Seeing the Unseen: Global Early Childhood Mental Health and Developmental Screening

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The prevalence of autism has increased dramatically.
30% of all disabilities are caused by mental health disorders.

Few children receive the care they need.

In 2011, mental health disorders cost $2.5 trillion.
18 Months
Age at which autism can be detected

700
Synapse/Sec
Rate of brain growth in the first few years of life

5.3 Years
Mean age of autism diagnosis in the U.S.
Early Identification is Key
Access to care starts with screening and diagnosis. Barriers to access include not enough clinicians or training and tools that are too expensive and time consuming.
Current Approaches DON’T SCALE
Digital platform to advance the science and practice of early childhood mental health

Automatic computer vision algorithms, machine learning, robotics, and novel methods for analyses of multi-modal “big data” to bridge the gap between our scientific knowledge and our resources to meet the mental health needs of children around the world.

Information science and technology are key to creating transformative solutions that scale.
Our Guiding Principles

- Our tools will be developmentally appropriate
  - “Right test at right age”
- They will enable us to assess behaviors and social-emotional development across development and over time
  - “Different tools to measure similar domains across development”
- They will be as complex as they have to be and as simple as they can be
  - “Just what we need but not more”
- They will be affordable
- We will design tools for use on everyday digital devices (smart phones, tablets, go pro cameras)
- They will be inexpensive or free
- They will require minimal training
- They will be non-intrusive to the child
- They will be reliable and valid for use “in the field” (children’s natural environments) and across the globe
- They will be scalable
Our software automatically detects baby’s responses
Toddler watches video designed to elicit symptomatic responses while camera records toddler’s behavior
Our software automatically detects toddler’s emotional expressions in real time.
Developing a new screening tool

Social-emotional behaviors

- Social smiles
- Eye contact
- Pointing to share attention
- Response to name
Turning to name: typical child
Turning to name: child with autism
Responding to a social story: typical child
Responding to a social story: child with autism
Computer vs human coding

A scalable app for measuring autism risk behaviors in young children: A technical validity and feasibility study

Jordan Hashemi, Kathleen Campbell, Kimberly L.H. Carpenter, Adrianne Harris, Qiang Gu, Mariano Tepper, Steven Espinoza, Jana Schaich Borg, Samuel Marsamil, Robert Calderbank, Jeffery P. Baker, Helen L. Eggan, Geraldine Dawson, and Guillermo Sapiro

MOBIHEALTH 2015
Identifying difference between typical children and children with autism
Measuring Social-Emotional Development
Creating new knowledge together.

The start of a global community.
DISCOVERING THE UNSEEN

Enabling Children to Reach Their Full Potential

Duke Information and Child Mental Health Initiative

Duke Medicine

Pratt School of Engineering

Duke Trinity College of Arts & Sciences

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Duke Bass Connections