INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Trustworthy Ambient Intelligence in Inclusive Education Classrooms

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Category
Software
MOSS - Michigan Open Source Support

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OVERVIEW

Framework ensures trustworthy, safe, and fair AI in inclusive classroom environments

- Improves AI classroom assistance with measurable trust, safety, and fairness guarantees
- Inclusive education, special education, classroom AI interventions, teacher support tools

BACKGROUND

The integration of artificial intelligence into classrooms has introduced new opportunities for personalized interventions supporting students' physical, cognitive, and social-emotional development. However, in inclusive educational settings—where students have diverse abilities—these AI systems must be both effective and trustworthy. Most existing classroom AI lacks rigorous mechanisms to verify safety, fairness, and respect for human autonomy, especially amid complex, dynamic classroom interactions. Historically, teachers and decision-makers have faced uncertainty about relying on AI tools due to concerns about bias, unpredictability, and unintentional harm. Furthermore, approaches to modeling and validating such systems have often neglected the participatory input of teachers, students, and other stakeholders. This context highlights the need for a robust, evidence-based framework to assess and ensure the trustworthiness of ambient intelligence in inclusive classroom settings.

INNOVATION

This invention introduces a comprehensive modeling framework specifically designed for trustworthy ambient intelligence in inclusive education. It systematically addresses uncertainty and the complex dynamics of social and physical interactions through scientifically grounded multi-agent models. By mapping core trustworthiness properties—such as safety, fairness, and human autonomy—to robust systems theory concepts like reachability, stability, and observability, the framework provides measurable guarantees for AI-enabled classroom interventions. Unique to this invention are dedicated visualization and simulation tools that empower participatory design and oversight by teachers, students, and stakeholders. Real-world applications include AI assistant tools for special and inclusive education, classroom management support systems, and trustworthiness validation guides for educational technology developers, fostering not just innovation but inclusive, collaborative, and secure educational environments.

ADDITIONAL INFORMATION

PROJECT LINKS:

DEPARTMENT/LAB:

- Hugo Gonzalez Villasanti, Mechanical Engineering

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