

Intelligent Network Platforms for Digital Education

EDUCATIONAL TRANSFORMATION

The Fourth Industrial Revolution (IR4.0). IR4.0 is a technical revolution that is ushering in the development and implementation of technology and innovation that enables things like Artificial Intelligence (AI), The Internet of Things (IoT), Nanotechnology, Robotics and 3D printing. Through AI human intelligence is simulated through machines that are programmed to think like humans and mimicking their actions. Through IoT systems are interrelated and objects connected on the internet to collect and transfer data over a wireless network without human interaction. Through Nanotechnology we can see and control individual atoms and molecules in which everything on earth is made up of. By utilizing Robotics, we can design, construct, and use a machine to perform tasks normally done by humans. By utilizing 3D printing a user can have access to the full three-dimensional printing capabilities using a fabrication process that decreased the production time for making things like eyeglasses. As these innovations are implemented, we can begin to see the educational and economic advancement of communities on the earth which will help us experience the full potential of the 4th industrial revolution.

With the onset of the global COVID-19 pandemic where teachers and students had to change from in-person teaching and learning to remote teaching and learning methods. An alarming trend began to emerge where schools in underserved communities lacked adequate resources for students to successfully participate in remote learning. The schools had to quickly devise plans on how to manage this issue while keeping students on track in meeting state, county, and district learning requirements. The disparity in underserved communities caused learning gaps that hindered teaching and learning opportunities and caused a lot of angst amongst students and teachers alike.

Dalet Access sees this disparity as an opportunity for improving the service offerings that educational institutions provide to students and teachers. As we work with education institutions to deploy our Intelligent Network Platforms for Digital Education, we will assist educational institutions and families who lack adequate Internet connectivity to successfully participate in remote learning functionality and be able to provide schools and district administrators with a valuable student, teacher, and administrative data.



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As we have seen during the pandemic when students lack the tools necessary to take part in remote learning it hinders their ability to learn and grow in their educational pursuits which affect their ability to become a successful student. Our educational platform enables educational institutions to have adequate Internet connectivity with Fiber-like speed and agility which enables students and educators to learn new technology and successfully engage with remote learning options.

The past decade has seen major advances in digital education. Educational applications are now commonly used at all K-12 grade levels as well as in university settings (although with some variations between different age cohorts). Although a quality education will always require active engagement by parents and human educators, the new normal of intelligent education promises continuing educational enhancement across all grades by providing personalized curricula focused on individual student needs at a scale larger than your typical classroom structure can provide. Intelligent educational initiatives will prepare students for IR4.0 but resolving how to best integrate human interaction with face-to-face learning in today's existing infrastructure remains a key challenge.



To tackle this challenge Dalet Access plans to implement an overall strategy that consists of deploying an adaptive sensor-based network infrastructure that is known as an Intelligent Sensor Networks (ISN). This type of network is one where Sensor Networks, Signal Processing and Machine Learning are integrated and focused on closely managing the sensing, networking, and smart signal processing using machine learning technology solutions. This interface will interact with fully automated educational platforms to

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implement advanced curricula offerings. This allows us to offer customers our solution at a lower cost with limited-power requirements and small-sized equipment. With this solution, our customers have access to specific or multiple functional wireless communicating devices that smartly processes data and provides real-time information that enables them to grow or shrink their service requirements based on the utilization in real-time.

These are offerings that will meet the developing challenges of training students for entry into institutions of higher education and professional schools. These educational systems will deploy educational modules that use a human-computer interface to communicate with adaptive AI training engines. This will help to prepare students for the IR4.0 workforce or to carry them through a university education that will train them to be engineering innovators for the new IR4.0 economies.

As educational institutions have implemented Natural Language Processing (NLP) which gives computers the ability to understand the text and spoken words like a human being, Machine Learning (ML) leverages artificial intelligence (AI) and Computer Science (CS) in order to use data and algorithms to imitate the way that humans learn, with a gradual improvement in accuracy and Crowdsourcing which allow for gaining access to information by enlisting the services of a large number of people, typically via the internet. By implementing this type of technology educational institutions can experience a boost in online learning and also enable teachers to multiply the size of their classrooms while simultaneously addressing individual students' learning needs and styles.



The Intelligent Educational Platforms we implement matches students with interactive machine educators for a range of subjects from Language skills to Science, Technology, Engineering & Math (STEM) skills. The data captured can be used to determine the educational needs of students which will help educators and students to gain a better understanding of areas of success and improvement in their educational journey.

Intelligent Sensor Network (ISN) platforms support the collection of data. The data sets derived from large online learning initiatives are resulting in rapid growth and advances in learning analytics and natural language processing. Over the next five years, there will be

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greater demand for sensor-based platforms that can deliver intelligent educational solutions in classrooms and homes. Learning will be based on virtual reality applications and natural language processing. Although computer-based learning is not likely to fully replace human educators in schools this new hybrid learning delivered through an intelligent self-organizing network platform is the bridge into the IR4.0. Utilization of our Intelligent Network Platform for Digital Education helps school administrators to obtain the required data to validate their administrative and educational assumptions to prepare their educational institutions for the new learning environments being offered to educators and students in the 4th industrial revolution.

