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From Digital Intelligence to Physical Intelligence

Four perspectives on AI moving between the screen, the machine and the world we live in.

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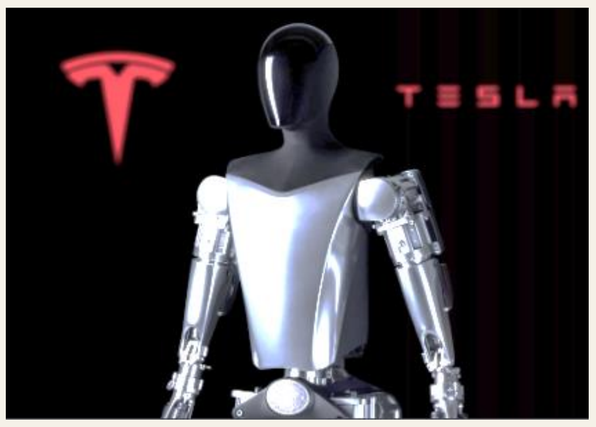
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FROM DIGITAL INTELLIGENCE TO PHYSICAL INTELLIGENCE

Nowadays, we all use AI on a daily basis. But now AI has become advanced, driving a major shift in the tech world. Over the past few years, Artificial Intelligence has largely been confined to screen interfaces. From generating text with ChatGPT to producing digital art, traditional Digital Intelligence processes data within virtual software environments. But now a drastic shift is occurring as technology moves from Digital Intelligence to Physical Intelligence. As we compare both, Digital Intelligence operates within the virtual world. It is an AI system inside screens that can process text, code, images, and data on screens and servers like ChatGPT, Claude etc. whereas Physical Intelligence operates within machines. It is an AI system integrated into hardware which can interact, answer your questions, can do physical things on your commands but physically present in front of you. Equipped with a physical body of metal, we call these machines Robots like Tesla Optimus (Gen 2) or Autonomous Machines like Tesla Automatic Car. We want to understand that How digital intelligence shifting to physical intelligence?

When Digital Artificial Intelligence was first introduced through ChatGPT in 2022 to the public, people initially thought that it was just like the Google Search Engine. Those who used ChatGPT at that time used it as a toy because AI is a type of machine which can interact with humans in their way. At the same time, AI was doing many logical, arithmetic, and mathematical errors in answering questions, which created an image of AI as a failure. After some time, ChatGPT launched improved updates which built trust in AI and the start of the Real Era of Artificial Intelligence.

