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The purpose of the Journal is to disseminate knowledge, experience, and best practice in engineering & manufacturing.
The articles are written by practicing professionals in the Engineering City (EC). They cover issues relevant to their projects, operations, and organizations.
The articles address the challenges of the time. As such, the Journal is also a chronicle of the evolution of the EC, its companies, and its individuals.
It is the aim of the Journal to advance the engineering & manufacturing practice, to enrich the engineering & manufacturing community, and to contribute to the worldwide discourse in engineering & manufacturing.

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Editorial

Every time we get into a discussion about art, we involuntarily find ourselves going deep into philosophical thoughts.

Andranik Meliqsetyan's two articles on art trigger some deep thoughts on the aspirations of the human spirit – freedom to explore, discover, and create.

Along this long path of the human spirit, engineering & art played a major role. Engineering created the means, and the arts expressed the challenges of each period and ignited the vision of the future.

In his first article "Why Art & Engineering", Andranik tells the story of how engineering and the arts have worked together in this journey.

In his second article, Andranik calls on art to express the new reality of our time – Artificial Intelligence – and ignite the vision of the human future. The novelty that he is introducing is that he calls on engineering itself to be part of the artistic expression. As such, art itself becomes a very interesting engineering project. Towards this end, he is putting a team together to work on this project.

Art & Engineering Corner

. Why Art & Engineering

by Andranik Meliqsetyan, NI

Throughout history, humans have been driven by an inherent curiosity to explore the unknown. This curiosity stems from a fundamental desire to understand the world around us, to uncover new discoveries, and to push the boundaries of our knowledge. From ancient times to the modern era, this pursuit of exploration has been deeply intertwined with

both art and engineering, each playing a unique and complementary role in fueling our curiosity and expanding the horizons of human experience.

Artistic Expression in Exploration

Art has long served as a powerful medium for capturing the essence of exploration and conveying the wonder and beauty of uncharted territories. From cave paintings depicting hunting scenes to intricate maps and illustrations of faraway lands, artists have played a crucial role in shaping our perceptions of the unknown. Through their imaginative interpretations, artists have inspired explorers and adventurers to venture into new realms, igniting the imagination of countless generations with tales of discovery and adventure. Artistic expressions such as literature, painting, sculpture, and music have not only documented historical explorations but also stimulated the human spirit of exploration, encouraging us to seek out the mysteries that lie beyond the familiar.

Engineering Innovations in Exploration

In parallel, engineering has been instrumental in enabling and facilitating exploration by developing innovative tools, technologies, and vehicles that extend the reach of human exploration. From ancient navigational instruments like astrolabes and compasses to modern-day spacecraft and deep-sea submersibles, engineers have continuously pushed the boundaries of what is possible, designing solutions to overcome the challenges of traversing unknown terrain and environments. Engineering innovations have enabled explorers to venture into uncharted territories, whether it be conquering the seas, scaling mountain peaks, or reaching for the stars. Through their ingenuity and technical expertise, engineers have transformed the abstract dreams of exploration into tangible realities, opening up new frontiers for human discovery and understanding.

The Symbiotic Relationship

Art and engineering are not separate endeavors but rather interconnected disciplines that collaborate in the pursuit of exploration. Artists and engineers often work hand in hand, with artists providing the creative vision and inspiration while engineers bring those visions to life through practical design and implementation. This symbiotic relationship between art and engineering is evident in historical expeditions where artists accompanied explorers to document their discoveries through sketches, paintings, and written accounts. These artistic representations not only captured the beauty and majesty of unexplored landscapes but also served as valuable records for scientists and engineers to study and analyze.

Conclusion

In conclusion, the inherent curiosity of humans to explore the unknown has been a driving force throughout history, leading to remarkable feats of exploration and discovery. Art and engineering have been integral to this pursuit, providing the creative inspiration and technical innovation necessary to push the boundaries of human knowledge and understanding. By combining artistic expression with engineering ingenuity, explorers have been able to transcend the limits of what was once thought possible, unlocking the mysteries of the world and beyond. Art and engineering are often seen as separate disciplines, but they share a common thread of creativity and innovation. When they come together, amazing things can happen. Engineers bring technical expertise and problem-solving skills, while artists contribute creativity, aesthetics, and a different perspective on design and functionality. Moreover, this fusion of art and engineering can inspire cross-disciplinary thinking and foster innovation in both fields. It encourages people to think outside the box, experiment with new ideas, and explore unconventional solutions to complex problems. Ultimately, when art and engineering combine forces, they have the power to transform society by creating products, structures, and experiences that are not only functional but also beautiful, meaningful, and impactful.

. Art & Engineering in Navigating the Unknowns in the Era of ML/AI Driven Smart Manufacturing

by Andranik Meliqsetyan, NI

Immersing into Start of the Art ML/AI-Driven Smart Manufacturing

Imagine stepping into a state-of-the-art smart manufacturing facility bustling with activity. As you enter the production floor, you're greeted by a symphony of synchronized machines whirring and humming in perfect harmony. Alongside these machines, you see teams of skilled human workers moving with purpose, overseeing operations, and fine-tuning processes. In one corner of the facility, you observe a team of engineers collaborating with AI specialists, huddled around a computer terminal. They're analyzing real-time data streams from sensors embedded throughout the manufacturing line, monitoring equipment performance, and predicting maintenance needs. The AI algorithms they've developed are continuously optimizing production schedules, minimizing downtime, and maximizing efficiency.

