Solution Brief

Object Detection
Artificial Intelligence

meldCX's AI Playground Brings Artificial Intelligence to the Classroom Through Gamified Object Detection

meldCX, Intel, and the University of South Australia have opened the door for fun and engaging AI in the classroom with a Mars Rover mission

Classrooms and AI: The numbers

4%

Total global expenditure from educational institutions on technology in 2021

20-30%

Percent of time that AI can help teachers reallocate toward student learning activities

39%

Of educational institutions are considering the use of AI but have not yet begun to take action

50%

Of educational Institutions say that a lack of a clear strategy is holding them back from utilizing AI

AI meets reluctance in the classroom

Any introduction of new technology is likely to be met with resistance from some stakeholders. This holds true for bringing artificial intelligence (AI) into the classroom—many parents and teachers are hesitant to jump on board. Much of this hesitation stems from:

- **Lack of knowledge:** Misunderstanding or gaps in knowledge can cause hesitancy around AI for the education sector. Most government education departments and policy makers have not yet provided AI-specific funding or guidance to educators, leaving it up to individual school districts to decide whether to use this technology and how to do so.
- **Questions about the resources needed for AI implementation:** It can be tough to understand the required budget, equipment, and bandwidth needed to integrate AI into education, which can cause projects to go under before they even begin. Most school districts do not believe they have the technological or data infrastructure in place to make use of AI.
- **Ethical concerns:** Many educators and parents worry about their students' data privacy when AI-based solutions include capturing individual facial expressions and engagement to provide behavioral analysis of students.

Regardless of how informed educators and parents are around AI, it's destined to become a major part of students' lives—in fact, it already is. Social media, smart phones and watches, smart homes, and AI assistants are all examples of AI-enabled products that people use every day. The next generation of students, workers, and innovators need the right skills and resources to understand what AI is, how it is designed, and why it is important in today's digital world.

With the need to prepare students for a digital future comes an onus on educators and policy makers to do so in an ethical way. AI is not inherently a force for good or bad. It is a tool that, if used responsibly, can make our lives easier, help us work smarter, and revolutionize educational experiences. Defining "responsible use" of AI is an incredibly important task, and one that we must share transparently with the next generation.

There are already ethical standards in place that companies like meldCX have embraced, such as the globally-recognized TrustArc Privacy Verification which ensures that organizations are complying with international privacy frameworks, namely ISO 27001, U.S. Health Insurance Portability and Accountability Act (HIPAA), OECD Privacy Guidelines, APEC Privacy Framework, and the General Data Protection Regulation (GDPR) standards that impose stringent obligations onto organizations that target or collect data related to people in the EU.

To help overcome AI hesitancy and take advantage of the opportunities AI can provide educators and students, meldCX began working with Intel and University of South Australia to create a way to instill AI responsibility and knowledge in students and teachers. The result was the meldCX AI Playground, an innovative classroom solution that puts AI in the hands of students. They developed a program for students ages 6-11 that doesn't capture any personal demographics, but instead focuses on using object detection.

meld CX™

AI PLAYGROUND

The meldCX AI Playground offers students a way to learn with AI by building their own Mars Rovers. The meldCX solution:

- **Creates a safe place to explore AI and tackle complex AI problems**, instilling confidence, imagination, problem-solving skills, and collaboration.
- **Sparks rich conversations in the classroom** about what we can do with AI, what is desirable, and what is ethical.
- **Caters to multiple learning styles**, supporting one-on-one learning and one-to-many learning. For example, some learners can watch others do the object detection activity and learn themselves (presentation or small group) and others will learn better if they themselves do the object detection activity (one-on-one).
- **Provides a different option for learning that diverges from the traditional route.** No longer do students need to do all their learning off analogue content: diagrams, written instructions, etc. They can learn through merging the cognitive experiences of touch and sight. A recent study[5] shows that in children to college-age adults, active learning techniques like object detection encourage students to produce thoughts and act on feedback rather than passively receiving information in approaches such as lectures and readings.
- **Prepares students to enter an AI-driven world.** AI will take a front seat in our digital future, and job markets and workforces will require a basic understanding of it.
- **Empowers teachers to take the first step in an AI-enabled classroom.** AI Playground's simple integration in the classroom makes a daunting step doable.

How does it work?

The AI Playground is based off the building blocks of Viana, a meldCX solution that turns visual data into actionable insights. The platform enables various vision analytic capabilities such as object detection, which is a primary function of the AI Playground.

meldCX connects educators to distributors to easily procure the parts needed for a simple, straightforward set up and software download. From there, the reins are in the students' hands to prepare, create, and launch their own mission into space.

Step 1: Prepare

Students learn about the building process of a Mars rover. AI-powered cameras help them select the required Lego pieces for the rover design by detecting if the pieces they've chosen are correct and alerting them if not.

Step 2: Create

Once the correct pieces are identified, students work together with AI to build their Mars rover. AI provides them with feedback during the building process and guides the rover design towards completion. The solution sends encouraging messages to help students get to a fully built rover.

Step 3: Launch

When ready, the rover is launched into space! Students can then navigate their own rover in a virtual outer space environment — learning about Mars and mapping new terrain.

What do you need to get started?

meldCX will connect you with distributors for every part and use case so that you make sure customers are purchasing the best equipment.

Camera:
Any type of web camera will work for object detection.

Lego bricks:
Schools can procure Lego bricks themselves by contacting Lego Education customer service. meldCX provides SKUs and can also provide procurement assistance if needed.