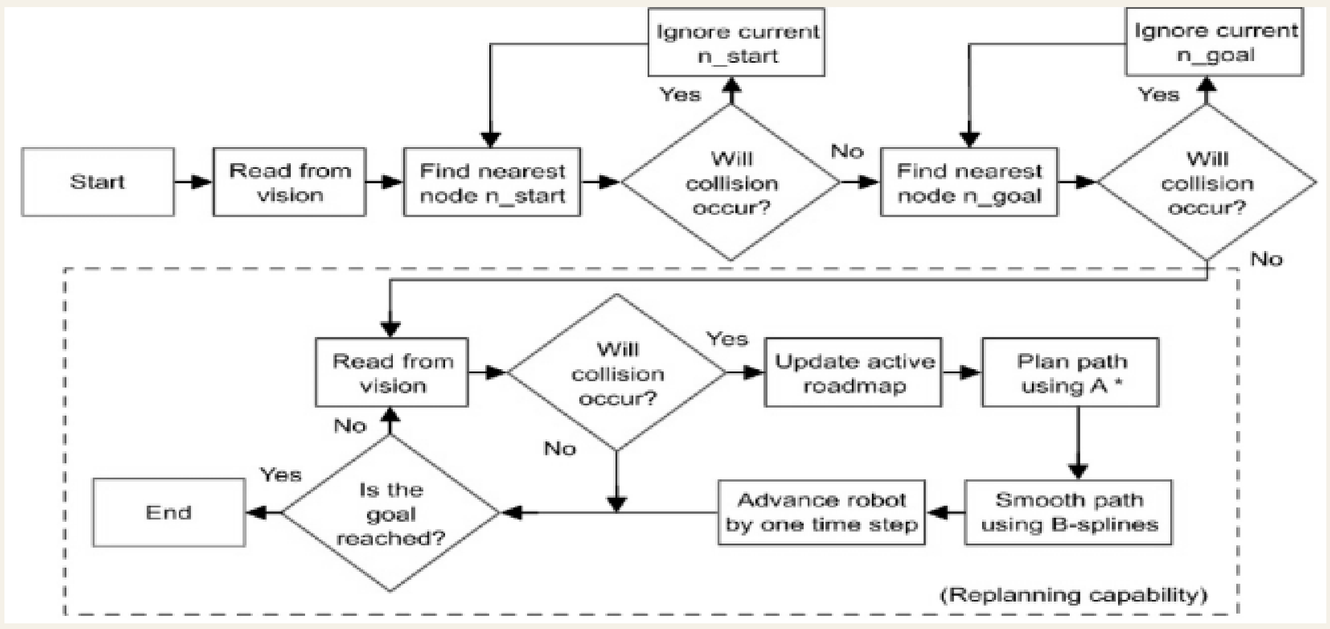


Tesla Optimus

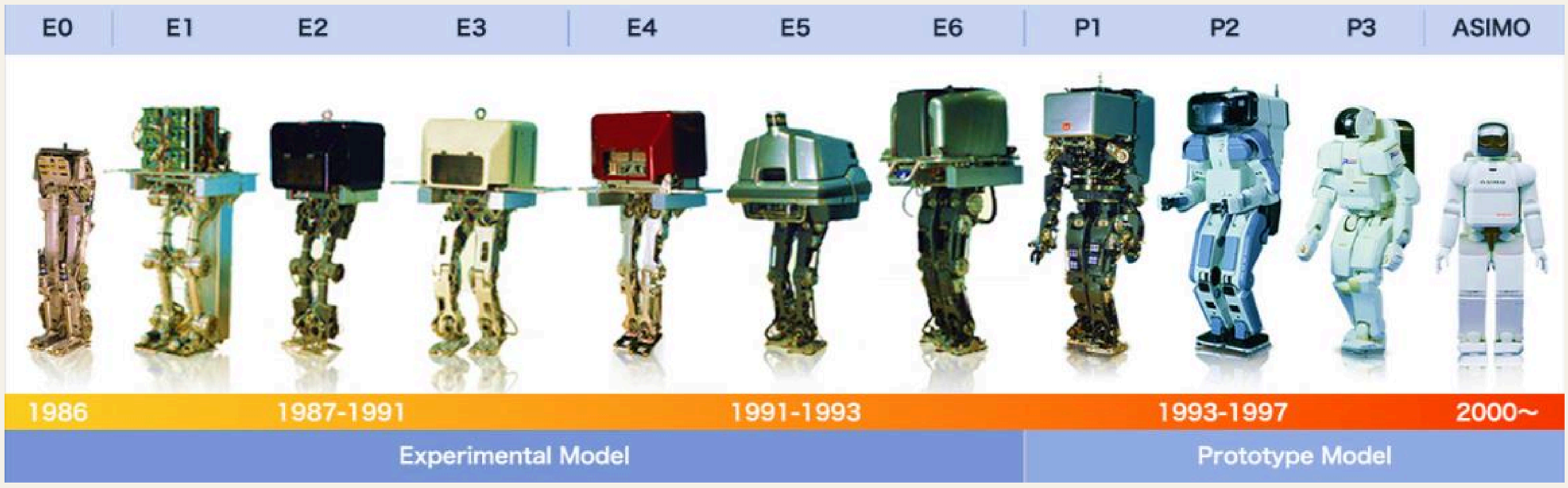
ChatGPT



From screen to machine: AI steps into the physical world



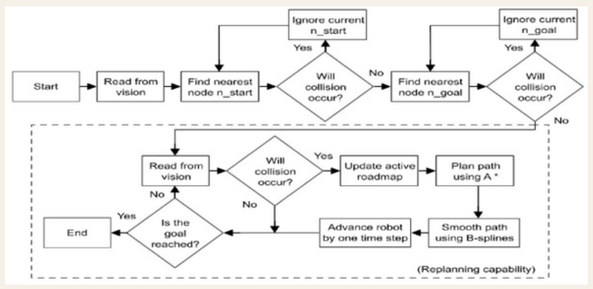
Most people say that AI is a new concept, which is wrong. Before modern Physical Intelligence, the concept of physical robotics began with Unimate (1961)—the world's first industrial robotic arm and Honda's ASIMO (2000), a machine that could walk on two legs.



The road to ASIMO: experimental and prototype models, 1986–2000

Now AI can do anything physically as well, and it happened due to the Evolution of AI. It took three steps which gave you AI as a friend, guide, teacher, etc.

Firstly, Addition of Sensors and Vision, that give AI the ability to see and measure. Secondly, Developing Spatial & Physical Reasoning, makes AI capable of self-decision making in some key areas. Third, Translating Software into Physical Movement (Actuation), when any output code runs in Digital AI, the Physical AI translates that code into electric impulses sent directly to physical motors. This makes AI a robot which