AI Trends and Challenges From Data Centers to Edge Devices

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February 2025

AI System Innovations

Development of GPGPUs, TPUs, and specialized AI chips.

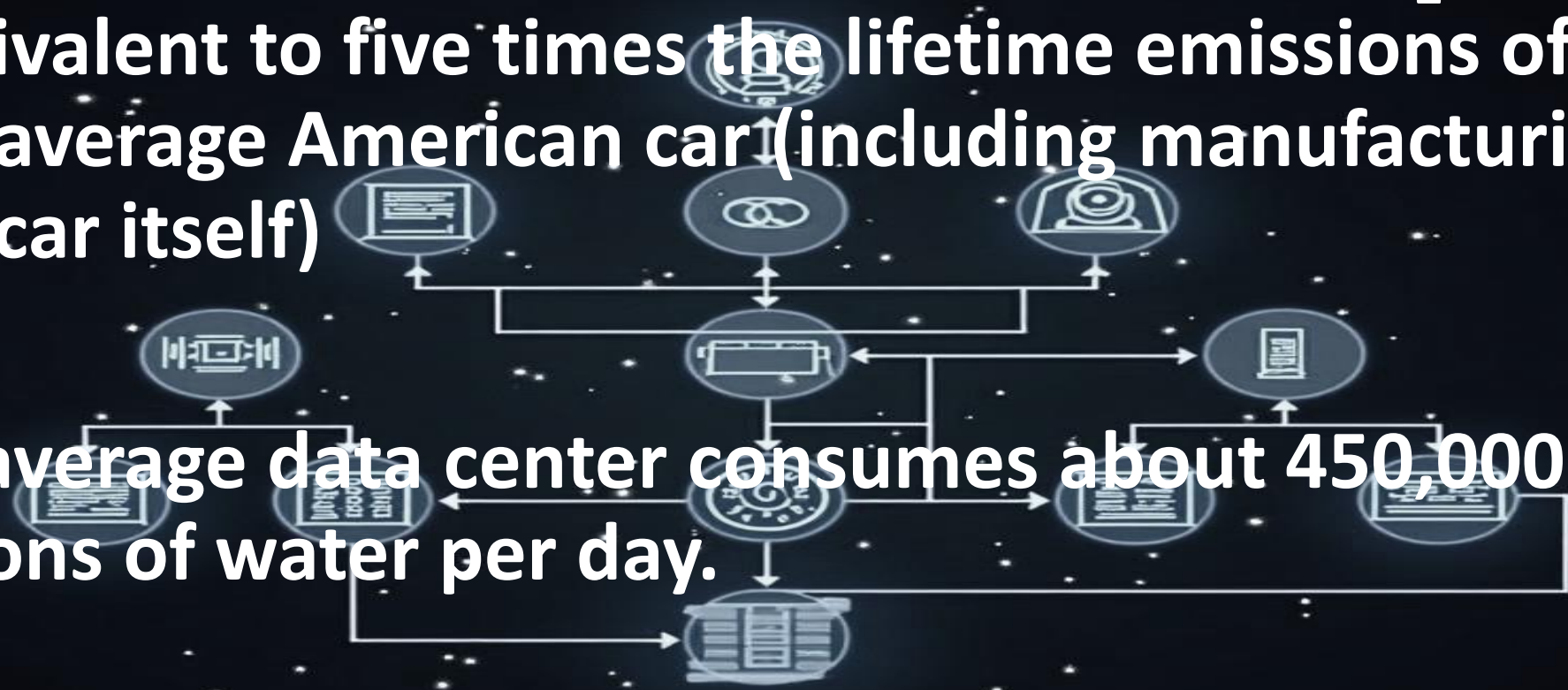
Development of new algorithms and frameworks.

Harvesting vast amount of data for training the models.

Investment in infrastructure and development of use cases.

AI End-to-End: Data Center to Edge

Carbon footprint for training GPT-3 in lbs CO_2 is equivalent to five times the lifetime emissions of the average American car (including manufacturing the car itself)



An average data center consumes about 450,000 gallons of water per day.

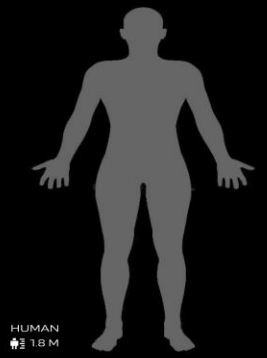
AI Technological Trends

Multimodal Gen AI inference is moving to the edge

- Inference power consumption crossing over data center training power consumption
- Challenges of privacy
- Need for the end-to-end security

Physical AI

- Humanoids for Industrial, Logistics and Healthcare
- Physical mobile system
- Multimodal sensor
- Immersive Gen AI



THE MOST NOTABLE HUMANOID ROBOTS IN 2024 - Ver 1.1

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About the creators

MERPHI is Sweden's leading design and R&D agency specializing in robotics. With a proven track record of creating famous robots and tech products, we empower our clients to elevate their offerings. We enhance product functionality, design, and user experience, ensuring a seamless fusion of technology and aesthetics. Our services include top-tier design, cutting-edge R&D, and user experience optimization.
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Icon Guide

- Robot's height (Meter)
- Robot's weight (Kilogram)
- Hand Payload (Kilogram)
- Degrees of freedom (DoF)

BostonDynamics

Atlas 2024.