A screen:
A monitor of any kind to display the virtual environment.

Intel® NUC 12 Extreme Kit:
The meldCX AI Playground software come pre-integrated into the Intel NUC. It connects with any given monitor to run and display the Mars Rover activity.

Xbox Controller:
To explore the virtual outer space with the Mars rover.

> In the AI playground, kids can, under our guidance, develop AI and, through play, experience the workings of AI, and engage in ethical discussions about the impact of their algorithms — understanding what it takes to develop safe AI.
>
> — Prof. Dr. Maarten de Laat,
> Co-director Centre for Change and Complexity in Learning (C3L),
> University of South Australia

Valuable Intel Components

Access to Intel's technologies, partner programs, and technical teams was instrumental in helping meldCX build the solution.

Intel® NUC 12 Extreme Kit

The Intel® NUC 12 Extreme Kit, based on Intel® Core™ Processors, provides high-level performance in a small form factor— taking up significantly less space than a typical PC. This means easier set up and more time for customers to think about how the solution will work instead of where they will house it. By using an Intel® NUC, meldCX can customize the PC experience for education in a way that prioritizes quality, performance, and long-term reliability.

Intel® Distribution of OpenVINO™ Toolkit

Intel® Distribution of OpenVINO™ toolkit is used to improve performance by expediting inference engine processing and optimizing AI for Intel platforms, so machine learning models can keep up with and process heavier loads of data. Statistics include:

- **1 second inferencing**: While it normally takes 4 seconds for raw ML models to infer, AI Playground is doing it in 1 second with OpenVINO™ toolkit.[4]
- **37% reduction in compute power:** Using OpenVINO™ toolkit, AI Playground has reduced its compute power requirement by 37%. Raw ML models normally running at 100% are optimized to 65% on average.[4]

OpenVINO™ toolkit also provides the capability to deploy prebuilt modules to detect and track the video feed of any digital camera, as well as support multi cameras.

How does AI Playground adhere to AI ethics?

AI Playground and meldCX have achieved TRUSTe's Enterprise Privacy & Data Governance Practices Certification. The certification is based upon globally recognized laws and regulatory standards, such as: EU General Data Protection Regulation (GDPR), ISO 27001, U.S. Health Insurance Portability and Accountability Act (HIPAA), OECD Privacy Guidelines, and APEC Privacy Framework. meldCX is deeply invested in ethical AI and ensures that their AI Playground solution realizes this with the following features:

1. AI Playground only tracks hands and the blocks they are working with— it does not track any faces or other identifying features.
2. Students own their own data. Their data is not transferred outside the premise that they are working on. Data used in the context of student-AI collaboration are kept private and secure, and will not be used outside of the app nor will it be accessible to train other AI.
3. The reference models used to build AI Playground are synthetic (meaning not based on actual/identifiable persons), like a virtual 3D environment. Essentially, AI Playground does not perform any type of person recognition; instead, captured data points are nonidentifiable and anonymized. Further, meldCX has also taken the stance of making sure its synthetic data models have no identifying qualities that indicate race.
4. The Viana solution by meldCX AI Playground does not see, view, or annotate any personal, identifiable, or sensitive live data in the cloud. Instead, data is extracted as it passes through the system without recording or storing any footage. During processing, hands or any recognizable element is blurred, and humanized data captured is saved as a "token," or randomized number, in the system.

meldCX Viana Platform enables endless opportunities for AI and education

The capabilities of meldCX's Viana platform can be extrapolated to endless use cases in education. meldCX has been working with educators to get ideas from the front lines on how AI could create even more benefits in various classroom settings such as:

- **Trade schools:** Using object detection to interactively teach students how to perform trade-related tasks, like assembling a car engine for mechanics or fixing power lines for electricians.
- **Biology classes:** Assembling a model of a human stomach, piece by piece, then exploring what happens when it ingests different foods.

meldCX is bringing responsible and fun AI to classrooms all over the world, enabling students to build, explore, and learn to prepare for an AI-enabled future. **Are you interested in integrating AI into your classrooms?** Talk to the experts at meldCX to learn about the possibilities or even start a trial period for your class. **Begin your AI education journey today at https://www.meldcx.com/get-started.**

About meldCX

meldCX's mission is to empower businesses and individuals to create premier customer experiences through AI and intelligent edge technologies.

Market leaders need applications that make customer and employee experiences more interesting and fulfilling — meldCX technology delivers the building blocks for their success. meldCX is headquartered in Melbourne, Australia, with teams in APJ, USA, and UK (EMEA).

Learn More

To learn more about meldCX AI Playground visit:

- meldCX Viana Product Page
- Blog: Gamifying Education Through AI Blog
- Blog: First Class Humans, Supported by Second Class AI Blog

To learn about Intel® technologies visit:

- Intel® NUC 12 Extreme Kit
- Intel® Core™ Processors
- Intel® Distribution of OpenVINO™ Toolkit

intel®

1. Education Technology in 10 Charts, HolonIQ, 2021.
2. How Artificial Intelligence Will Impact K-12 Teachers, McKinsey, 2020.
3. Global Education Expectations, HolonIQ, 2019.
4. meldCX, 2022. Results are indicative based on a subset of customer operational models in the meldCX lab. There are many factors that contribute to model performance and benchmarks as such represented results should be considered as indicative only and should not be a basis in forming a decision.
5. Active Learning: "Hands-on" Meets "Minds-on", American Association for the Advancement of Science, 2021.

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