CHALLENGES AND OPPORTUNITIES

One might have expected that school districts across the nation would be further along in the digital transformation path. Even as the COVID-19 pandemic initiatives seem to be sputtering along with as many failed projects as there are wins, much of the lack of progress can be explained by the lack of access to the intelligent network infrastructure in most communities. Likewise, the inertia of the tried and true has discouraged interest in pursuing a visionary transformation from the status quo. These problems are being addressed, albeit slowly, by the emergence of a new generation of infrastructure technology known as "Network As A Service (NaaS). Implementing the NaaS model users are enabled to operate a network and achieve the outcomes they expect from it without owning, building, or maintaining any physical infrastructure. Dalet Access implements its NaaS framework by leveraging unlicensed millimeter Wave (mmWave) technology which is a band of the radio spectrum between 57 GHz and 64 GHz that can be used for high-speed broadband access and enabling the utilization of Intelligent Edge computing technology that is a distributed, open IT architecture that features decentralized processing power, enabling mobile computing and Internet of Things (IoT) technologies that ushers users into the new technological revolution being implemented in iR4.0.



Considering the hype that surrounds many IR4.0 initiatives, the expectations of educational administrators and decision-makers may frequently exceed the reality of what intelligent

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edge systems can provide. The experiences and continued trend in mmWave innovation have led to better assessments of the potential of an Intelligent Sensor Network (ISN) framework that offer Natural Language Processing as a service offering to support intelligent education and innovative educational applications. Artificial Intelligence (AI) applications will not only be interacting with students but with teachers to dynamically customize curricula for individual students' needs.

Continued advancements in edge network technologies will pave the way for more sophisticated Augmented Reality (AR) technology which enhances the real physical world through the utilization of digital visual elements, sound, or other sensory stimuli delivered via technology and Virtual Reality (VR) which is a computer-generated simulation in which a person can interact within an artificial three-dimensional environment using special goggles with a screen or gloves fitted with sensors so that students can fully immerse themselves in their learning experience.



The functionality available with Artificial intelligence techniques will increasingly blur the line between formal, classroom, and self-paced learning, thereby creating a hybrid form of learning. In higher education, adaptive learning/teaching algorithms will become a core part of the teaching process in higher education because of the pressures to manage cost while serving a larger number of students and moving students through school more quickly. Although formal classroom instruction will not disappear in this new normal, however, other forms of online education will become part of this learning at all levels, from K-12 through university, in a blended classroom experience that will develop the next workforce.

This development will facilitate more customizable approaches to learning, in which students can learn at their own pace using educational tools that work best for them. These online education systems will learn as the students learn, and their adaptability will support rapid advances in our understanding of the learning process. Learning analytics as part of natural language processing, in turn, will accelerate the development of personalized education that includes communities with fewer resources.

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Education is transitioning from hard copy books to eBooks. In a transition from passive consumption to active engagement, digital reading platforms will likely become much 'smarter' when merged with the adaptive intelligent sensor-network framework. This will prompt students with additional subjects to study and enhance their learning experience and outcome. Machine translation and access to application technology will also make it easier to translate educational material into different languages with a fair degree of accuracy, just as it currently translates technical manuals.

As part of the new normal, online learning systems will also expand the opportunity for adults and working professionals to enhance their knowledge and skills in a world where these fields are evolving rapidly. This will include the expansion of fully online professional degrees as well as professional certifications based on online coursework.

DALET INTELLIGENT PLATFORM IN COMMUNITIES

Many opportunities exist for leveraging an intelligent Sensor Network (ISN) framework to improve educational opportunities and empower people in all communities. The implementation of the Intelligent Sensor Network (ISN) framework in communities brings intelligent learning technology closer to the end-users in classrooms and at home which allows for students and teachers the flexibility to engage in learning and teaching in a school and home classrooms.



Learning and teaching in the IR4.0 world will depend on educational technology being able to sense and adjust to the ebb and flow of data on a network. The Dalet implementation of mmWave technology organizes the application utilization across the network so that users can access their applications when it's operating with a high number of users and applications on the network with ease and efficiency. Dalet Access leverages smart sensors on the platform to detect and correct performance issues, giving each application and end-user the bandwidth needed for optimal performance. Around this framework, we will be able to deploy a proactive system of security that will identify and protect against potential privacy and security threats to students and teachers. This hybrid learning model will bring

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about digital transformation in education and will bring the needed resources to underinvested rural communities, tribal communities, and communities of color.

COMPANY PROFILE

Dalet Access Labs is a leading Network As A Service (NAAS) provider. We utilize an Intelligent Sensor Network framework to enable digital educational transformation by providing intelligent broadband and networking solutions that enable educational institutions to leverage technological advances in natural language processing, virtual reality, augmented reality, and machine learning to enhance teacher and student learning environments. We use industry 4.0 applications that give an unparalleled customer user experience. As the complexity of network infrastructures and application bandwidth usage increases, the ability of the network operators to conform to stringent SLAs will potentially be challenged. We will make it possible for even the most demanding Fourth Industrial Revolution (IR4.0) services to be successfully deployed by leveraging self-organizing, smart-decision sensors at the edge of the network. This allows for optimal performance, and our self-defending proactive management algorithm to continuously learn and adapt to user behaviors while identifying and protecting against potential outages and threats.

Contact Us:

info@daletaccess.com

401 Roland Way, Suite 205 Oakland, CA 94621

www.daletaccess.com