can walk, work, and interact with us. From Healthcare to the Defence sector, both Digital and Physical Intelligence have transitioned to vital necessities. AI has evolved from a digital interface into a reliable physical assistant. In conclusion, the journey from software-bound algorithms to real-world physical systems mark a defining shift in human history. As hardware and artificial intelligence continue to merge, this evolution will redefine the future of human potential and automation.



Path planning with collision checks and replanning

3 STEPS TO PHYSICAL AI

1 — SENSORS & VISION

Gives AI the ability to see and measure.

2 — PHYSICAL REASONING

Lets AI make its own decisions in key areas.

3 — ACTUATION

Turns software output into electric impulses for motors.

-By Amish Saxena, B.C.A. 1st Year

THE RISE OF THE INTELLIGENT CITIES

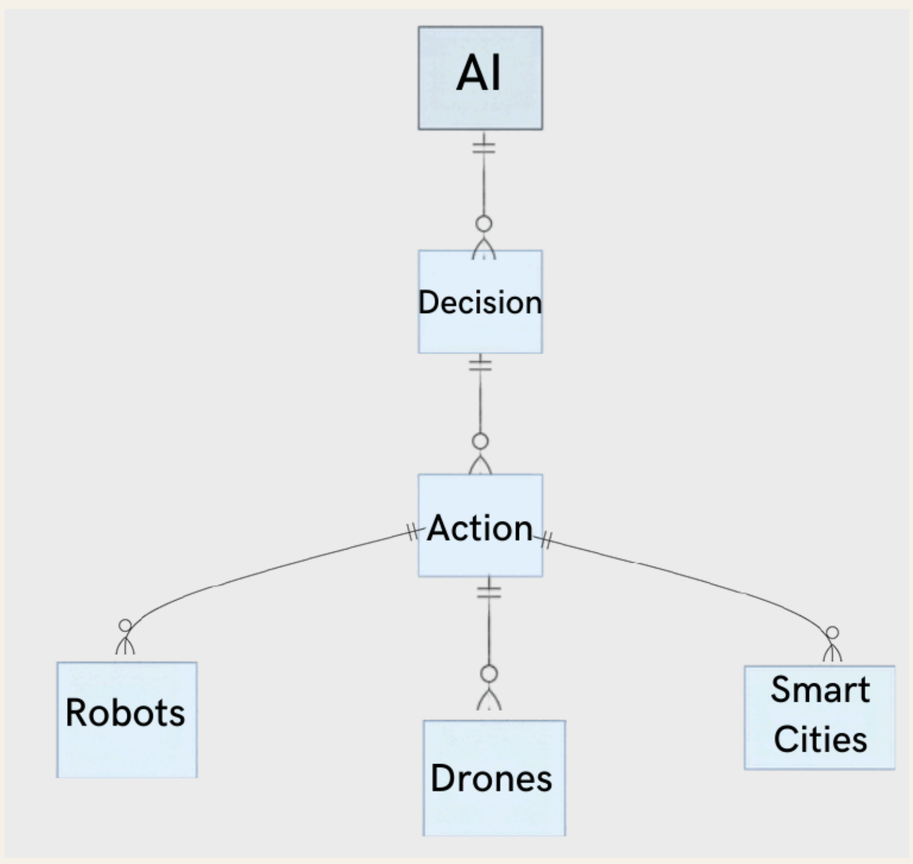
Welcome to an era of Physical Intelligence where digital code comes to life in the material world. See how decentralized edge-AI and self-governing robotics are transforming our concrete city grids into living, thinking systems.

