

# **Managing in the Age of Smart Machines**

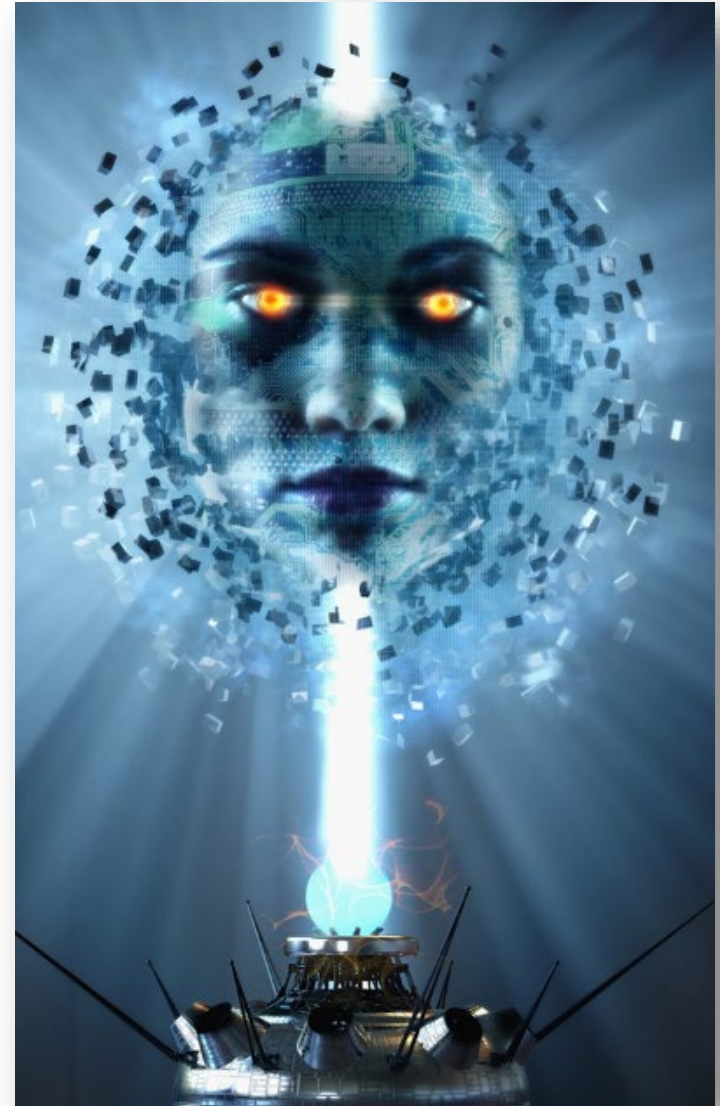
**Greater Rochester Quality Council**

**November 29, 2023**

**Sean Hansen, PhD**

Saunders College of Business  
Rochester Institute of Technology

A specter is  
haunting the  
human race –  
the specter of  
artificial  
intelligence.



"Before we share the planet with super-intelligent machines, we must develop a science for understanding them. Otherwise, they'll take control."

— James Barrat, *Our Final Invention: Artificial Intelligence and the End of the Human Era*

"I agree that the future is scary and very bad for people. If we build these devices to take care of everything for us, eventually they'll think faster than us and they'll get rid of the slow humans to run companies more efficiently."

— Steve Wozniak, Interview in *Australian Financial Review*

"One can imagine such technology outsmarting financial markets, out-inventing human researchers, out-manipulating human leaders, and developing weapons we cannot even understand."

— Stephen Hawking, writing in *The Independent*

"I am in the camp that is concerned about super intelligence ... I agree with Elon Musk and some others on this and don't understand why some people are not concerned."

— Bill Gates, in a Reddit Q&A session

"I think we should be very careful about artificial intelligence. If I had to guess at what our biggest existential threat is, it's probably that. So we need to be very careful."

