

SCC-PG: Bridge: An AI-Enabled Platform to Support Connected Communities for Coordinated Care of Children with Autism



The University of Texas at San Antonio™

Mimi Xie, The University of Texas at San Antonio

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Project Background

Autism spectrum disorder is growing prevalence among children. About 1 in 40 children in the U.S have been identified with autism spectrum disorder according to CDC. Therapy based on the social science of applied behavior analysis (ABA) established an evidence-based best practice treatment.

Project Challenge

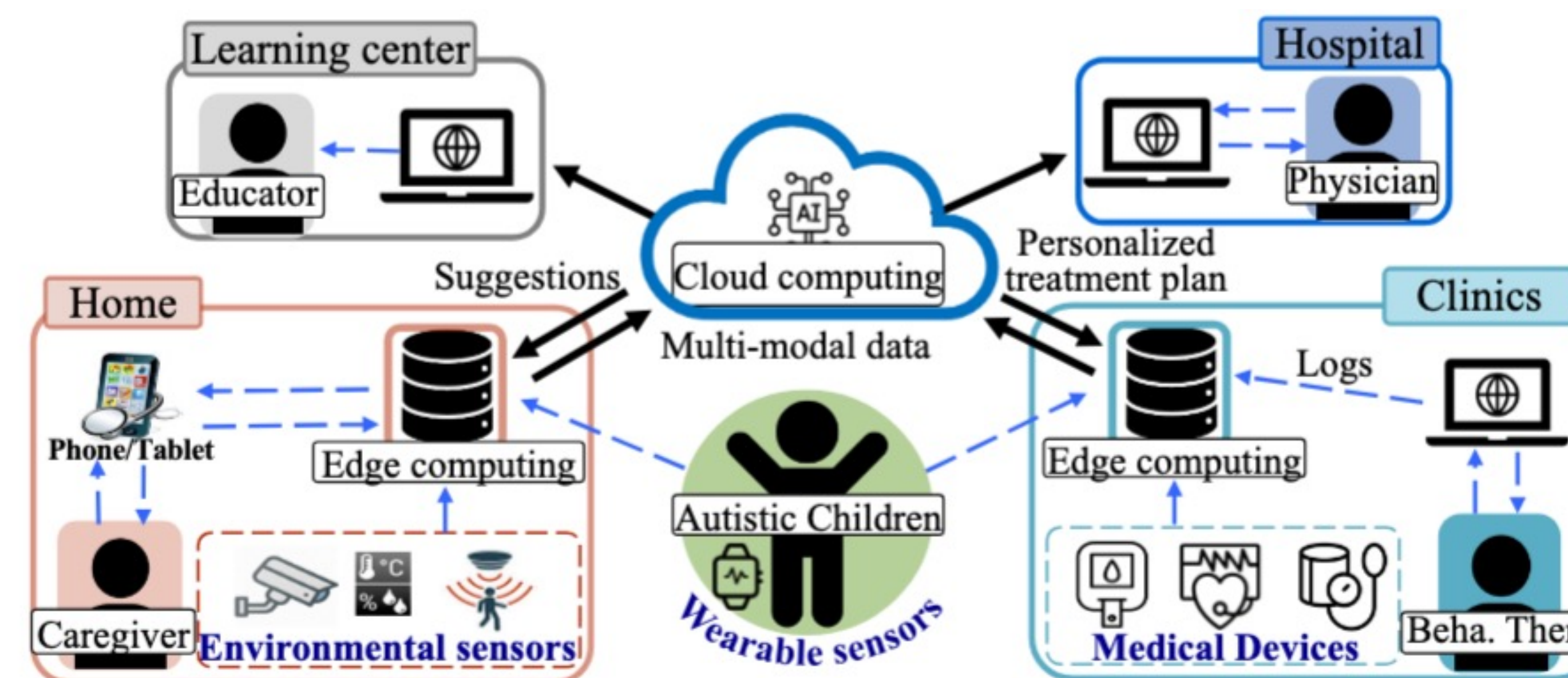
First, data collection and analysis for ABA therapy is time consuming and resource intensive. There is a lack of care and reduced dosage of care for CWA.

Second, data exchange between care teams (i.e., behavior analyst, physician, and caregiver) are often one-sided and limited by duration of observation.

Third, the ABA therapy may be imprecise due to the reliance on human experts. Due to varied clinical training and differences in individuals and environments, ABA is subject to human bias and errors.

These issues all stem from the lack of system support for long-term data collection, consistent data sharing among stakeholders, and AI assisted analysis and integration of data.