Meanwhile, on the assembly line, you witness a seamless collaboration between human workers and robotic arms equipped with advanced AI vision systems. Human workers are responsible for intricate tasks that require agility and judgment, such as quality control checks, assembly of delicate components, and troubleshooting unforeseen issues. At the same time, AI-powered robots work alongside them, handling repetitive tasks with speed and precision, freeing up human workers to focus on higher-value activities. As you move through the facility, you encounter a training area where workers are engaged in immersive simulations and hands-on exercises designed to familiarize them with AI technologies. They're learning how to interact with AI systems, interpret data analytics, and troubleshoot AI-driven processes. The goal is to empower workers with the skills and knowledge needed to collaborate effectively with AI and adapt to the evolving demands of smart manufacturing. In the break room, you strike up a conversation with a veteran machine operator who has witnessed the evolution of the facility firsthand. She shares how, initially, there were concerns about AI technology replacing human jobs. However, over time, she has come to appreciate the symbiotic relationship between human workers and AI systems. Together, they've achieved levels of efficiency and quality that were previously unimaginable, allowing the facility to stay competitive in an increasingly dynamic marketplace. As you leave the facility, you're struck by the sight of human workers and AI technology working hand in hand, each leveraging their unique strengths to propel the manufacturing process forward. It's a testament to the power of collaboration and innovation, demonstrating how humans and AI can coexist harmoniously to drive progress and success in modern smart manufacturing.

Project Goals

This project is aiming to explore the unknowns in the era of ML/AI driven smart manufacturing. The collaboration between CYLAND media art lab’s artists and engineers from EC will bring fresh and unbiased perspectives in the conflicting and uncarted territories of aggressively developing ML/AI technologies in the domain of smart manufacturing. ML and AI are conquering every aspect of human life starting from our day to day life and human assisting aspects, however given Engineering City’s focus we would like to explore the smart manufacturing by co-developing an art and engineering installation which will demonstrate the state of the art ML/AI driven manufacturing with couple of robotic arms that are conducting harmonious and precise operations alongside with humans that are not feared but rather energized with the efficiency and future opportunities that this combination of technology is bringing to them in transforming their personal and professional life.

High level concept overview

I took liberty to have some conversations with CYLAND team to navigate the project abstract into something that can give us ground to start, you can see below the visual concept of the practical art and engineering installation, which consists of couple of robotic arms to be equipped with corresponding sensors to sense the surrounding to effectively collaborate with human workers in smart manufacturing.

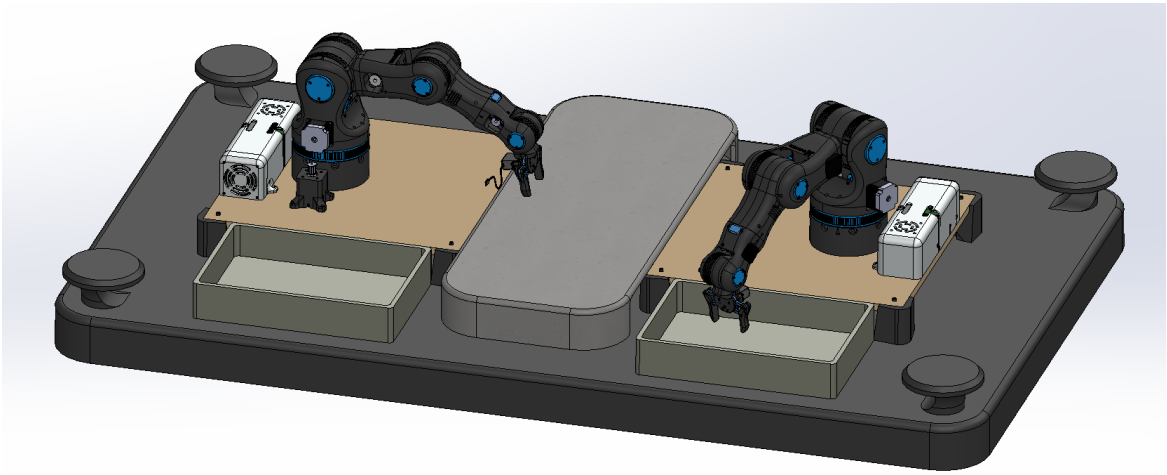


Figure 1 The visual concept of the art and engineering installation.

All other technical aspects should be designed and developed by the engineering project team, asynchronously working with artists to grasp the art perspectives and make sure that this work will serve the purpose that is described in the article. This project is not meant to be a cool engineering project but rather be opportunity for us to explore uncharted territories of art and engineering convergence. To serve the purpose CLAND team will accompany us with art lectures aiming to bring us into the world of art, this brings us back to the other articles from January discussing benefits of art and engineering for engineers and engineering organizations, if you have not looked on that article yet please do so, if you already done, please read one more time.

