative</td>
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<td>115744</td>
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Craving Prediction

- Beginning of Summer
- Different Pipeline (Mentioned Earlier)

<table>
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<tr>
<th></th>
<th>Predict Positive</th>
<th>Predict Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Positive</td>
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<td>65</td>
<td>1031</td>
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<tr>
<td>Actual Negative</td>
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<tr>
<td>Total</td>
<td>1607</td>
<td>5322</td>
<td>6929</td>
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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

  • http://jmvidal.cse.sc.edu/talks/decisiontrees/allslides.html
• Ruiqi Presentation for Pictures of Device and Lab
• Thanks for the Help Nick!
Questions