

Large Scale Mood and Stress Self-Assessments on a Smartwatch

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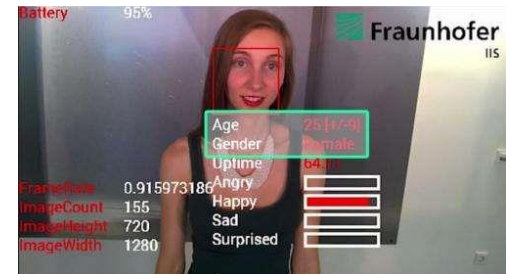
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The Problem

- Mental health problems one of the main causes for diseases
- Especially chronic stress and negative affective states are related to:
 - Cardiovascular diseases
 - Cancer
 - Shortening of lifespan
 - Decreases happiness
- Approach: Utilization of wearable sensing as basis for data-driven interventions

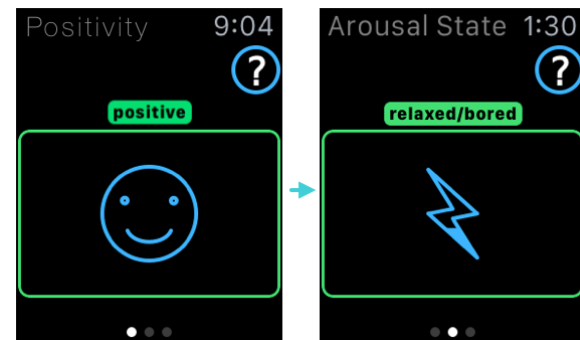
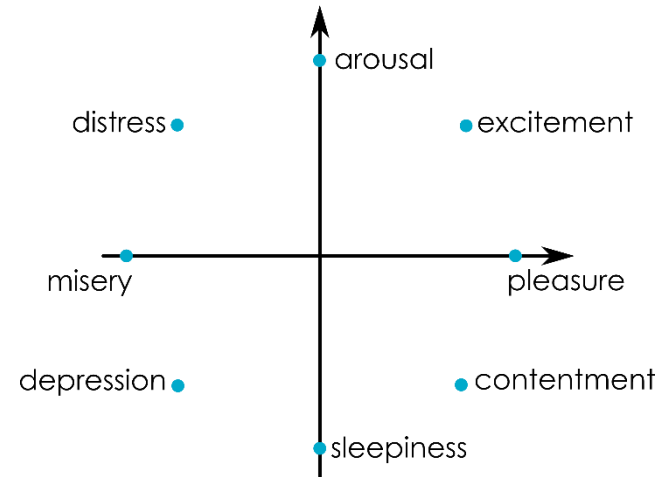
Background – Affective Sensing

- Visual:
 - Facial Recognition
- Mobile:
 - Usage Patterns, Ambient Sound, Bluetooth proximity
- Wearable and Bio-Signal Sensing:
 - Measurement of physiological arousal with Galvanic Skin Response
 - Heart Rate and Heart Rate Variability with ECG or Optical Blood Flow Sensors