— Elon Musk, speaking at MIT's AeroAstro Centennial Symposium

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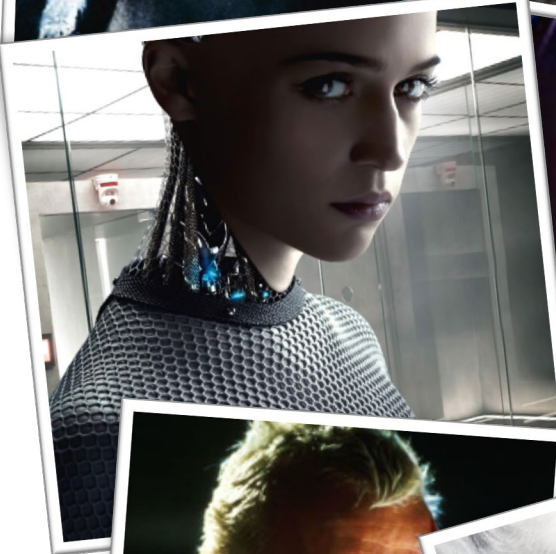
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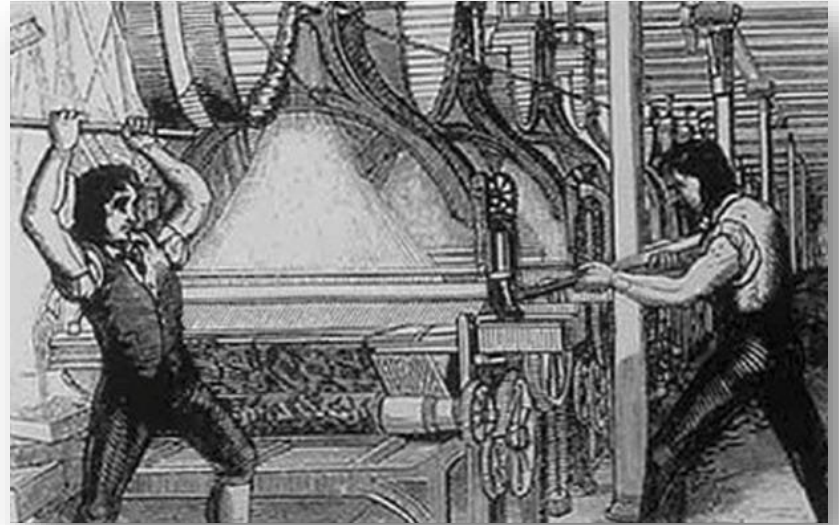




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# We've been here before ...

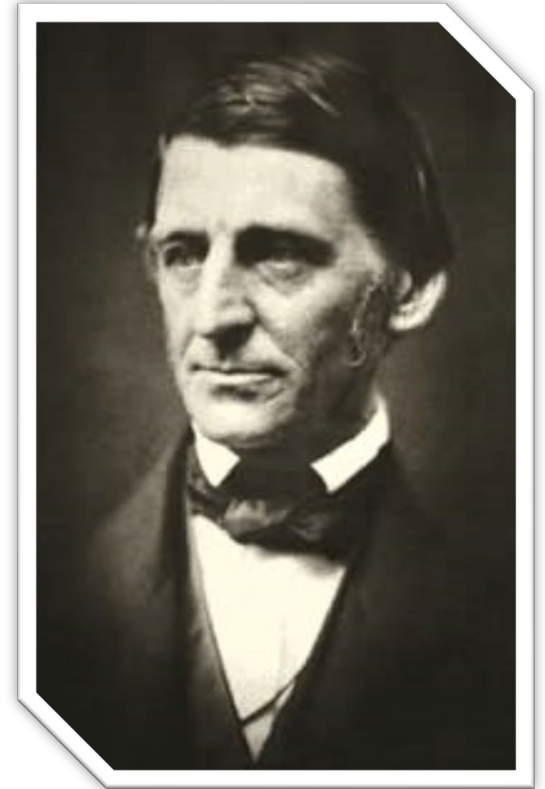
**Luddite:** *noun* (and *adj.*) –  
One who opposes the  
introduction of new  
technology, esp. into a  
place of work.



In the 19<sup>th</sup> century, the Luddites were English textile workers who protested against and vandalized emerging technologies, such as the power loom and spinning frame, which automated manual processes.



“The horseman serves the horse,  
The neat-herd serves the neat,  
The merchant serves the purse,  
The eater serves his meat;  
'Tis the day of the chattel,  
Web to weave, and corn to grind,  
Things are in the saddle,  
And ride mankind.”



– Ralph Waldo Emerson,  
*Ode, Inscribed to William H. Channing*

“I had worked hard for nearly two years, for the sole purpose of infusing life into an inanimate body ... but now that I had finished, the beauty of the dream vanished, and breathless horror and disgust filled my heart.”



