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Summary

Discovery Dashboard is a visual analytics system for exploring large volumes of time series data from mobile medical field studies.

- Visual analytic system for time series
- Rich user interaction for exploration
- Data mining motif discovery algorithm

Mobile Sensor Data

Collected from a 4-day mobile sensor clinical study conducted at the University of Minnesota that aimed to uncover what causes relapse in cigarette smokers attempting to quit smoking.

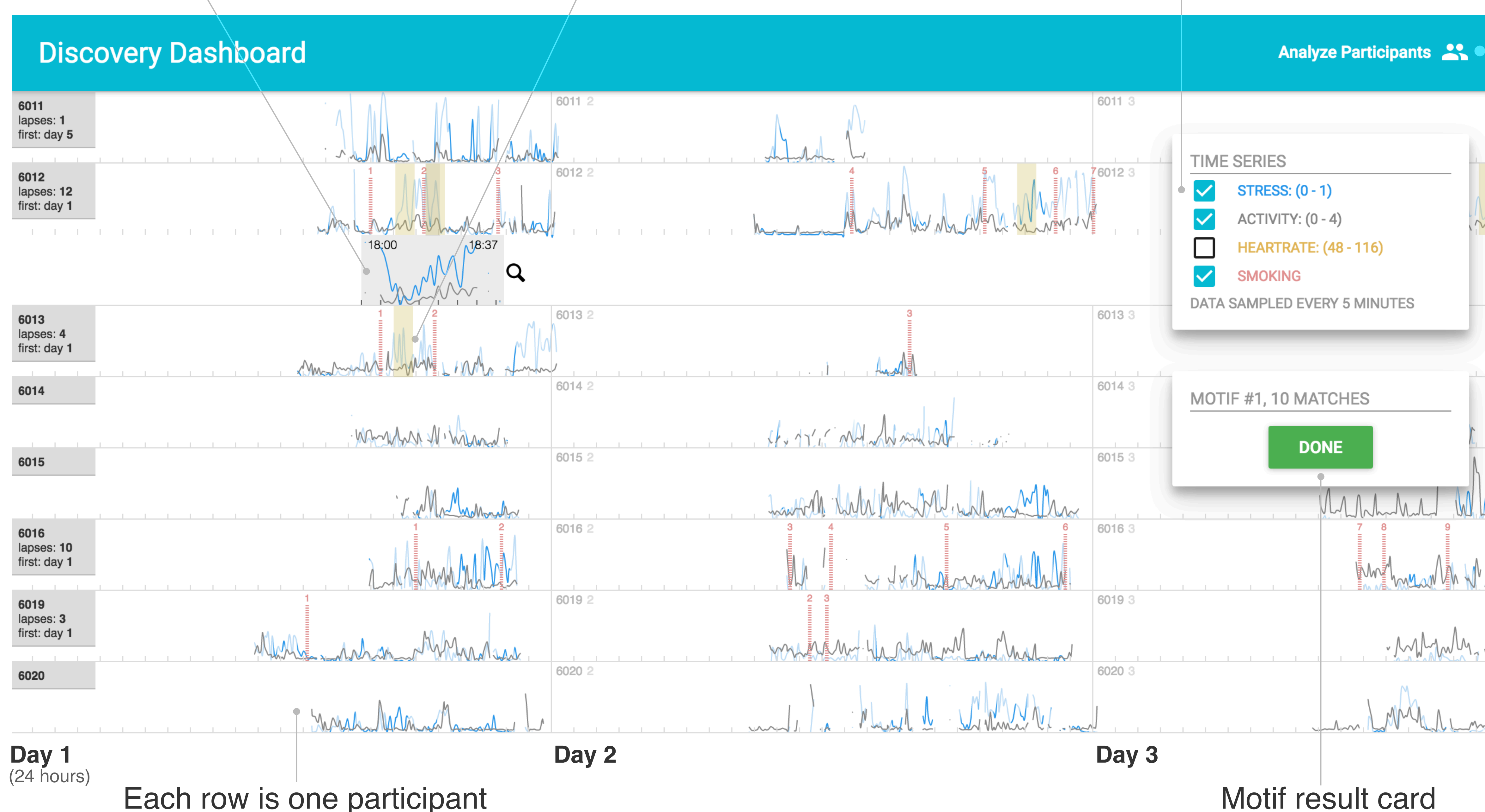
Characteristics

- 52 participants
- 365MB dataset
- 4.7M data points (1Hz)

Time Series

- Inferred stress
- Physical activity
- Heart rate
- Smoking lapses

Motif discovery algorithm (SAX) searches user defined patterns in other participants... and highlights low activity and rising stress motifs near lapses in participants 6012 and 6013.



Analyze Participants to align by lapse, filter by participant, data zoom on hover

Align Participants By

- Beginning of Study
- Time of First Lapse

Filter Participants

Select participants(s)

Total Lapses: 0 to 12

Day of First Lapse: 0 to 15

Find Motifs in Data

ENABLE MOTIF FINDING

User Interface

Show Lens on Mouse Over

Data Visualization

Smooth Data Lines

Normalize

By Each Participant

Tech

Discovery Dashboard is modern web-based tool.

- Data visualization: D3.js
- Data rendering: React.js
- Data storage: SQLite
- Data caching: Redis
- Time series quantization: SAX (Symbolic Aggregate approxXimation)

Ongoing Work

Include *Ecological Momentary Assessment (EMA)* data to establish qualitative context around the measured quantitative patterns.

Deploy Discovery Dashboard to researchers and medical practitioners to evaluate the system's real world usage.