Intellectual Merit



AI-augmented platform for coordinated care of CWA

1. Identify platform parameters including types of data to be collected, privacy concerns, and expected performance of platform;
2. Identify AI approaches to assist the data analysis and decision-making during ABA procedure;
3. Develop information integration and communication framework prototype to identify the challenges and main function modules.

Broader Impact

Community impacts: The outcome will enable smart and connected community for coordinated care of CWA and will benefit diverse families especially those from social economic disadvantaged areas where resources are scarce.

Technical, Economic, and Societal Impacts: Design of AI augmented IoT system; Understand AI-aided information technologies; findings dissemination.

Student Training: bring together frontier theoretical concepts and hands-on engineering applications for student training.

Major Outcomes/Progress

What digital technologies can be integrated into clinical decision-making pipelines?

Physicians

- o Needed: Change in Behavior (100%)
- o Helpful: Sleep, eating, change in routine, medication adherence, illness, progress in therapy (50-75%)

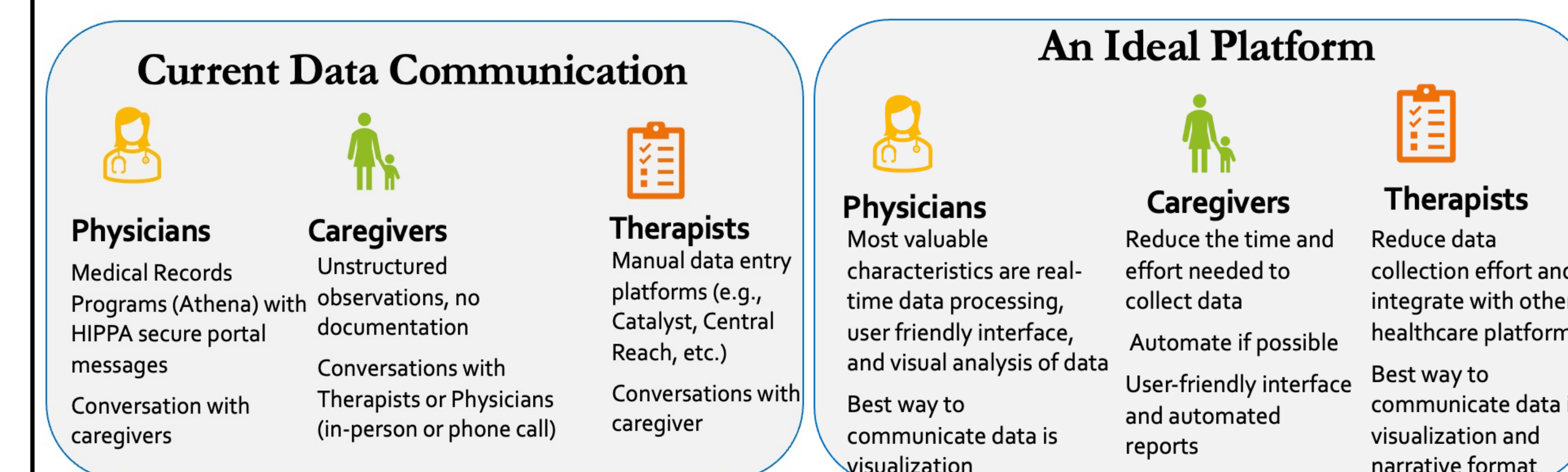
Caregivers

- Needed: Sleep duration/quality (37%)
- Helpful: Behavior (22%), Medication and dosage received (22%),

Therapists

- Needed: Change in Behavior (100%)
- Helpful: Change in medication (89%), change in routines (84%), sleep quality/duration (84%), eating (79%)

What infrastructure is needed to build the special care platform?



Future Goals

	Result from Summary	Associated goals
Data Collection	Challenging behaviors	Measuring intensity with wearables Camera solution for challenging behavior
	Sleep duration and quality	Sleep monitoring with cameras/robots
	Medication dosage and adherence	Voice activated medication schedule + weight measure
Data Communication	Communicate data using visual analysis with optional narrative reports	Using AI to visualize treatment data
	Include the ability to integrate with other healthcare platforms	Identify existing healthcare platform that can integrate
Data Privacy	Cameras are not a privacy concern for most parents	Focus on this in the Caregiver Focus Group- + feasibility, modality, voice?,

1. Host focus group sessions to further define platform parameters.
2. Pilot study of an IoT-Edge-Cloud prototype
3. Plan and conduct workshop