Pervasive Assessment of Social Behavior

Jim Rehg
Georgia Tech

NSF Workshop in Pervasive Computing at Scale
NSF Expeditions in Computing Program

Computational Behavioral Science: Modeling, Analysis, and Visualization of Social and Communicative Behavior

James M. Rehg
Lead PI, Georgia Tech
Understanding Behavior

Rapid-ABC Screener for Autism

- Behaviors:
  - Response to name
  - Joint attention
  - Ball game

- Key properties:
  - Dyadic
  - Multimodal
  - Context
  - Timing
  - Heterogeneous

- Assessment: How hard is it to engage Pablo?
  - Output: Score and “felt sense”
Understanding Behavior

Bhavish

Rapid-ABC Screener for Autism

Ousley, Abowd, and Arriaga

• Behaviors:
  Response to name
  Joint attention
  Ball game

• Key properties:
  Dyadic
  Multimodal
  Context
  Timing
  Heterogeneous

• Assessment: How hard is it to engage Pablo?
  Output: Score and “felt sense”
Societal Impact: Autism

- 1 in 110 children in the US have autism
- Lifetime cost of care is $3.2 M per person

Autism Spectrum Disorder

Communicative

Scaling up the delivery of analysis and care

Triad of Attributes

Social

Restrictive/Repetitive
50% of disorders are not identified until school age.

Treatment and monitoring requires behavioral observation.

Communicative:
- Developmental Language Delay

Social:
- Williams Syndrome
- Down Syndrome
- Maternal Depression

Triad of Attributes:
- Schizophrenia
- ADHD
- Anxiety Disorders

Restrictive/Repetitive:
- Fragile X Syndrome
- ASD

Behavioral and Developmental Disorders
Research Questions

• How to leverage large amounts of data in combining multiple sensing modalities
  – e.g. “Level of social engagement”
• How to assess behavior in natural environments
  – e.g. Identify and interpret the relevant data
• How to scale assessment capabilities to the national level
  – e.g. Screening in doctor’s office or daycare
• How to deliver services to a diverse cross-section of stake-holders (and pay for them)
  – e.g. Children and their caregivers
Goals

• Objective measurements of human behavior from childhood to old age
  – To identify psychiatric disorders at an early stage
  – To give people the tools to understand and manage their interpersonal relationships
  – To better understand the connection between behavior and physical and mental health
  – To provide the behavioral sciences with new data-driven methods for diagnosis, treatment, and research