Continuous sensing of addictive behavior

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Cognitive Detection

Habituation

Detection

Intervention

Habituation

Routine

Cue

Reward

Intervention
iShadow: The Computational Eyeglass
Real-time eye measures on a wearable eyeglass

Power consumption: < 30mW
Pupil tracking accuracy: 0.6 deg
Pupil Dilation accuracy: 0.25mm
Frame rate: Up to 250 Hz
Eye closures for fatigue & dopamine level sensing
Detecting drug use from wearable ECG

ECG Features
Detecting cocaine use from wearable ECG

**Lab Cocaine Detection Model** → **Domain Adaptation** → **Field Cocaine Detection Model**

- **ECG (mv)**
  - Lab data
  - Field data

- **P(cocaine)**
  - 5 minutes windows
  - 24 hours (5 minutes windows)

- Other activity, Cocaine use, Other activity

Positive urine test
Challenges

- **Devices**: How can we get towards 24/7 monitoring of addictive behavior?

- **Data**: Lot of raw data but very limited labels in the wild => difficult to use “big data” methods

- **Markers**: How can we leverage wearables + imaging + genomics to obtain precise biomarkers?

- **Intervention**: Design more subtle intervention mechanisms than in-your-face notifications