– Victor Frankenstein upon seeing his creature, from *Frankenstein* by Mary Wollstonecraft Shelley



# Competing Schools of Thought

**Weak AI**

**vs.**

**Strong AI**



# Have we entered a new era?



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# Characteristics of Contemporary AI

- ***Adaptation***: Changing outputs based on search and experience.
- ***Probabilistic Prediction***: Inference based on probabilities.
- ***Pattern Recognition***: Identifying “hidden” associations and trends in data.
- ***Context Awareness***: Using sensor networks and computer vision to identify and respond to aspects of the environment.
- ***Generativity***: The ability to create new content.
- ***Autonomous Action***: No programmer required (for some tasks).





# Machine Learning and Deep Learning

**Machine Learning:** A set of algorithms that enables programs to improve their performance on a variety of tasks through recursive training and application.

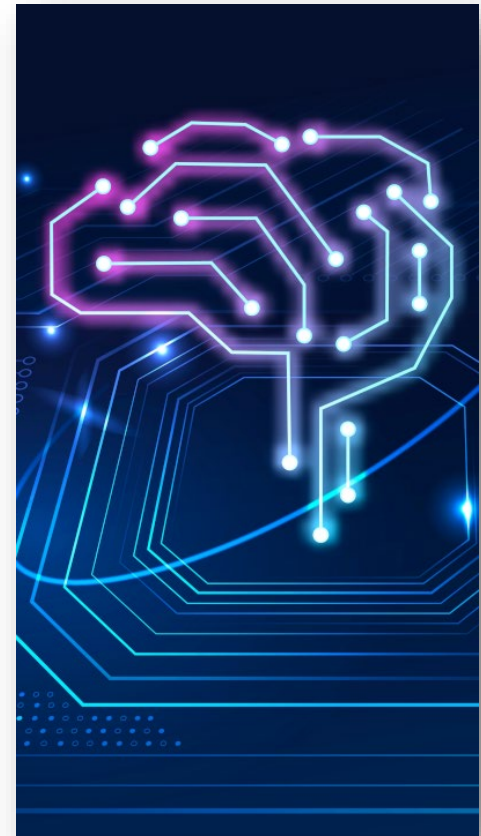
**Deep learning:** A subset of machine learning that uses artificial neural networks to mimic human information processing.



# Generative AI

AI that is capable of generating novel text, audio, images, or other media by leveraging natural language processing (NLP) and computer vision.

- This is where Large Language Models (LLM) come in.
- LLMs are built off large bases of text (e.g., all Internet content). Generative Pre-trained Transformer 4 (GPT-4) is an example.
- Other Generative AI: ChatGPT, Bard, DALL-E, and Midjourney.



# Exemplary Applications of AI



## Quality Management

Automated quality control  
Robotic process automation  
Sensing/Monitoring systems

Route management  
Inventory optimization  
Risk detection

## Supply Chain Management



## Nonprofit Management

Targeted fundraising  
Predictive engagement  
Event planning



# Exemplary Applications of AI

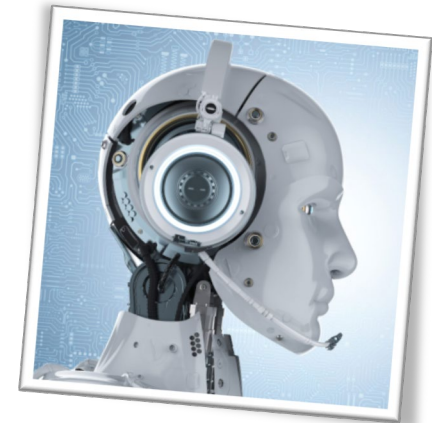


## Healthcare

Image analysis  
Diagnostic support  
Predictive alerts

Intelligent scripting  
Emotion analysis  
Inquiry routing

## Customer Service



## Human Resources

People analytics  
Targeted skill development  
Turnover intervention

# Exemplary Applications of AI



## Marketing

Targeted presentation  
Content personalization  
Digital nudging

Algorithmic trading  
Portfolio optimization  
Multi-agent simulation

## Finance



## Law

Litigation discovery  
Legal document generation  
Strategic guidance in settlements

# Managerial Implications

Start the exploration today! Don't wait for these technologies to achieve "maturity."

Focus on ***augmented intelligence***, rather than artificial intelligence – What skills or sensibilities will be needed?

Consider how AI can enable changes to a ***business model*** and ***business processes***.

***Strategy*** should guide the technology, not the other way around.

Executive support will be essential for the success of AI initiatives.





# Discussion