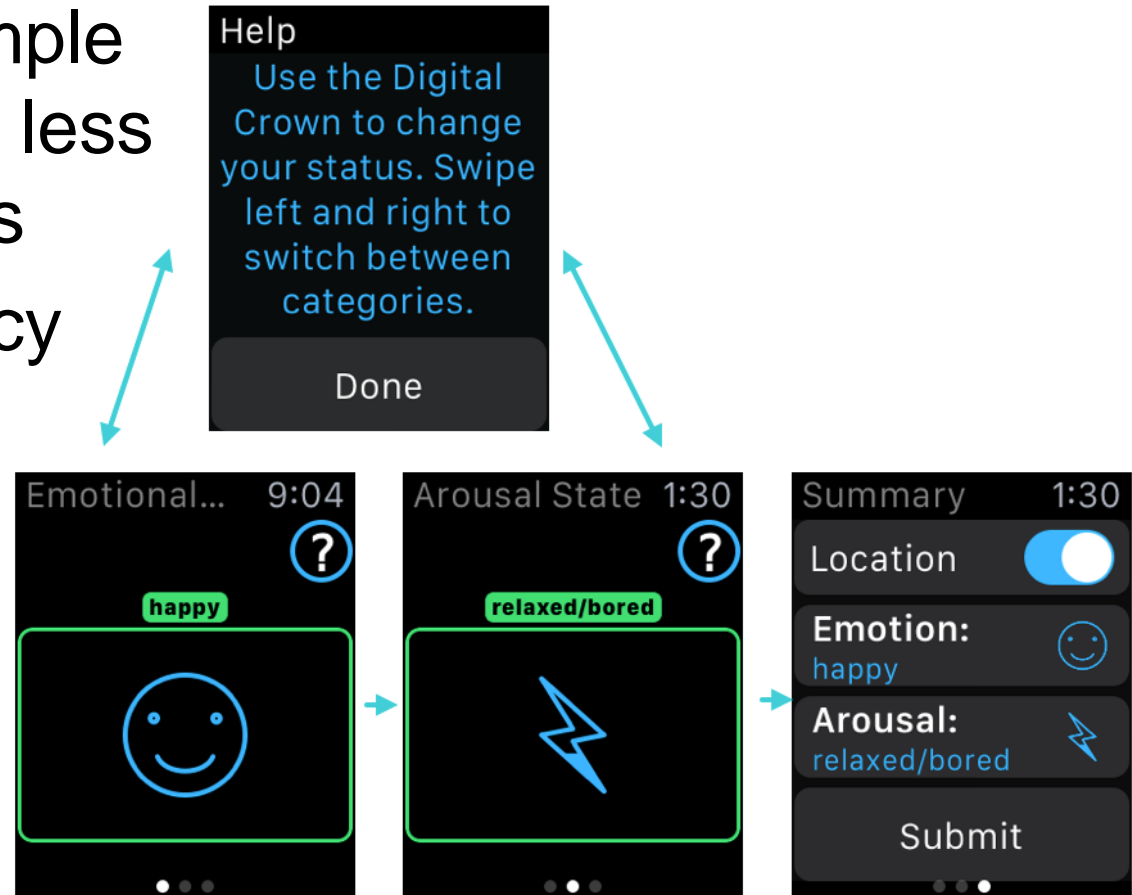
The EmoRate App

- A smartwatch app for the Apple Watch to quickly assess current emotional states
- Established Scale based on Russel's Model of Affect^[1]
- Offers sensor access:
 - Heart rate
 - Wrist movements



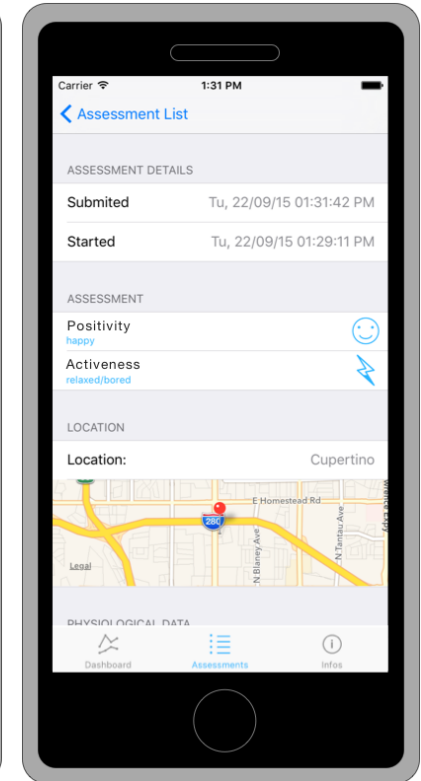
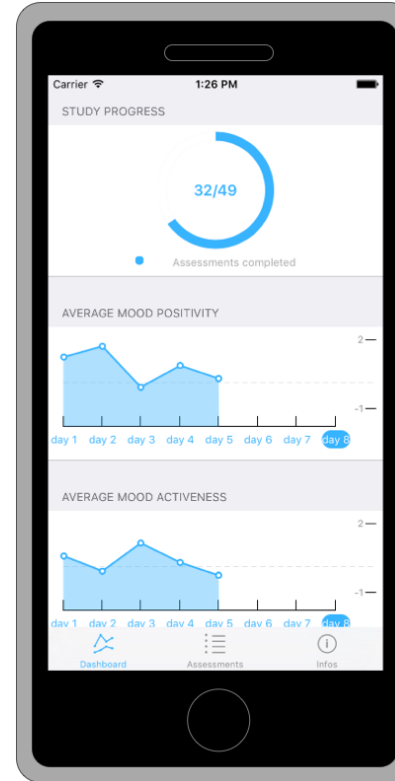
The EmoRate App