WHEN AI LEAVES THE SCREEN: THE RISE OF PHYSICAL INTELLIGENCE

For years on end, artificial intelligence has been hidden in a glass screen. We type a query, and a chatbot whirs up a calculated response. This is Digital Intelligence — a disembodied brain, locked into the cloud. But now, an engineering revolution is happening - right in front of our eyes, as technology pioneers begin to liberate artificial intelligence from the server room to the environment we live in. The future is Physical Intelligence.



SHENZHEN: AI IN ACTION. Bionic Machine Maiden, humanoid robotic sculpture. Source: Shenzhen Evening News



WHAT IS PHYSICAL INTELLIGENCE?

Historically, "smart cities" have passively sent raw sensor data to be processed and visualized by human analysts on remote cloud servers, but physical intelligence entirely sidesteps third-party data collection by combining machine learning with decentralized edge computing. By replacing abstract data with embodied reality, AI networks are now capable of making localized decisions and initiating kinetic action via robotics and automata, whether it be in the form of self-repairing traffic systems or independent robotic vehicles. Our physical world can now make judgements and manipulate its environment, unaided and unescorted by human or cloud supervision.



Source: China Briefing

This autonomous delivery drone carries goods in the air. It bridges the divide between digital and physical intelligence. It takes computation out of the screen and into a mechanical body that makes calculations on the laws of physics to better navigate obstacles and wind to deliver its payload.

The Xpeng IRON humanoid robot serves as an excellent example of how digital information and physical objects can be combined into a working whole. Instead of simply performing calculations in a virtual environment, the robot's artificial intelligence is harnessed to perform calculations in real-life, such as compensating for the effects of gravity and its center of gravity. This enables the machine to take abstract digital information, such as code, and turn it into real-life movements that can be used to manufacture electric vehicles.



Source: Shenzhen Evening News

The sculpture is called the Bionic Machine Maiden Art Installation and was created as the centerpiece attraction of the Bay Area MixC Technology Festival in Shenzhen, China. As a whole, the sculpture is located in the heart of Shenzhen's high-tech business district.

The robot is 6 metres tall. The figure is striking in its combination of metallic silvery elements with realistic human features made of ultra-detailed skin. In addition, this smart sculpture has been given a unique feature for the visitor to experience smart technology that allows the head to turn and realistic fingers to move, creating a stunning effect of a living organism.

This robot is a perfect example of how digital technology can take shape in the real physical world, interacting with the same material objects around it. In other words, engineers have taken digital information in the form of a computer simulation and have given it life. Through the development of new hardware technologies and the intelligence of robots' movement and balance, they have taken the fight to a more advanced level — the level of real life.

-By Manya, BBA 1st Year

WHEN AI STEPS INSIDE A BMW FACTORY

From Digital Intelligence to Physical Intelligence

1. The Bigger Picture

When we hear the word Artificial Intelligence, we usually think about chatbots, image generators, recommendation systems or voice assistants. These are examples of AI working mainly with information.
But what happens when AI is given a physical body? This is where Physical Intelligence comes in.



2. The Case

BMW has been exploring the use of humanoid robots from Figure AI at its manufacturing plant in Spartanburg, South Carolina.
The project is part of BMW's larger effort to bring Physical AI into production. The goal is to use robots for tasks that are repetitive, physically demanding or require workers to do the same movements over and over again.

