TSUSG 2024
Artificial Intelligence

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U.S. DEPARTMENT OF ENERGY

AI can be defined in many, many ways.

Dictionary

Definitions from Oxford Languages · Learn more

🔊 ar·ti·fi·cial in·tel·li·gence

/ˈärdəˌfiSH(ə)l ənˈteləj(ə)ns/

noun

the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

A. M. Turing (1950) Computing Machinery and Intelligence. *Mind 49:* 433-460.
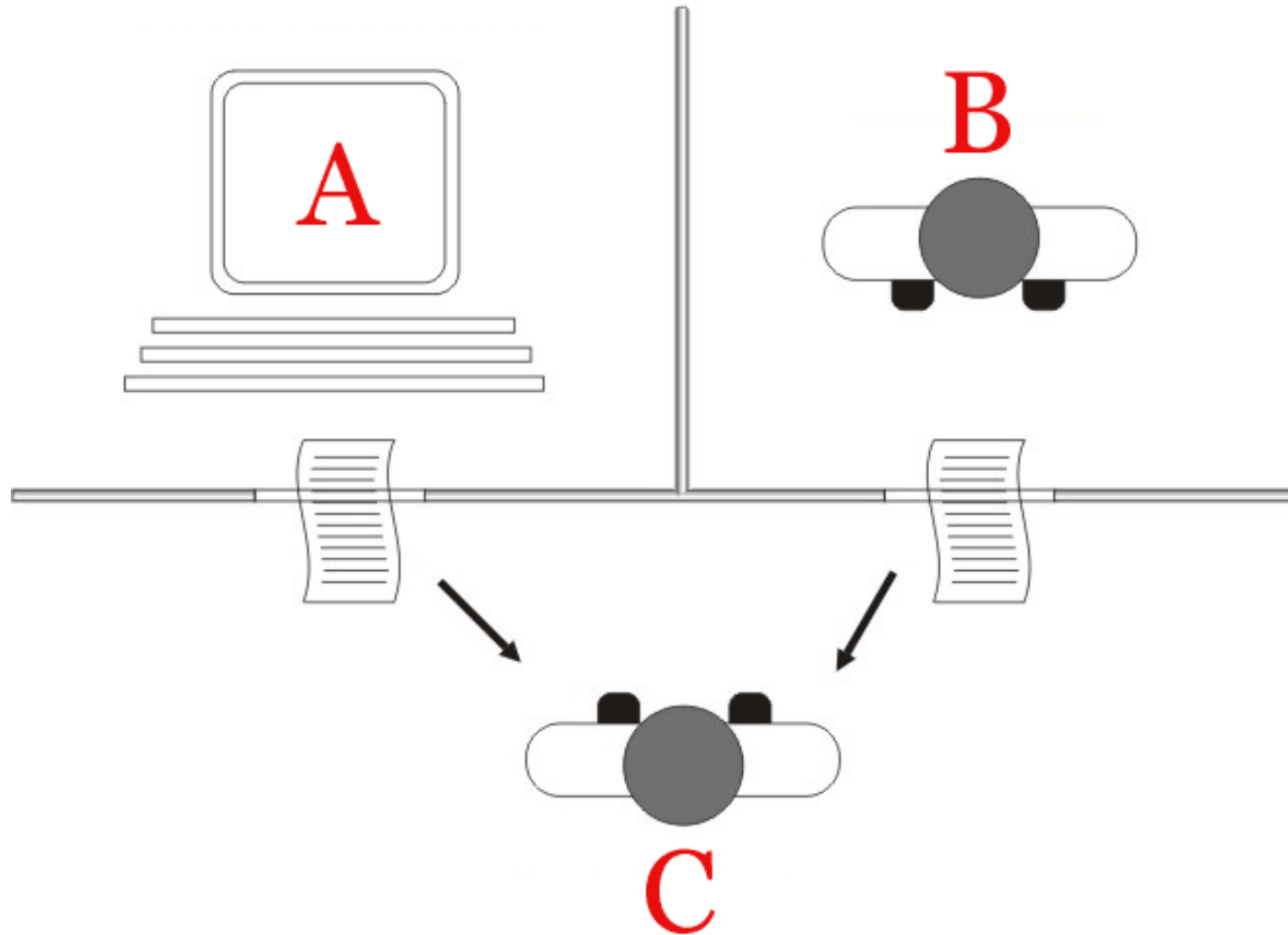
COMPUTING MACHINERY AND INTELLIGENCE
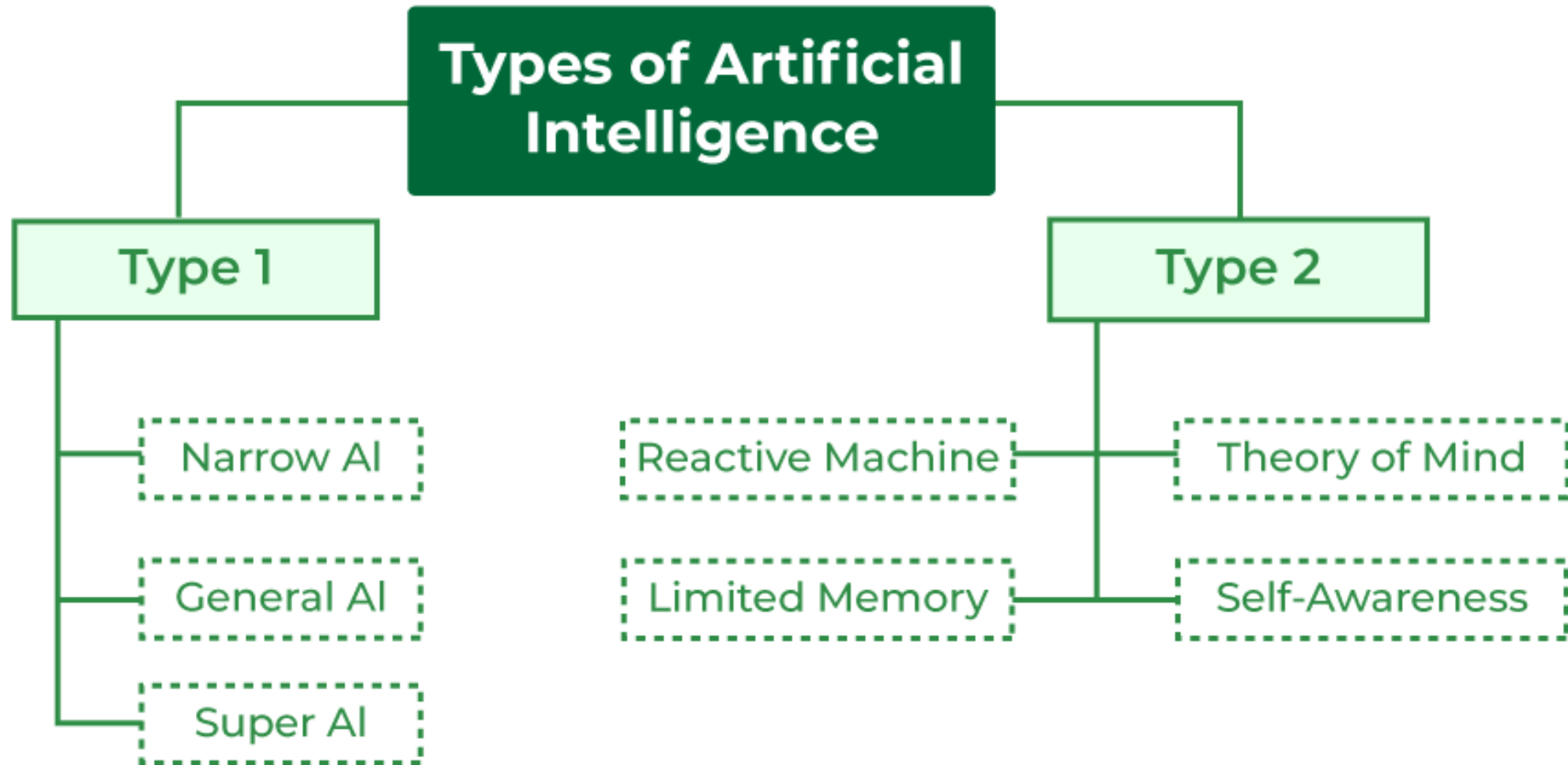
By A. M. Turing