- Simple UI allowed Experience Sample collection within less than 10 seconds
- UI offered privacy options for location sharing

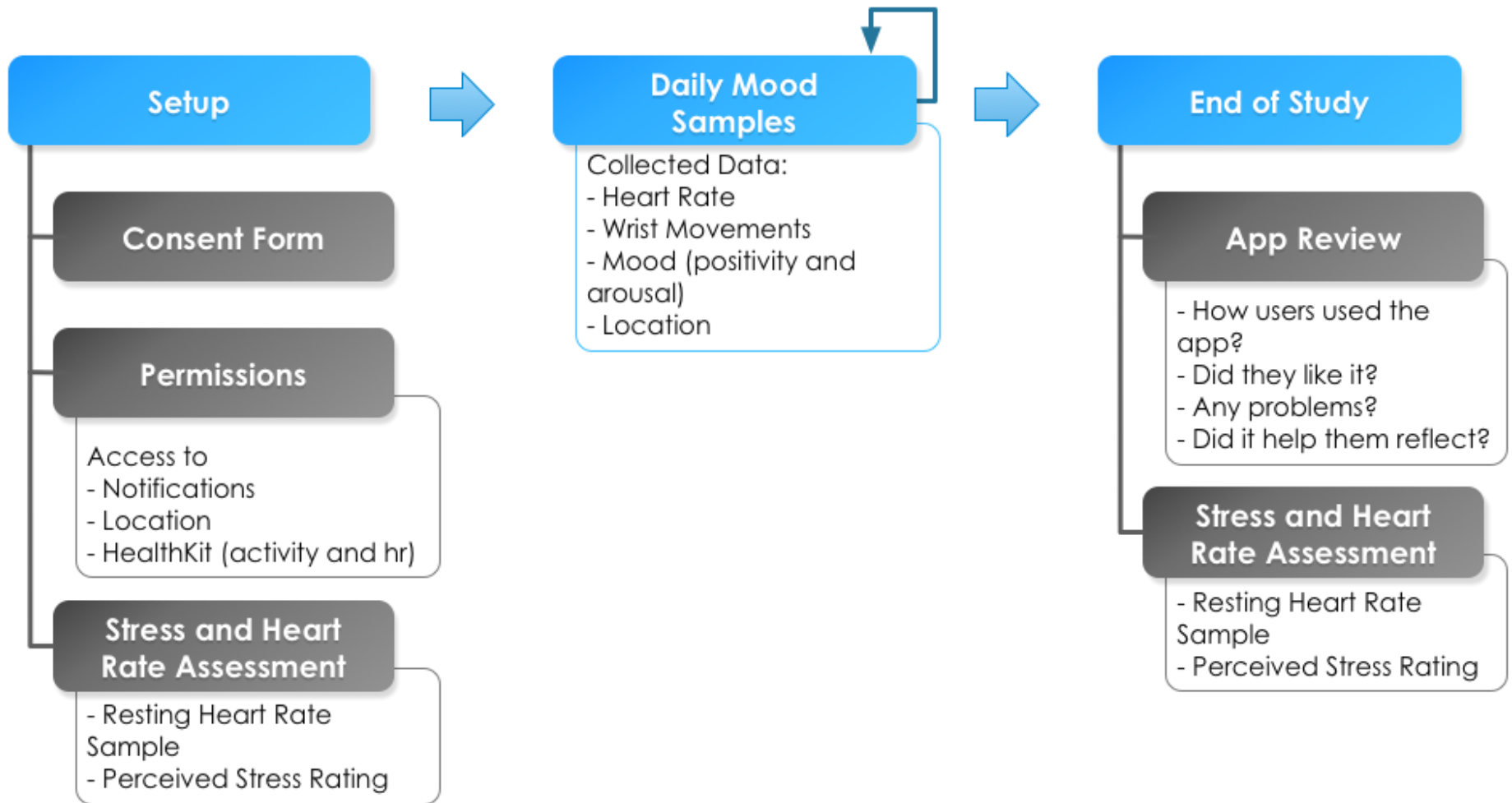


The EmoRate App

- The Phone App:
 - Initial Setup Process with Consent and Questionnaires
 - Dashboard with graphs as motivational tools
 - List of previous assessments
 - Settings menu with options and redirect to mental health support websites in case of need



Study Workflow