3. How It Works

The robot doesn't just follow fixed steps. It understands its surroundings, makes decisions and performs real actions.



4. Why BMW Is Testing Humanoid Robots

- Many factory spaces are already designed for humans (human-sized doors, shelves, workstations, tools).
- A humanoid robot can work in these existing spaces without redesigning the entire environment.
- It can handle repetitive physical tasks, reducing fatigue for human workers.
- This allows people to focus more on judgement, supervision, communication and problem-solving.

It's not about replacing humans, it's about working together.

5. The Challenges

Unpredictable Environment: Factories are always changing — people move, objects get placed differently, machines behave differently.

Safety: The robot must be able to detect people and work safely around them.

More Than Just Movement: The real challenge is making the robot understand, respond and perform reliably in real situations.

6. What Can We Learn From This?

The BMW example shows that AI is slowly moving beyond our screens.

Earlier, we mainly asked AI to give us information. Now companies are trying to make AI interact with the physical world.

A chatbot can tell us how to move a box. A physically intelligent robot could identify the box, pick it up and move it.

That difference may look small, but technologically, it's a major step.

7. My Take

What I find most interesting is how Physical Intelligence connects two areas that were previously treated quite differently — software and the physical world. We are used to thinking of AI as something inside a computer or phone. Humanoid robots show another possibility — AI that can see, move, interact and respond to the environment.

The BMW case is still part of an evolving technology, and there are many challenges before humanoid robots become common in workplaces. But it gives us an idea of where AI could be heading. The future may not simply be about smarter software. It may be about smarter machines that can actually do things in the real world.

KEY TAKEAWAY

Physical Intelligence is not just about thinking. It's about understanding, interacting and making a real impact.

Source: BMW Group Press Release (Feb 2024) · press.bmwgroup.com

-By Nandini Bansal BCA 1st Year

WHEN ARTIFICIAL INTELLIGENCE GETS A BODY

From digital intelligence to physical action



AI-generated illustration of the examples in this article: a robot waiter, drone crop-spraying and robotic telesurgery.

From thinking to doing

Jensen Huang, the CEO of NVIDIA, has repeatedly said that the next wave of AI is physical AI. The idea is simple, but important: a computer may write an essay in seconds and still struggle to fold a shirt or move through a cluttered room. Everyday physical tasks are difficult for machines because humans have evolved to see, move and balance in the real world over millions of years. Abstract reasoning is comparatively new in evolutionary terms.

In 1991, roboticist Rodney Brooks argued that intelligence cannot exist only as reasoning inside a computer; it also develops through perception and action in the real world (Brooks, 1991). More than three decades later, Google DeepMind's RT-2 offered a clear example. Trained on large amounts of text and images, it could control a robot and handle unfamiliar objects. When asked to find something that could work as an improvised hammer, it selected a rock (Brohan et al., 2023). Digital knowledge was guiding a machine in the physical world.

PHYSICAL AI, IN 4 SIMPLE STEPS

1 NOTICE

Camera / sensor spots what is there

2 DECIDE

AI works out what to do

3 ACT

Robot moves, lifts or drives

4 CHECK

It uses feedback to adjust safely

Example: a robot waiter detects a table, plans a route, carries food and adjusts if someone blocks its path.

DIGITAL AI VS PHYSICAL AI

DIGITAL AI

Works with text, code, images and data on screens and servers. A chatbot can explain how to fold a shirt.

PHYSICAL AI

Works through sensors, motors and hardware inside machines. A robot can see the shirt, grip it and fold it.

The change is already happening

This is not just a future possibility. The International Federation of Robotics reported that around 542,000 industrial robots were installed worldwide in 2024—more than double the number a decade earlier—and 4.66 million industrial robots are now in operation (IFR, 2025). Amazon has also reported using one million robots across more than 300 facilities (TechCrunch, 2025). Waymo has reported fewer crashes causing serious or fatal injuries in its driverless-car data, but these are company-reported figures and should be read in that context (Waymo, 2026).