1. The Imitation Game

I propose to consider the question, "Can machines think?" This should begin with definitions of the meaning of the terms "machine" and "think." The definitions might be
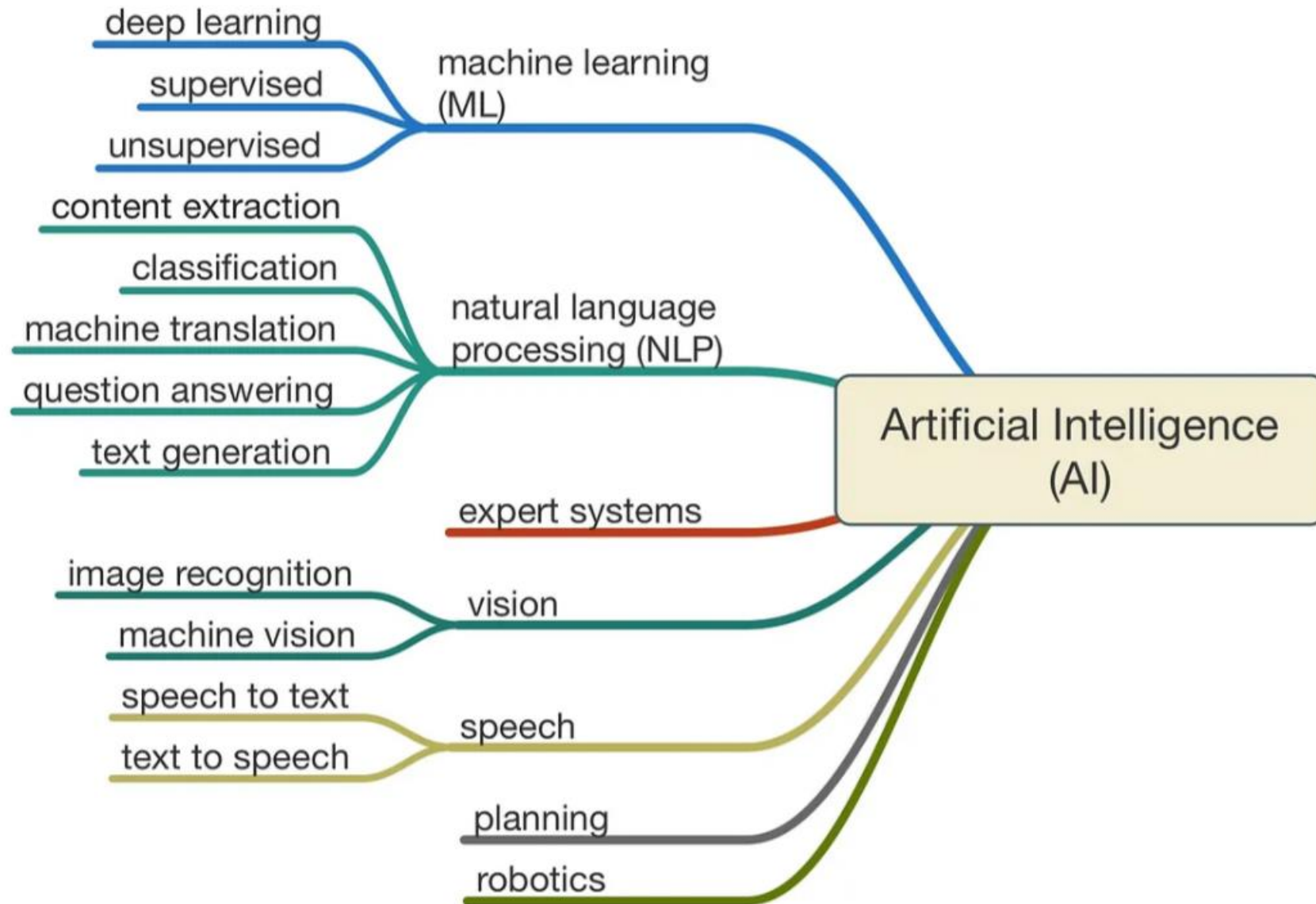
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The Turing Test Aims to Test "Intelligence"