1.75 | N/A | N/A | N/A

Atlas is a fully-electric humanoid robot. Unlike previous generations of the robot, this version doesn't rely on hydraulic actuators and is lighter and more compact, while also being stronger and more dexterous. Capable of dynamic motions, the robot can move and bend its body in ways that exceed human capabilities. (IEEE)

AGILITY ROBOTICS

Digit 2019.

1.75 | 65 | 16 | 24

Digit is a humanoid robot designed to move in a more dynamic fashion than regular robots do. It has nimble limbs and a torso packed with sensors that will allow it to navigate complex environments and carry out tasks like package delivery. (IEEE)

SANCTUARY

Phoenix 2024.

1.7 | 70 | 25 | 75

Phoenix, is the world's first general-purpose humanoid powered by Carbon™, a pioneering AI control system, designed to give Phoenix human-like intelligence and enable it to do a wide range of work to help address the labor challenges affecting many organizations. (SA)

FIGURE

Figure-02 2024.

1.68 | 70 | 20 | N/A

F-02 is an improved version of F-01 with more integrated body panels and wires tucked in. Figure brings together the dexterity of the human form and cutting edge AI to go beyond single-function robots and lend support across manufacturing, logistics, warehousing, and retail. (Figure)

TESLA

Optimus Ge2 2023.

1.78 | ~59 | 20 | N/A

Optimus Gen 2 is a general purpose, bi-pedal, humanoid robot capable of performing unsafe, repetitive or boring tasks. Achieving that end goal requires building the software stacks that enable balance, navigation, perception and interaction with the physical world. (Tesla)

APPTRONIK

Apollo 2023.

1.7 | 72 | 25 | 30

Apollo is designed to transform the industrial workforce and beyond in service of improving the human experience. It will first be used in logistics and manufacturing, but Apptronik promises "endless potential applications long term." (IEEE)

Unitree

G1 2024.

1.3 | 35 | N/A | <43

The G1 is a small, flexible and cost efficient humanoid robot. It can be optioned with articulating, force-controlled, three-fingered hands, which can be further optioned with tactile feedback. The robots battery has an operating time of "about 2 hours" and is designed to be quickly swapped out.

Fourier Intelligence

GR-1 2023.

1.65 | 55 | 50 | 44

Fourier GR-1 offers embodied AI that combines AI technology with physical robots, providing a controllable, perceptible, interactive, and mobile body. The GR-1 has significant potential in industrial, rehabilitation, home, and research applications. (fourierintelligence)

mentee robotics

Menteebot 2024.

1.75 | 70 | 25 | 40

Menteebot is developed for both warehouses and households. It is enhanced with Advanced Sim2Real transformation that minimizes the gap between simulation and reality. The highlight of this robot is the advanced semantic perception of the environment and the LLM interface. (Mentee Robotics)

XIAOMI

CyberOne 2022.

1.77 | 52 | N/A | 21

CyberOne is a humanoid robot designed to be a general and capable platform for industrial applications and research. It has advanced vision capabilities, enabling it to detect human emotion, as well as functionality allowing it to create 3D virtual reconstructions of the real world. (IEEE)

NEURA ROBOTICS

4NE-1 2024.

1.8 | 80 | 15 | N/A

NNE-1 is capable of carrying out multiple daily and industrial chores. One of the many X factors in the humanoid robot is that it possesses exchangeable forearms, which can be changed as per the requirement to make it serve any specific purpose. (Neura robotics)

1X

NEO 2024.

1.65 | 30 | 20 | N/A

NEO's body is engineered with muscle-like anatomy, making them strong and gentle like we are. It is one of the few humanoid robots covered fully by fabric covering. NEO can walk, jog, climb stairs, and navigate your space naturally. As they move and perform tasks, they get even more efficient. (1X)

AI Challenges

- Artificial General Intelligence (AGI)
- Super Intelligence
- Singularity
- Alignment
- Connected Agents (Virtual or Physical)
- Military decision-making and execution
- Balanced regulations, safety and freedom to innovate
- Geo-political forces that affect democratizing AI

Recommendations for AI Innovation in the Arab World

Focus on AI education to build skilled AI workforce.

Investments in AI research and development.

Establish startup incubation.

Collaborate on relevant and impactful mega-projects.

Align with, and influence global AI regulations.