AI AR/VR and Immersive Intelligence

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Artificial Intelligence (AI) tools are becoming more mainstream today, and an increasing number of manufacturers and professionals, such as designers, engineers, and robotics operators are looking at ways to incorporate various AI-driven technologies into their workflows.

However, leading companies today are realizing that AI alone isn't enough to gain a true competitive edge. Through the integration and use of AI, along with immersive mixed reality, such as Augmented Reality (AR) and Virtual Reality (VR), a new suite of solutions is now being leveraged for enterprises and manufacturers, known as Immersive Intelligence.

The Rise of Automation Technology Using AI

Automation technology using AI can be programmed to complete logical processes for a particular business. With the already large array of technological applications and programs businesses use, what makes AI technology the next best thing? First, AI technology is flexible. It can be used by many industries in their own unique way, such as aiding them in data mining, targeted marketing or constructing precision-based financial models.

AI today can be found in markets such as medical equipment manufacturers; construction equipment producers; tech; telecom; and engineering firms for aerospace and automotive, mining projects, utilities, and oil and gas. Not only is the technology flexible in its implementation, but also in what it is compatible with. This technology can work with diverse business applications, and with structured or unstructured data.

Combining Generative AI with AR/VR

Generative AI is the latest technology driven by AI that uses natural language processing. It leverages deep learning algorithms to enable users to converse with chatbots. What has captured the attention of designers and engineers is that it is an advanced system that can understand complex questions and provide very accurate answers almost immediately. Because it was developed with conversational AI capabilities, it can immediately comprehend user queries and generate natural-sounding responses that are tailored to the conversation context. It also has built-in memory capability that stores information from past conversations to better respond to subsequent messages.

However, engineers and designers are also realizing that many projects throughout vertical industries require more than just the development of text and responding to prompts. That is why these professionals are combining the powers of AI tools along with other progressive immersive technologies like AR/VR. They are building AI-models like ChatGPT to help create virtual worlds in the metaverse to run simulations and increase productivity/efficiency metrics. More specifically, AI tools like ChatGPT and the metaverse can help create 3D environments with digital twins that replicate the real world, and the data used can be harnessed for analysis, running simulations, and interacting with data more efficiently.

However, there are still some limitations with ChatGPT. As an example, when engineers are designing tools or products, AI technologies cannot recognize when physical items move and must be manually told that it is in a different location. That being said, technology such as ChatGPT can significantly assist with coding the virtual 3D world and running simulations. Historically this coding has been done manually, but with AI tools the developer time can be increased ten-fold.

Developers writing code will benefit because generative AI can create the vast majority of the code, while developers are then left to use resources to debug much less of the code. They can actually spend more time on innovation. Workers on the manufacturing floor will then better understand the code and language produced by generative AI through its natural language ability. As an example, the tools can provide alerts that increase safety standards when entering a hazardous section of the plant floor or when operating heavy equipment. Training and test simulations conducted within metaverse environments will also benefit from increased safety practices.

Generative AI will also play a leading role in helping to create code and language used in the development of digital twins – the virtual world where people, consumers, and workers all gather to communicate, collaborate, and share through a virtual presence on any device. This means companies will build immersively intelligent virtual spaces, and it will allow employees to virtually collaborate using their digital twin through chats, emails, video calls and even face-to-face meetings.

The power of simulation will be an exact game-changer for enterprises and businesses throughout the metaverse in a variety of industries, such as optimizing production planning in the automotive sector, accelerating design in the aerospace industry, improving overall

production efficiency for manufacturers, and increasing accuracy for consumer-packaged goods companies. Many companies are poised to leverage virtual simulation to make better decisions and generate the greatest return on investment. Several other examples how generative AI will benefit designers, engineers and manufacturers in an immersive intelligent arena leveraging AR/VR include:

Automation Support – Engineers will have proximity to leading technology that supports automation processes and reduces time spent on manual tasks, like collecting data, preparing reports, and monitoring trends in their industry.

Task Planning and Management – This is particularly critical for engineers since it requires a vast amount of organization, discipline, and time management when completing tasks effectively. Generative AI can improve the process by enabling an intuitive platform for task planning and management.

Knowledge Sharing – Engineers and their teams will be able to increase collaboration and efficiency in the workplace since generative AI allows for streamlined knowledge sharing between engineers and other employees at work.

Error Detection – This is an area that has always been a large issue for engineers as they continue to seek the most efficient ways to identify errors, which lead to time and cost savings. The use of natural language processing will now be leveraged to visualize errors in text-based data faster than ever before, critical in code review, error analysis, or debugging.

Security and Privacy – Security and privacy is one of the biggest issues facing today's world. Since metaverse environments have the digital twin as an integral part, the metaverse will have much richer data. The security and privacy in metaverse environments cannot be solved by traditional security tools. However, immersive technologies like AR/VR leveraging leading AI tools are better equipped to handle security and privacy related to digital twins.

Enhancing Labor Workforce Strategies Instead of Replacement

The use of immersive intelligence through generative AI and AR/VR can also create labor efficiencies like never seen before. While there will always be the fear of having human capital jobs replaced by technology, we're beginning to realize that there are greater efficiencies to be gained through the implementation of immersive intelligent solutions.

In late September, the United Auto Workers (UAW) began to commence strategic walkouts of its workforce at automotive manufacturing plants across the U.S. Much of this labor unrest was the result of a disagreement over compensation and benefits packages, but there is much more involved, such as the use of robotics and automation, and how to shorten work weeks for the labor force.

While the automotive industry is only one segment of the manufacturing landscape, many industries that involve a heavy dose of manufacturing and plant workers have certain been grappling over the use and future robotics and automation play.

Why AI, Robotics, and Automation Can Benefit Today's Labor Pool

However, another way of looking at the issue is to realize that these technologies may prove beneficial in helping to solve current labor challenges, as well as labor predicaments for all industries involving manufacturing facilities. These technologies can actually be a part of the manufacturers' overall plans for upgrading plant facilities to help employees be more productive and efficient in their work weeks.

Consider that even if every skilled worker in the country was employed in manufacturing, [Forbes](#) reports there would still be 35% more job openings than workers capable of filling them. By 2030, [Deloitte](#) predicts the industry will be short by more than 2 million workers.

"Cobots" based on immersive intelligent solutions may hold the key to the future of robotics and automation for many industries and manufacturers.

Cobots, which enable human-robot collaboration, are made to work safely next to human workers. Similar to traditional industrial robots, cobots are mechanical arms powered by AI, sensors and AR/VR that can be programmed to carry out a variety of tasks in a factory setting for the manufacture of items, including material handling, assembly, process tasks, quality inspection, and packaging. Due to the cobot's focus on repetitive tasks, this enables its human coworker to concentrate on other tasks that call for greater manual dexterity and cognitive skills.

Immersive intelligence based on generative AI and automation are poised to revolutionize the manufacturing industry by ushering in unprecedented efficiencies, cost reductions, and the seamless integration of advanced technologies. Through the implementation of AI-driven systems leveraging AR/VR, manufacturers can optimize production processes, enhance precision, and reduce operational errors, thereby streamlining workflows and maximizing productivity. Automation not only minimizes labor costs but also enables the rapid execution of repetitive tasks, freeing up human resources for more complex and creative endeavors. Additionally, AI-powered analytics and predictive maintenance contribute to proactive problem-solving, minimizing downtime and extending the lifespan of machinery. The synergy between AI, AR/VR, and automation promises to create a manufacturing landscape that is not only more competitive but also at the forefront of technological innovation.