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AI can be defined broadly in two categories.

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It can also be defined in a more granular fashion.

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What is AI?

It's complicated.

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The role of the TSUSG is to determine the implications of AI in transportation security.

Committee's Extensive Field and Practical Expertise

Brainstorming of State of the Art AI Methods and Techniques

Robust Understanding of What is Next in AI for Transport Security

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AI can be utilized by good and bad actors throughout the supply chain.

Main warehouse

Legend:
- ▲ Border crossing
- ✛ Airport
- Port
- Rail connector
- Highway
- Railway
- Marine highway
- – – Waterway connection
- Inland and coastal waterway
- Urbanized area
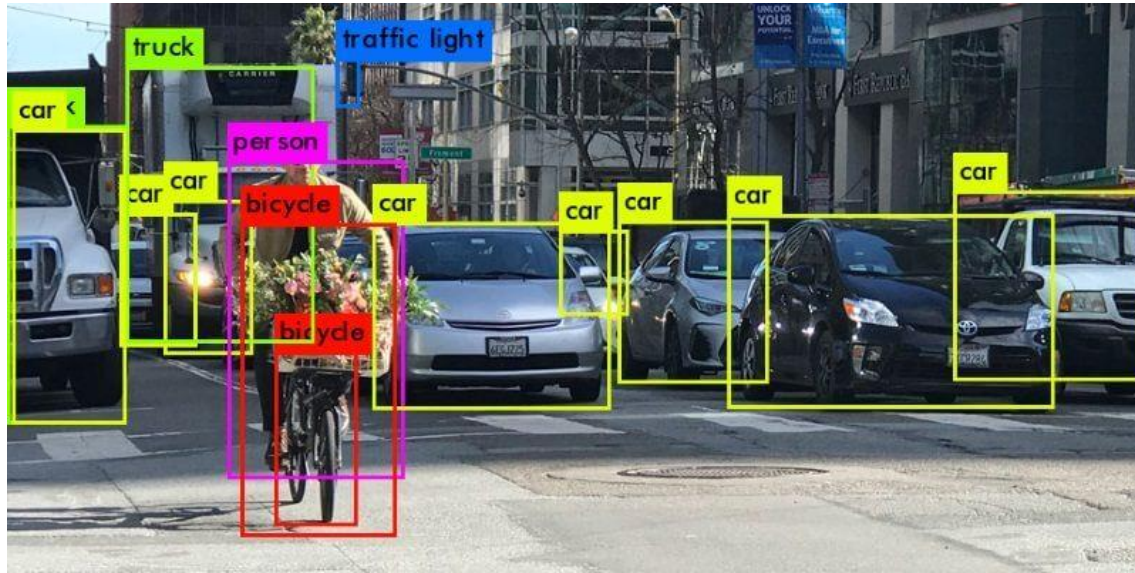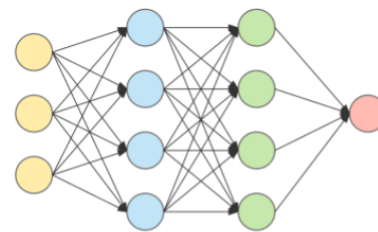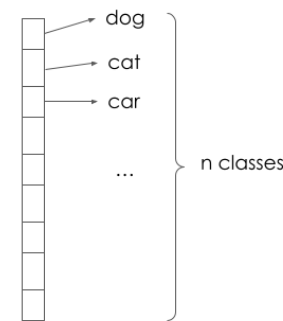
A straightforward example of AI in transport security is image classification.

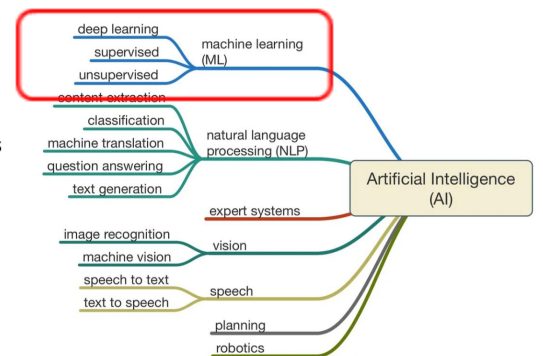Input photo

Backbone model
(resnetx, ViT, mobilenet, CLIP, etc

Classifier

dog
cat
car
...
n classes

deep learning
supervised
unsupervised
content extraction
classification
machine translation
question answering
text generation
image recognition
machine vision
speech to text
text to speech
planning
robotics

machine learning (ML)

natural language processing (NLP)

expert systems

vision

speech

Artificial Intelligence (AI)

