University at Buffalo
The State University of New York

NATIONAL AI INSTITUTE
for Exceptional Education

The National AI Institute for Exceptional Education

The National AI Institute for Exceptional Education is a National Artificial Intelligence (AI) Research Institute led by the University at Buffalo and funded by the National Science Foundation and the Institute of Education Sciences of the US Department of Education.

The National AI Institute for Exceptional Education (AI4ExceptionalEd) aims to advance AI to help speech language pathologists (SLP) practice at their full potential, ensuring no child in need of speech and language services is left behind.

Currently, nearly 3.4 million children, more than half of those served under the Individuals with Disabilities Education Act (IDEA), require speech and language (S&L) services. These children face communication challenges that place them at risk for suboptimal social-emotional and academic outcomes. An alarming shortage of SLPs, combined with delays in identification of needs and unmet services during the COVID-19 pandemic, has likely exacerbated this gap.

AI4ExceptionalEd aims to provide SLPs with time-saving tools and insights, allowing them to deliver tailored interventions to children during a fundamental period of growth. This approach mitigates the risk of them falling further behind in their academic and social development.

The Institute will develop AI technologies complemented by human expertise to inform two innovative solutions: the AI Screener and the AI Orchestrator. These solutions will not only enable the scaling of the SLPs expertise but also provide culturally sensitive universal screening and ability-based intervention. By enhancing the quality of S&L services for children, AI4ExceptionalEd seeks to begin a fundamental shift in how these services are delivered. Ultimately, this investment in our youth will create a pathway for long-term economic impact.

COLLABORATION

31 Researchers | 9 Institutions

The Institute is a partnership of multidisciplinary faculty from eight other institutions viz., Cornell University, Penn State, Stanford University, University of Illinois Urbana-Champaign, University of Nevada - Reno, Georgia Institute of Technology, University of Texas at El Paso and University of Washington.

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Contact us via email at **info@ai4exceptionaled.org**
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Impacts

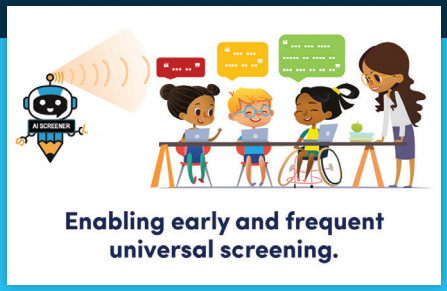
- Equip SLPs with time-saving AI tools to scale to scale speech and language services
- Improve children's academic performance and long-term social-economic prospects
- Identify and assist more children earlier
- Advance science and foundational AI scholarship

Innovations

- Early evidence-based screening for speech and language needs
- Culturally sensitive solutions
- Tailored interventions for individual needs
- Workforce development in underserved communities
- Development of the AI Screener & AI Orchestrator

Both solutions will create significant advances in self-supervised learning to address sparse and noisy data issues, multimodality perception, learning material rewriting & enrichment and edge AI for real-time processing. The Institute will develop human-centered AI methodologies to embody the solutions in a manner appropriate for children's learning. Most importantly, Learning Science will not only inform the initial prototyping and validation, but also continually derive unique insights from the deployed solutions.

AI SCREENER IN ACTION



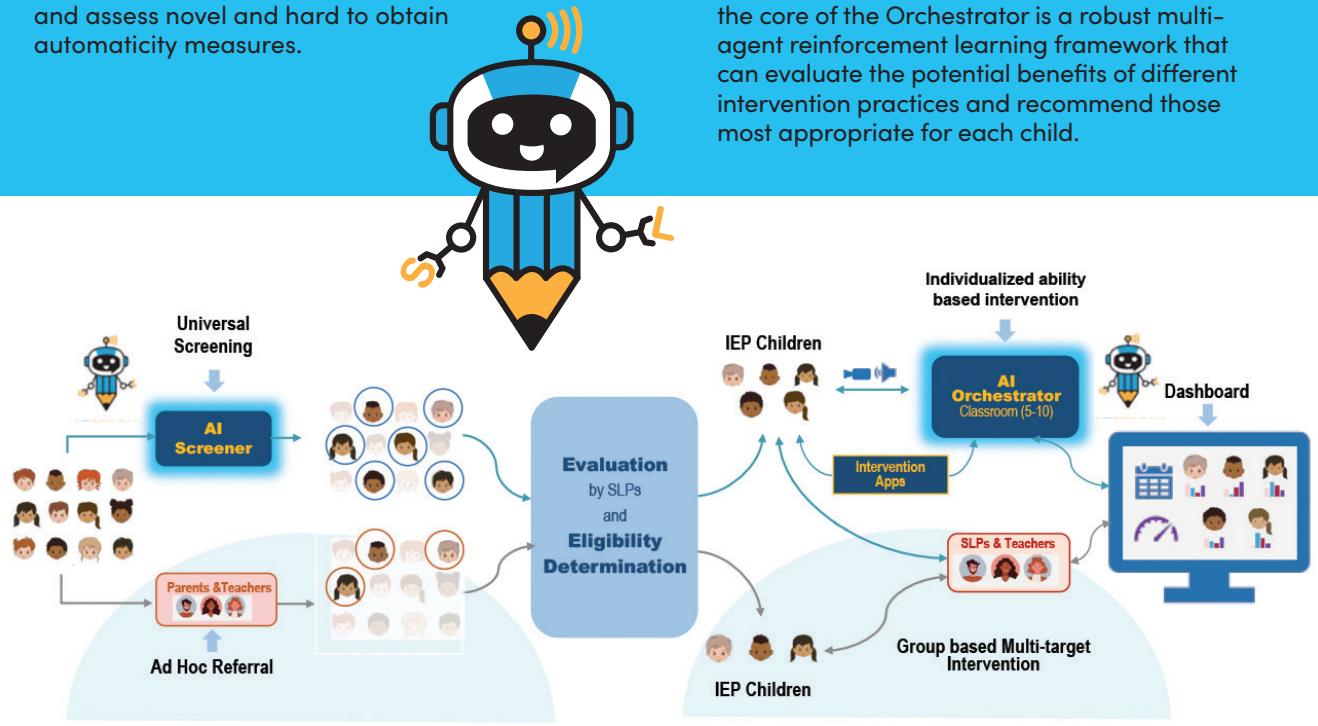
Enabling early and frequent universal screening.

The AI Screener is an edge-based solution that will be initially deployed in early childhood classrooms. It will analyze video and audio streams of children's classroom interactions, derive conventional speech and language measures used by SLPs, and assess novel and hard to obtain automaticity measures.

AI ORCHESTRATOR IN ACTION

Enabling SLPs to practice at the top of their license.

The AI Orchestrator is a superset of the AI Screener with its main application in the public-school classrooms. It will help SLPs to administer a wide range of evidence-based interventions and assess their effects on meeting children's individual IEP learning targets. At the core of the Orchestrator is a robust multi-agent reinforcement learning framework that can evaluate the potential benefits of different intervention practices and recommend those most appropriate for each child.



PennState · Stanford University · UTEP · University of Nevada, Reno · University of Illinois Urbana-Champaign · Cornell University · Georgia Tech · University of Washington

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