PHYSICAL AI: THE SCALE TODAY

542,000

industrial robots installed worldwide in 2024

4.66 million

industrial robots operating worldwide

1 million

robots Amazon says it uses across 300+ facilities

Sources: IFR (2025); Amazon figures reported by TechCrunch (2025). Company-reported figures are identified as such.

The change may be as wide-reaching as UPI. UPI did not only change payments: it changed how street vendors, banks and customers work. Physical AI could similarly reshape jobs and services. Workers may first notice changes in tasks such as sorting parcels, serving food or spraying crops. Businesses may gain new ways to work; customers may receive faster services; and governments and schools will face pressure to prepare people with new skills and rules.

WHO FEELS THE CHANGE?

WORKERS

Tasks and skills change

BUSINESSES

Costs and services change

PUBLIC

Speed, access and safety

GOVERNMENTS

Training and rules

Physical AI is already visible in India

At Resham Dhaba in Murthal, a robot waiter brings hot parathas to customers. It appears to be an added attraction rather than simply a replacement for staff (OPEN Magazine, n.d.). Under the Namo Drone Didi scheme, 15,000 drones have been approved for women's self-help groups, enabling them to offer crop-spraying services to farmers (All India Radio News, 2024). Healthcare offers another example: India's SSi Mantra surgical robot was used for a reported telesurgery between Colombia and Indore, roughly 22,000 kilometres apart. Its maker says the system costs less than many imported alternatives (Indian Pharma Post, 2026).

THREE EVERYDAY EXAMPLES FROM INDIA

FOOD SERVICE

A robot waiter carries food at Resham Dhaba, Murthal.

FARMING

Drone services help spray crops; Namo Drone Didi supports women's self-help groups.

HEALTHCARE

A surgical robot enabled a reported remote operation between Colombia and Indore.

The risks cannot be ignored

Some jobs will change or disappear, and workers will need time and support to adapt. The World Economic Forum projects that 92 million jobs could be displaced by 2030 while 170 million new jobs are created. This projection covers wider technological, economic and demographic changes—not physical AI alone (WEF, 2025). Safety and privacy matter too: a machine that makes a mistake near people can cause harm, while cameras and sensors may collect personal data in homes and public spaces. These are risks to manage, not reasons to pretend the technology is not advancing.

The International Federation of Robotics expects industrial robot installations to grow by about 7% annually until 2028 (IFR, 2025). As robots become cheaper and improve through simulation and practice, their use may spread beyond factories into hospitals, elder care, construction, disaster rescue, small shops and farms. Growth alone, however, is not enough.

What needs to happen next?

Workers need practical training before their jobs change. The Namo Drone Didi scheme links drone access with pilot training, helping women become service providers instead of being left behind (Voice&Data, n.d.). Access must also be fair and affordable. Clear safety standards and strong data-privacy protections are needed wherever machines operate near people. Most importantly, humans should remain responsible for judgement and care, while machines take on heavy, risky and repetitive tasks.

FOUR CONDITIONS FOR RESPONSIBLE PHYSICAL AI

TRAIN PEOPLE

Teach workers how to use and maintain new tools.

KEEP IT SAFE

Test machines before they work near people.

PROTECT PRIVACY

Limit unnecessary collection of personal data.

KEEP HUMANS IN CHARGE

People remain responsible for judgement and care.

The real question

For decades, we measured machine intelligence by what it could say. The next chapter will be measured by what it can do. I believe this shift can be useful if we guide it well. The harder question is who gets to share its benefits: a village woman flying a drone over nearby fields, or a patient in a small town whose surgeon is on another continent. Get training, rules and the human role right, and machines can work beside us—taking on difficult tasks while people focus on understanding and empathy. AI is becoming something that works in the world, not just something we talk to. What we do next will decide whether it works for us.

-By Vrishtha Singh, BCA 2nd Year

Keep reading, keep learning and keep growing.