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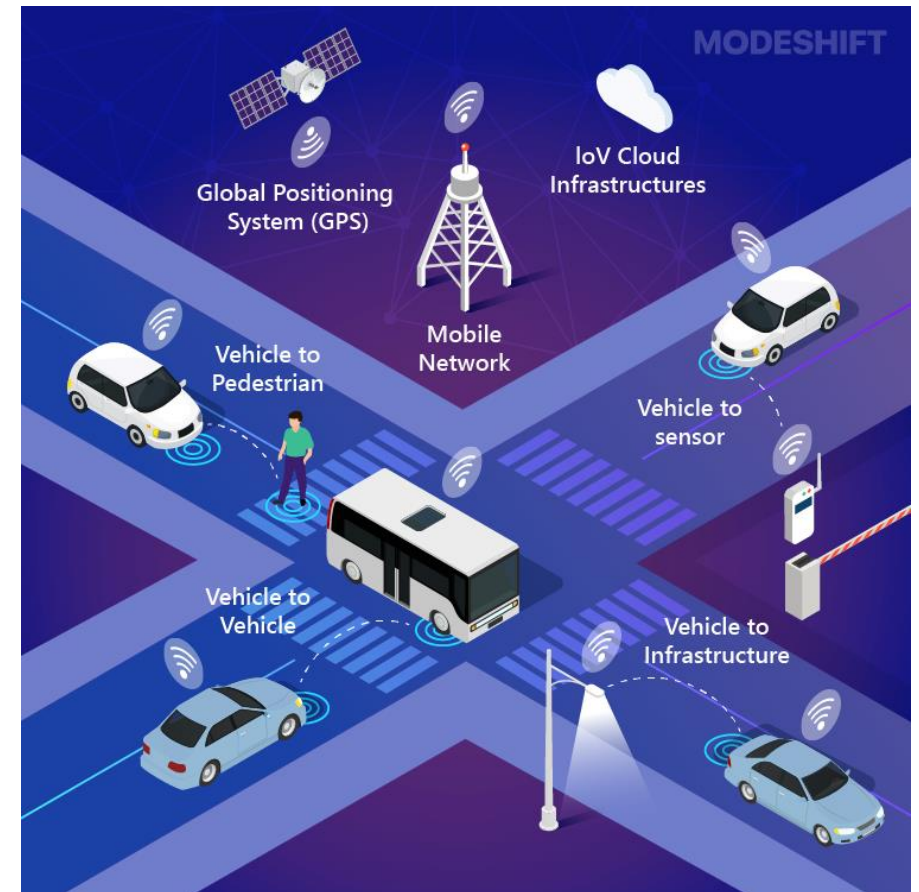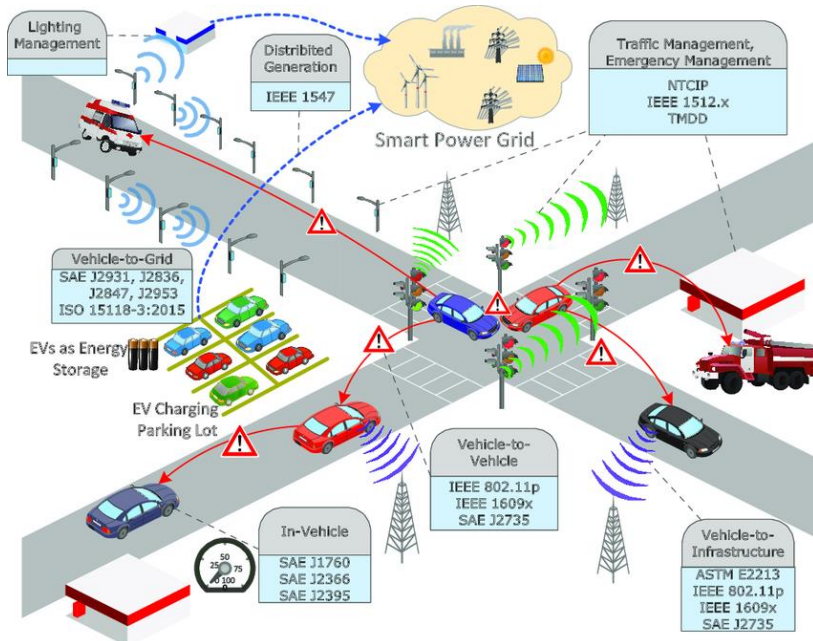National Laboratory

