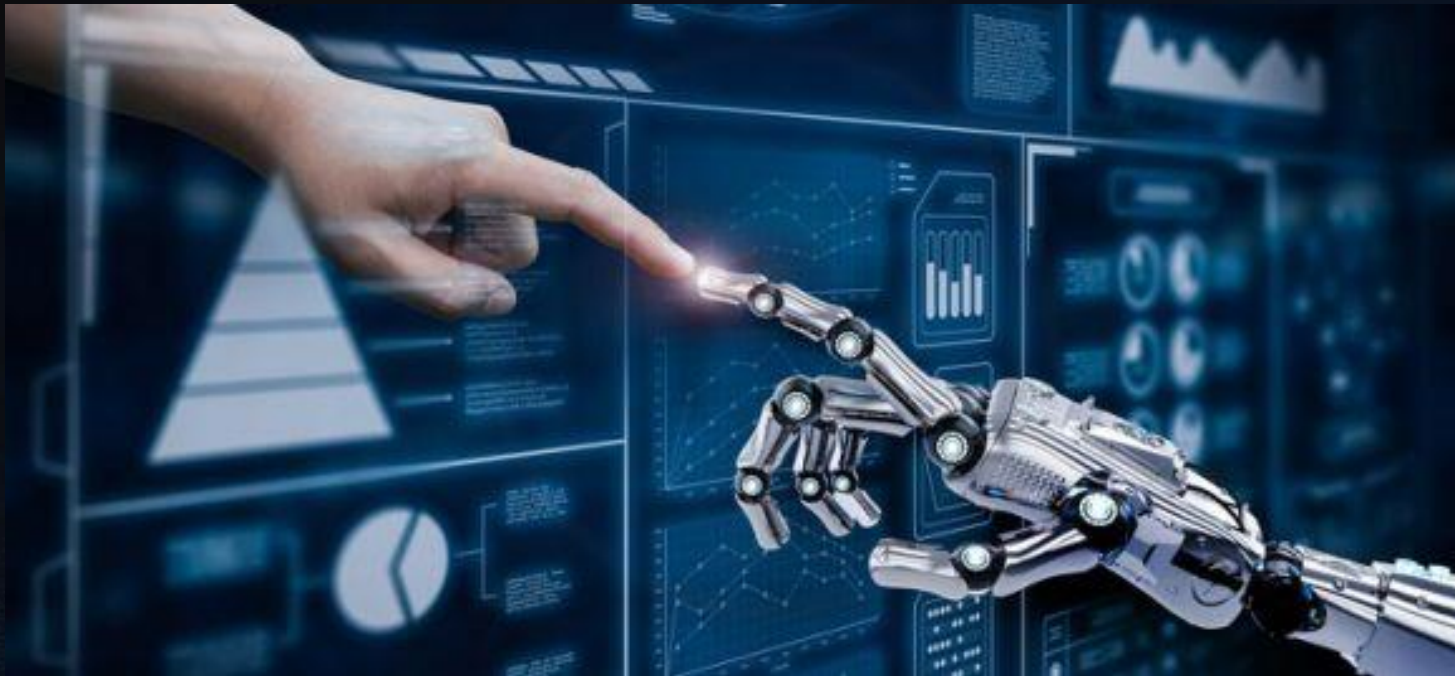


# How is responsible robotics different from responsible AI?

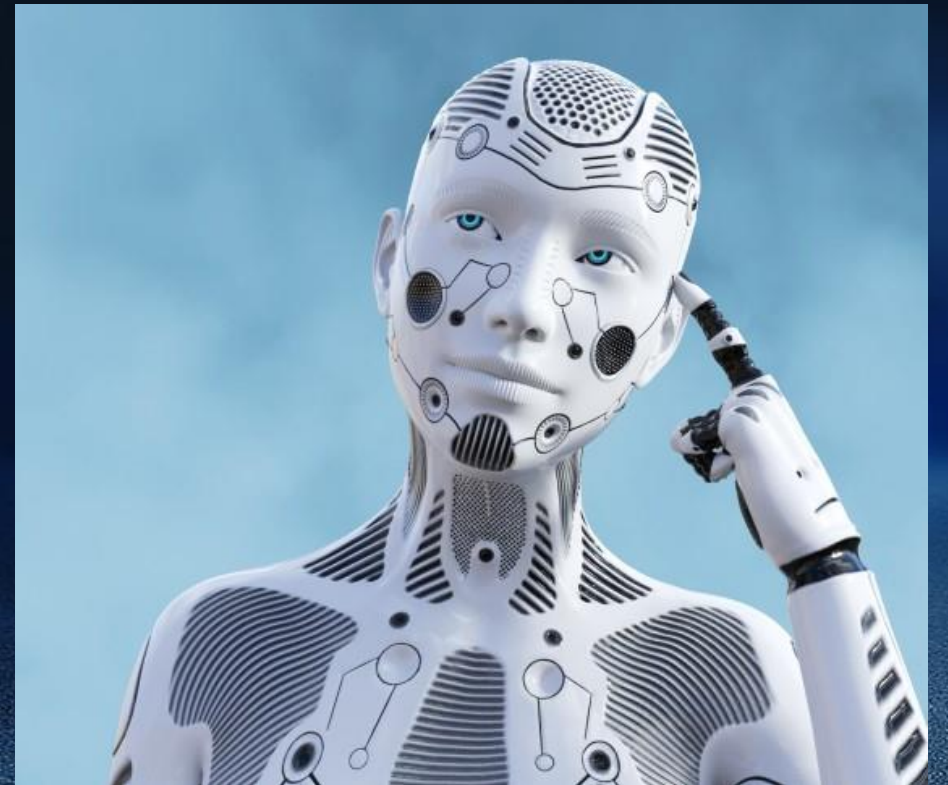


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# AI is increasingly embedded in robotics

- AI-enhanced perception and sensing
- Autonomous navigation
- Natural language processing
- Machine learning for control
- Social robotics
- Robotic process automation
- Swarming and multi-agent systems
- Etc.





# Applicability of EU guidelines for responsible AI

- EU Ethics guidelines for trustworthy AI
  - Human agency
  - Safety
  - Privacy
  - Fairness
  - Social and environmental well-being
  - Transparency
  - Accountability
- EU AI Act
  - Risk assessments for AI systems



# Robotics: unique ethical issues and risks

## Physical harm

Robots can cause physical harm to humans, property and the environment. Special safety needs.





# Robotics: unique ethical issues and risks

## Physical freedom and bodily integrity

Robots can touch and physically restrain humans and can restrict freedom of movement. Special rights protections needed.

## Impactful decision-making

Robot decisions have more real-world impacts than AI decisions since robots can physically act on their decisions.

# Robotics: unique ethical issues and risks

## Privacy and surveillance

Robot-mounted cameras and sensors can invade privacy in physical spaces in ways that software AI systems cannot





# Robotics: unique ethical issues and risks

## Human-robot relationships

More complex than human-AI relationships because embodied and more interactive

## Accountability

More complex than in AI systems, because robots operate in complex environments and outcomes are often consequential

# Resulting options

Option 1: Special ethics guidelines for robotics and robotics act

Option 2: Annexes to EU Ethics guidelines for AI and AI Act

Option 3: Updating or annexing Machinery Directive and General Product Safety Directive



THANK YOU !