Questions to be explored

As we will be immersing into the world of art and engineering by implementing the physical installation with the help of artists, we will need to approach below shown questions from different angles to bring new perspectives and generate new articles that eventually, in the end of our journey should serve as a collective thesis in Exploration of Unknowns in the era of ML/AI Driven Smart Manufacturing.

1. Coexisting: Human and AI in Smart Manufacturing:

This work will explore the evolving relationship between human workers and AI technologies in smart manufacturing environments. It will explore how humans and AI can collaborate effectively to optimize production processes, enhance efficiency, and drive innovation while also addressing challenges such as job displacement and ethical considerations.

2. Exploring Human Emotions in the Era of AI/ML-driven Intelligence:

This work will examine the intersection of artificial intelligence and human emotions, exploring how AI/ML algorithms are being developed to understand and respond to human emotions. It will discuss the potential applications of emotion-aware AI in various domains, from customer service to mental health care, and consider the ethical implications of AI's growing emotional intelligence.

3. Redefining the Role of AI/ML in the Future Landscape:

This work will take a forward-looking approach to AI/ML technologies, considering how they will shape the future landscape across different sectors. It will discuss emerging trends and advancements in AI/ML, from autonomous vehicles to smart manufacturing, and explore the transformative potential of these technologies in redefining industries, economies, and societies.

4. Blending Human and AI/ML Intelligence:

This work will explore the concept of blending human and AI/ML intelligence to create more powerful and effective solutions. It will discuss the benefits of combining human creativity, intuition, and empathy with AI's computational power and data-driven insights, highlighting examples of successful collaborations and interdisciplinary approaches across various fields.

5. Reevaluating Risks and Benefits of AI/ML for Humanity

This work will critically examine the risks and benefits associated with the widespread adoption of AI/ML technologies in society. It will discuss concerns such as job displacement, algorithmic bias, and privacy breaches, while also highlighting the potential benefits of AI/ML in addressing global challenges and improving quality of life for individuals and communities.

6. Charting New Paths: Fresh Perspectives for Humanity's Future:

This work will offer fresh perspectives on the future of humanity in an AI/ML-driven world. It will explore alternative visions for the future, considering how we can harness the power of AI/ML to create a more equitable, sustainable, and human-centered society. It will challenge readers to think critically about the choices we make today and the impact they will have on future generations.

This article is the final announcement of project kickoff. We will shortly start reaching out to the individuals who have already expressed interest in joining this initiative. Please take some time to reiterate through the articles on art and engineering and if you find this exciting reach out. There will be plenty of interesting and exciting things to be done during this project, you can focus only on Art or only on Engineering or both. Do not lose this opportunity to be a part of this important and extremely exciting journey that may change your view and change you for the better.

Musings Corner

. Engineering & Manufacturing as Enablers of the Human Spirit

by Rama, EA

Possibly it could be said that there are four fundamental freedoms that the human spirit thrives towards:

1. Freedom to explore and discover,
2. Freedom to create,
3. Freedom from want,
4. Freedom from fear.

Interesting that engineering and manufacturing play a fundamental role in all four. Engineering enables exploration and discovery, engineering enables creation, manufacturing enables abundance, and engineering together with manufacturing enable security.

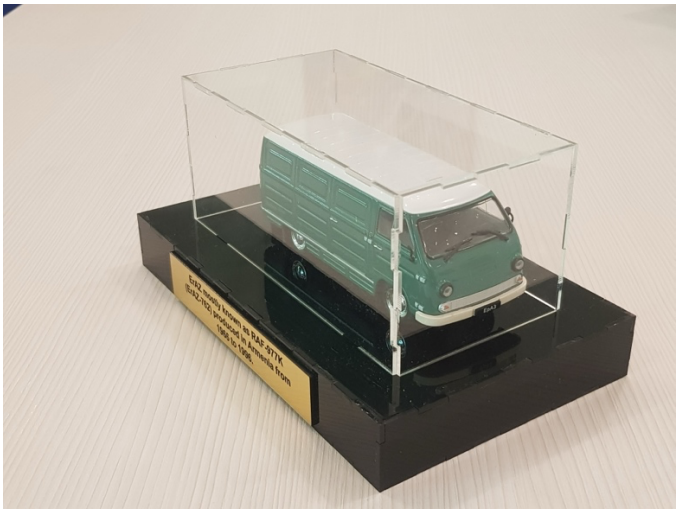
And along the way, as indicated in the above articles, the arts capture the challenges of each period and ignite the visions of the future.

Museum Corner

. Gift from Ambassador of India to the Museum of Science & Technology

Her excellency Ambassador Nilakshi Saha Sinha, Ambassador of India to Armenia, surprised us with a gift for the Museum of Science & Technology – a model replica of the ErAZ-762 which was produced in Armenia from 1966 to 1996.







Ambassador Nilakshi Saha Sinha handing the gift for the Museum of Science & Technology.

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