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AI brings interesting applications and intuition with predictive maintenance applications.
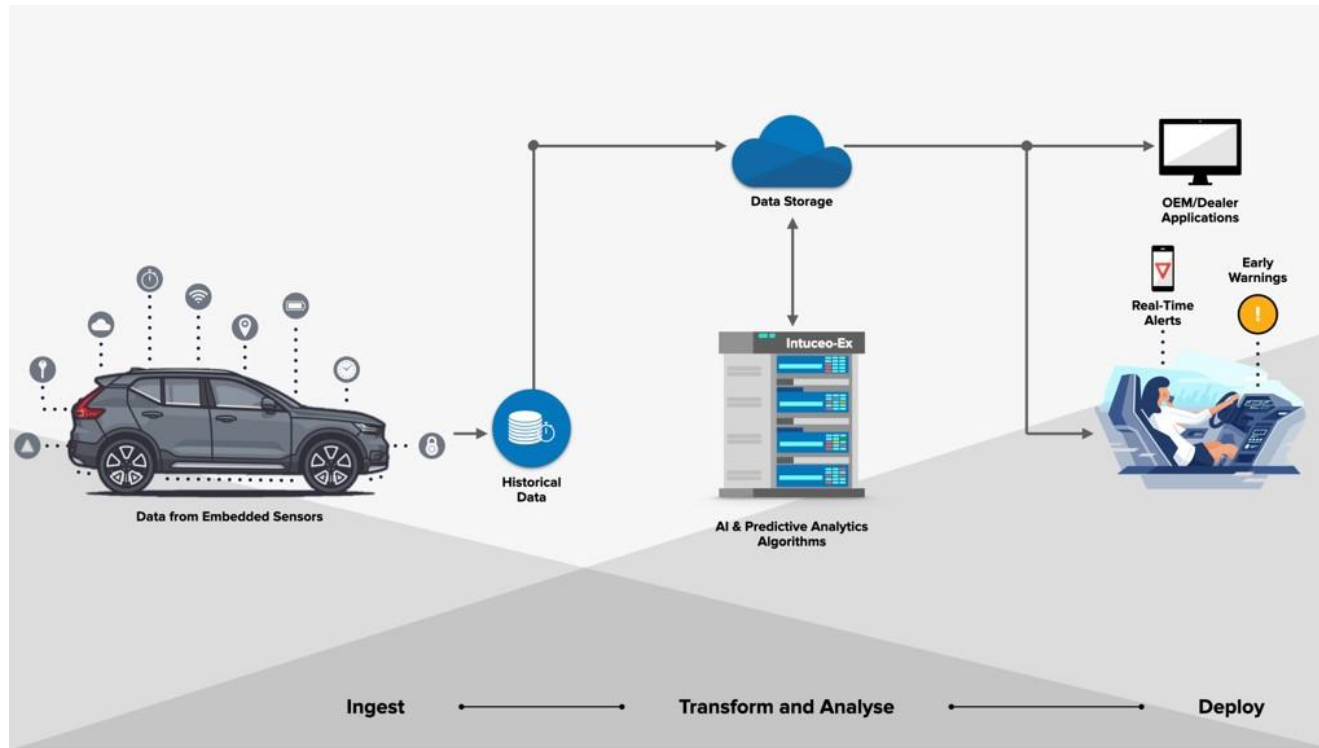
AI has direct impacts on traffic management and optimization.
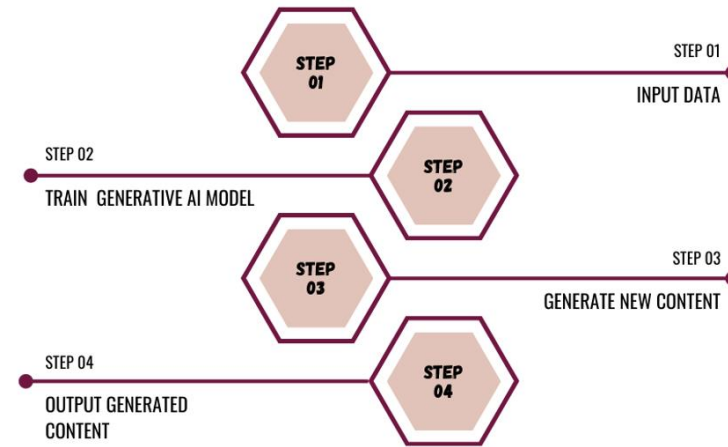
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Generative AI (GenAI) gives us the ability to potentially preemptively observe attacks before they happen.


Layers of AI

AI
Artificial Intelligence
The ability of machines to perform a task that usually need human intervention / intelligence i.e. language, images, and making decisions.

ML
Machine Learning
Task oriented subset of AI that develops algorithms that learn from provided historical data. Teaches computers to learn from data without additional programming. Ex: AI image recognition, and fraud detection.

DL
Deep Learning
Subset of Machine Learning – using complex algorithms to recognize patterns and make decisions. Ex: speech recognition, facial recognition, and autonomous driving

Generative AI
Subset of deep learning - Creates new and original content, rather than analyzing and identifying existing data. Ex: art, music, gaming, or text.

GENERATIVE AI PROCESS

STEP 01
INPUT DATA

STEP 02
TRAIN GENERATIVE AI MODEL

STEP 03
GENERATE NEW CONTENT

STEP 04
OUTPUT GENERATED CONTENT

STEP 01
STEP 02
STEP 03
STEP 04

@John Sladek from CNSC

Teams of LLM Agents can Exploit Zero-Day Vulnerabilities

Richard Fang, Rohan Bindu, Akul Gupta, Qiusi Zhan, Daniel Kang
University of Illinois Urbana-Champaign
{rrfang2, bindu2, akulg3, qiusiz2, ddkang}@illinois.edu