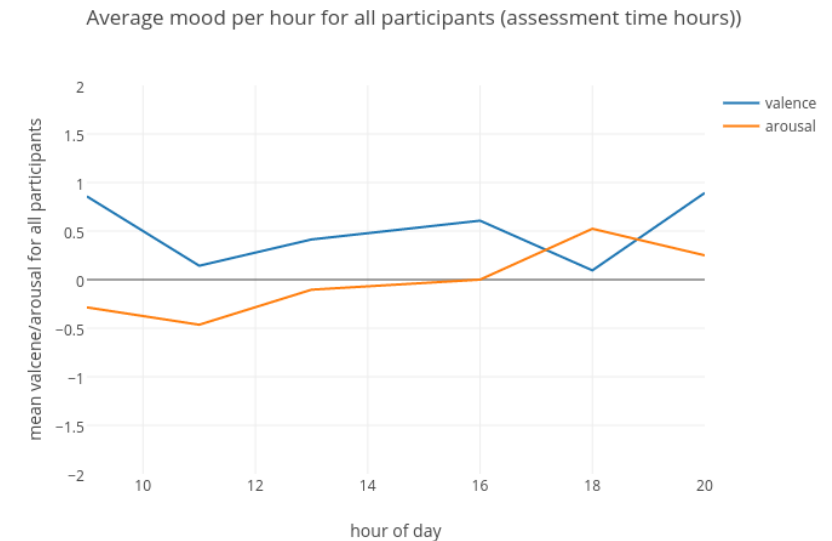
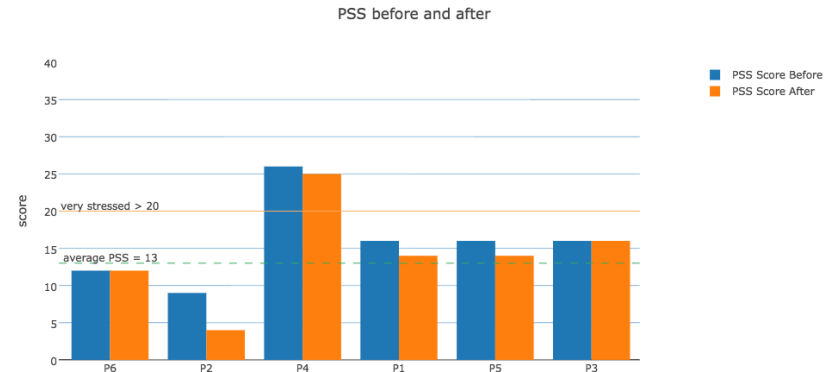
Pilot Study

- 7 Participants (data of 1 participant was not usable)
- 7 days each
- 6 notifications each day (9:00am, 11:00am, 1:00pm, 4:00pm, 6:00pm, 8:00pm)

Results

- Users liked the app
- Perceived Stress Scale measure reduced for 4 and stayed the same for 2
- A weak correlation of normalised HR and valence ($r_s = .246^{**}$) and arousal and time of day ($r_s = .261^{**}$)

$**p < 0.01$



Thank you