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Cyber Physical System Models for Just-in-time Care Delivery with Mobile Health Sensors

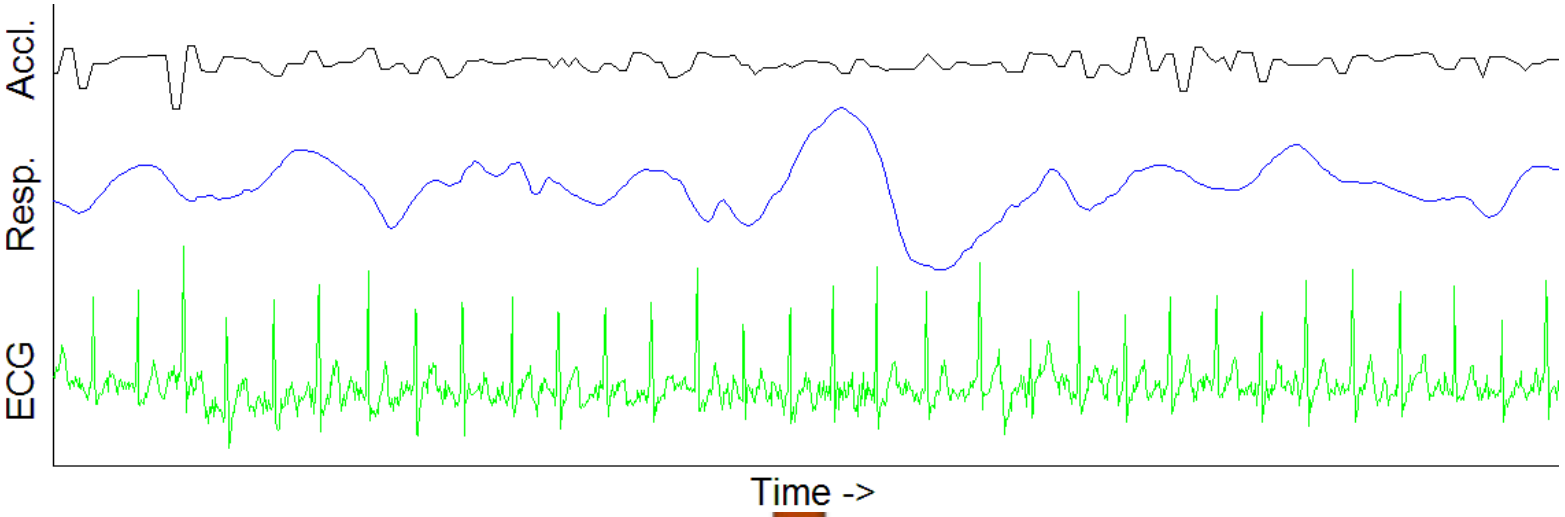
Santosh Kumar

Comp. Sc., University of Memphis

Collaborators (Health): Mustafa al'Absi, Donna Spruijt-Metz, Susan Murphy, Kenzie Preston, Bonnie Spring, Dave Wetter, et. al.

Collaborators (CS, EE): Emre Ertin, Jim Rehg, Mani Srivastava, et. al.

Sensor Time Series → Biomarker Sequence



Optimize Care Delivery Using mHealth Sensing

- Realize P4 Medicine & Precision Medicine
- Discover predictors of adverse health events
  - Find patterns in multivariate biomarker sequence
  - Specific and sensitive antecedents & precipitants
- Prevent via delivering personalized, just-in-time and precision treatments by
  - Identifying predictors in real-time measurement of health, behavior, context, and environment
  - And, by capturing response to interventions

CPS Foundations for JITAI

- Can use mHealth sensors to optimize the timing of JITAI delivery and adapt its content
- But, to systematically analyze their impact on efficacy and safety, need to establish theoretical foundations for JITAI
  - Formal models of health states, behaviors, environment, and interactions among them
    - Predict the response to potential actions
  - Need models for human-in-the-loop CPS
- JITAI must work eventually for each individual