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There are risks within the vehicles you drive everyday, and this increases year over year.
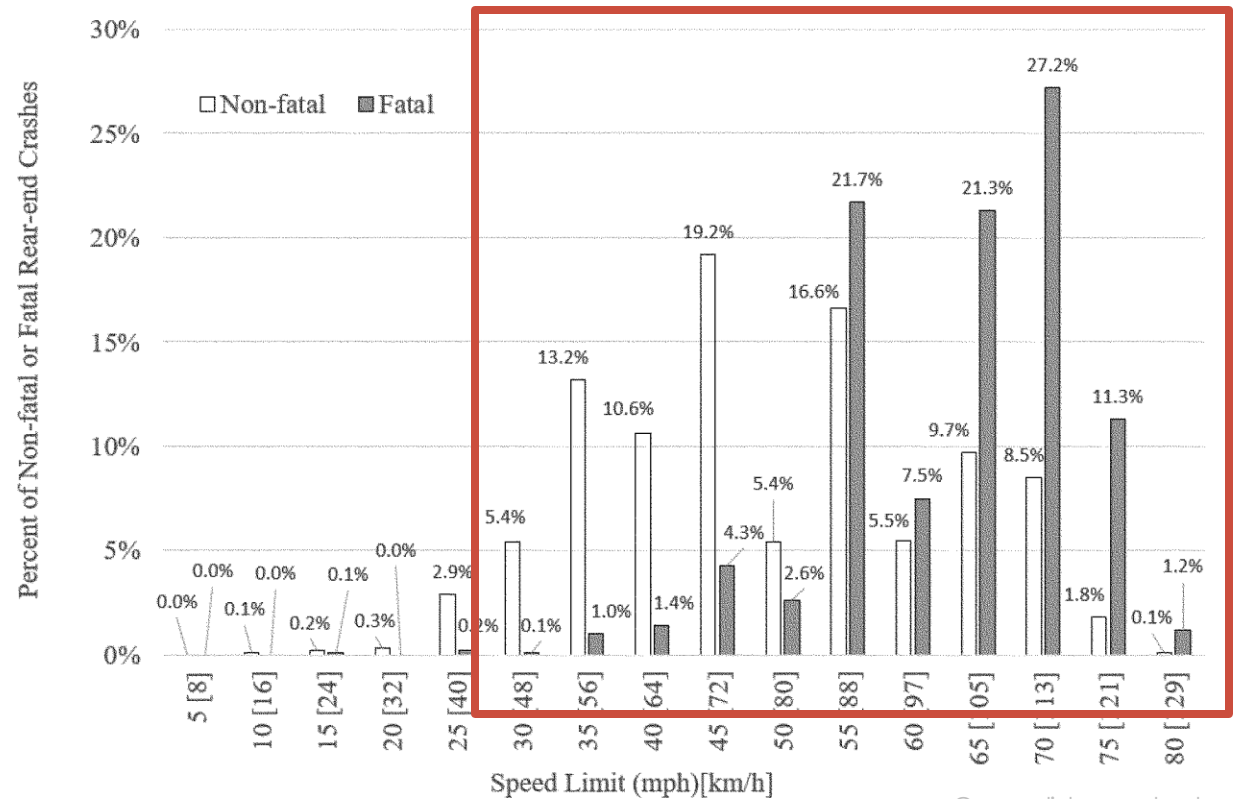
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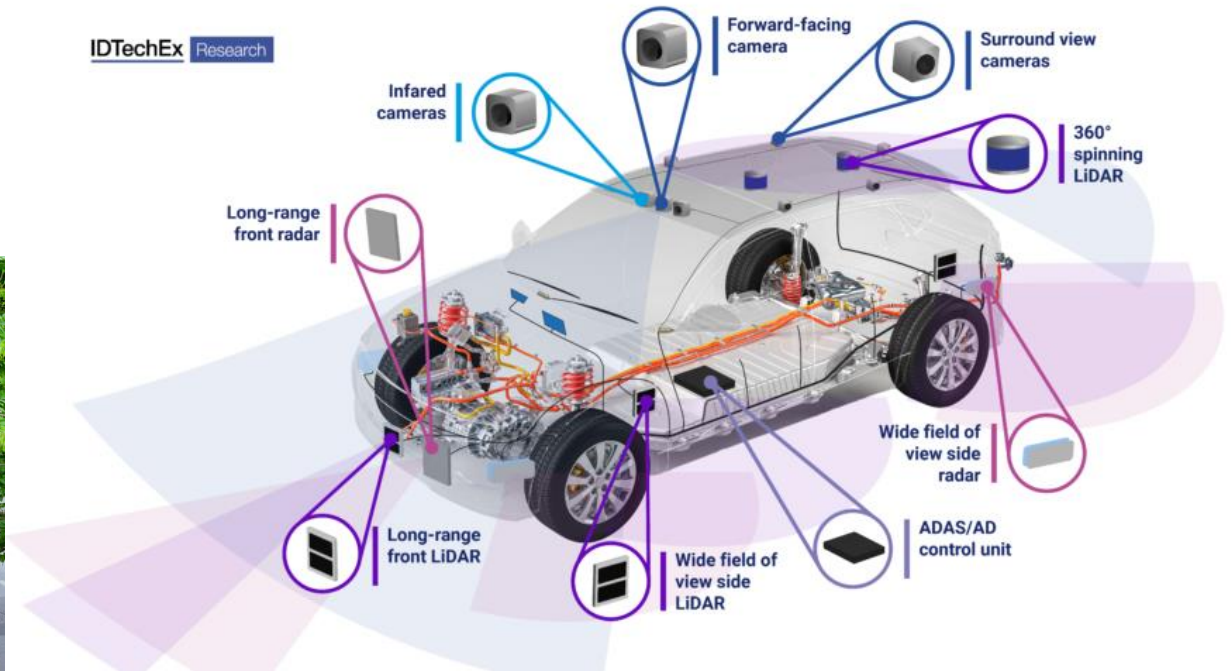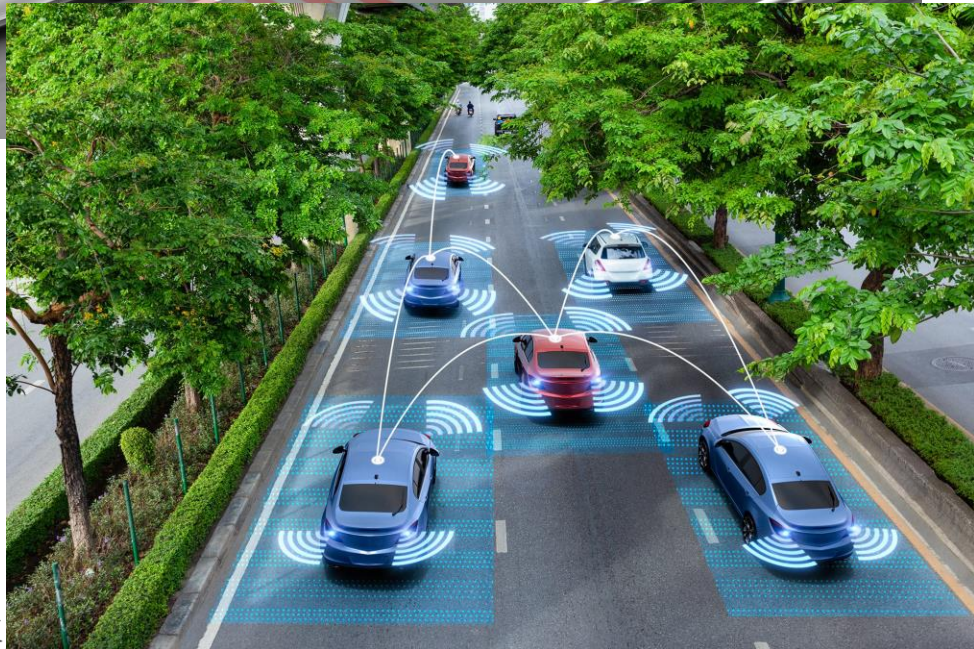
These risks extend into the heavy-duty domain, with mandates such as the NHTSA AEB mandate in 2025.

Figure 2. Distribution of Fatal and Non-fatal Rear-End Crashes by Roadway Speed Limit for Heavy Vehicles[32]

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AI is directly impacting transportation across the world

Intelligent Transport

How AI and machine learning enhances the safety, efficiency and passenger comfort of public transport

When users provide feedback to the operator on any part of their passenger experience, from cleanliness of toilets or the friendliness of staff...

Insider NJ

NJ TRANSIT RECEIVES FEDERAL GRANT TO DEVELOP ARTIFICIAL INTELLIGENCE SYSTEM FOR GRADE CROSSING SAFETY

NJ TRANSIT RECEIVES FEDERAL GRANT TO DEVELOP ARTIFICIAL INTELLIGENCE SYSTEM FOR GRADE CROSSING SAFETY. NJ TRANSIT to Work with Rutgers CAIT...

Dataconomy

New AI Security Bill Targets Weaknesses In Artificial Intelligence

Artificial intelligence (AI) is rapidly transforming numerous industries, from healthcare and finance to transportation and entertainment.

Forbes

Council Post: How AI Is Helping To Improve Transportation Safety On A Global Scale

CEO and co-founder of UVeye. getty. Artificial intelligence (AI) is transforming the transportation industry in many ways, and its impact on...

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AI is directly impacting transportation across the world

Smart Cities Dive

Ignoring AI is not a viable option for transportation officials: report

Artificial intelligence can create safer, more convenient and more equitable transportation systems, says an Eno Center for Transportation...

Intelligent Transport

Artificial intelligence: The new tool to make safe transportation accessible to all

Carlos Herrera Yagüe, Chief Technology Officer at Cabify, explores how artificial intelligence is transforming transportation accessibility,...

Federal News Network

DHS fills out AI safety board with big tech execs

The leaders of some of the biggest artificial intelligence companies are joining the new Department of Homeland Security board tasked with...

Intelligent Transport

Artificial intelligence in public transport

Jennie Martin, Secretary General of ITS (UK) – Intelligent Transport Systems, explains how artificial intelligence can support the wider...

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AI is directly impacting nuclear security

Department of Energy (.gov)

NNSA calls attention to the security of nuclear materials in transit at International Conference on Nuclear Security

On May 23, 2024, the United Kingdom and the United States co-sponsored an event at the IAEA International Conference on Nuclear Security to...

International Atomic Energy Agency

International Community Meets to Discuss the Future of Nuclear Security

Over 2000 Ministers, high-ranking officials, experts and delegates from all over the world will convene at the IAEA hosted, International...
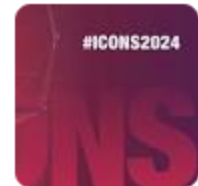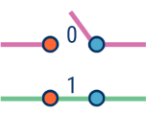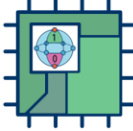
The Equation - Union of Concerned Scientists

Artificial Intelligence and the Evolving Landscape of Nuclear Strategy

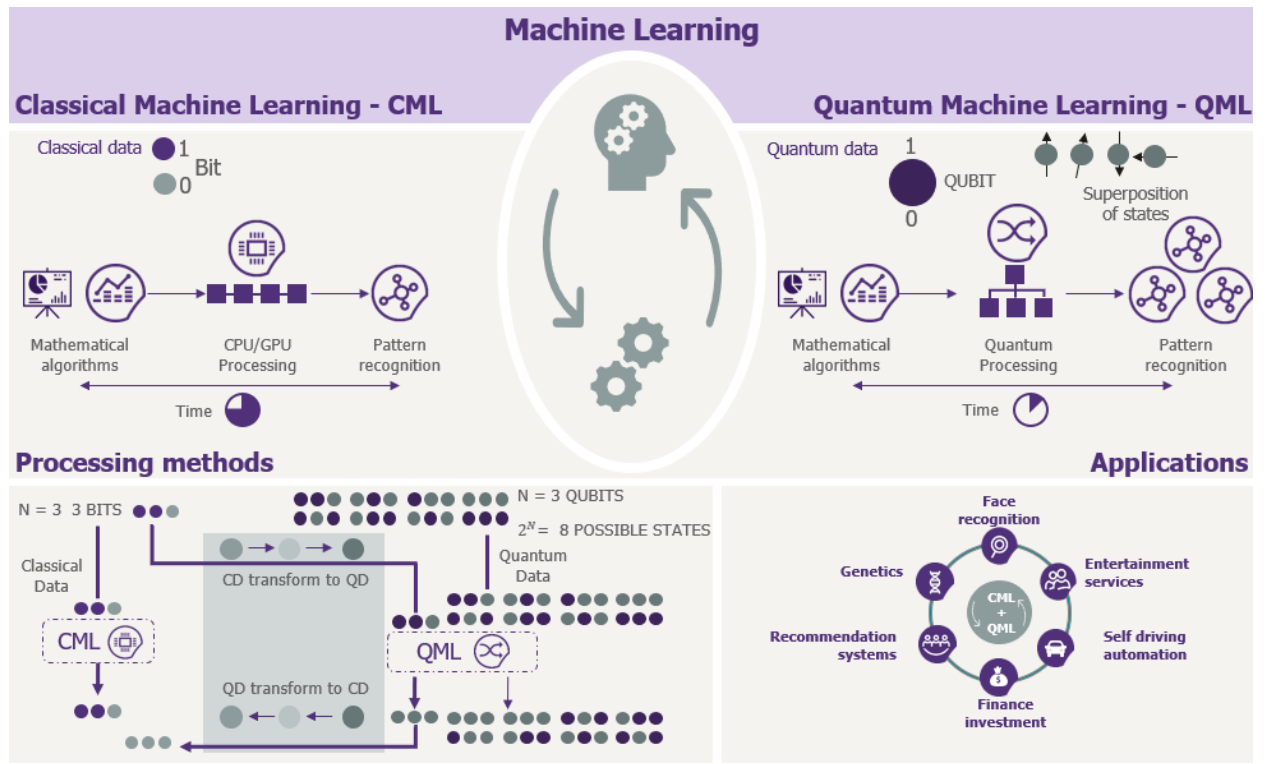How will an increasing reliance on artificial intelligence (AI) affect nuclear security policies?
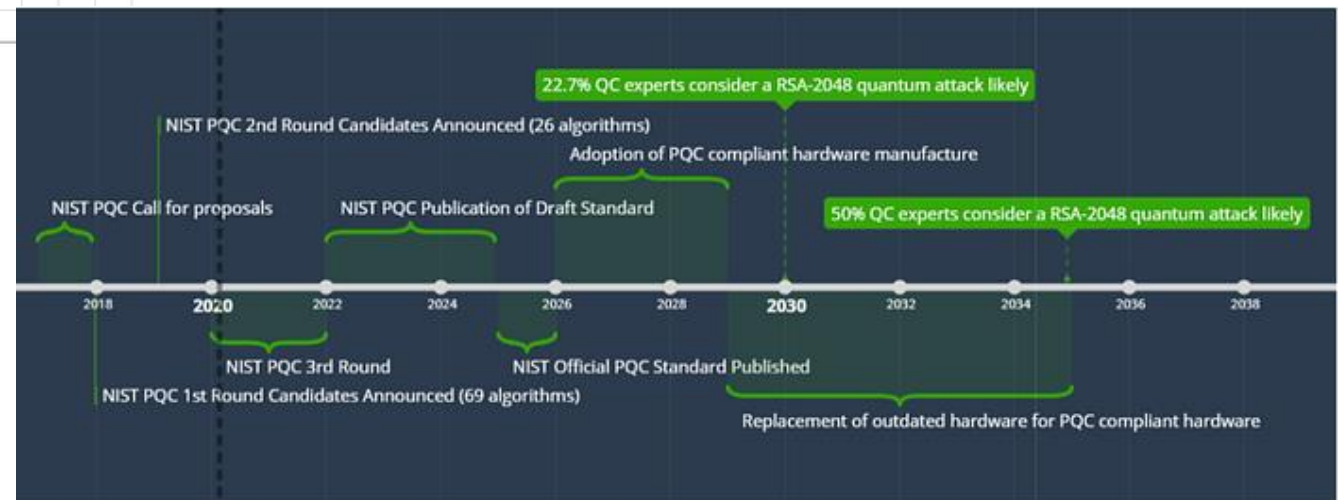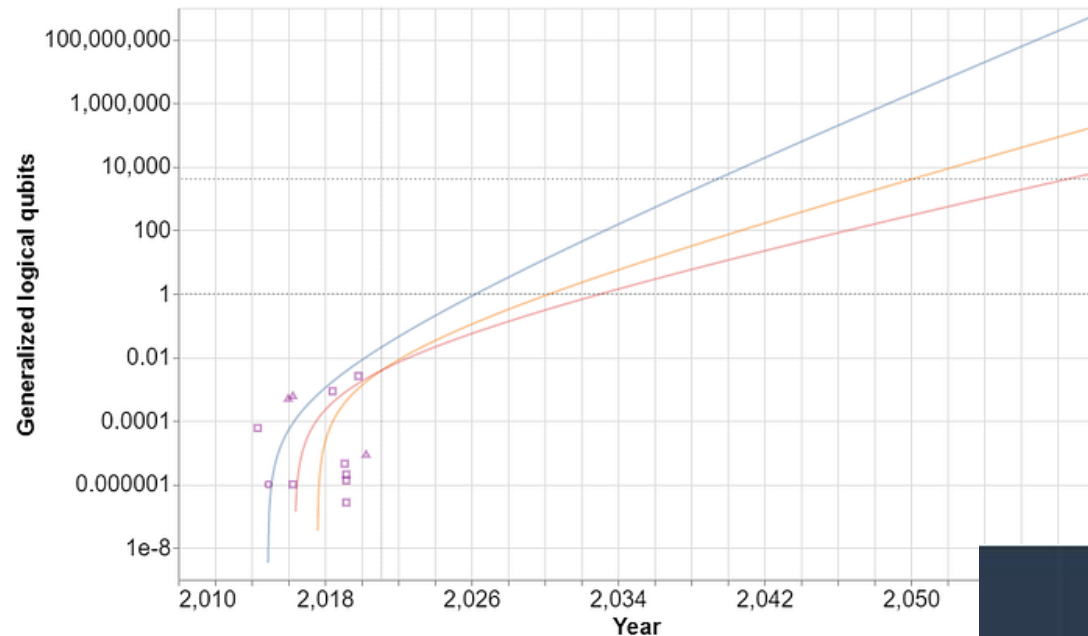
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What's Next – Quantum AI

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Quantum Computing poses a significant security threat in the future, especially related to RSA.

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AI has major implications for transportation security.

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