

If robots had reflexes

The future of real-time **intelligence**



The big challenge

Robots are modern, but the way they are controlled is **outdated**



Rigid processes

Expensive reprogramming



Slow reactions

No real-time adjustments

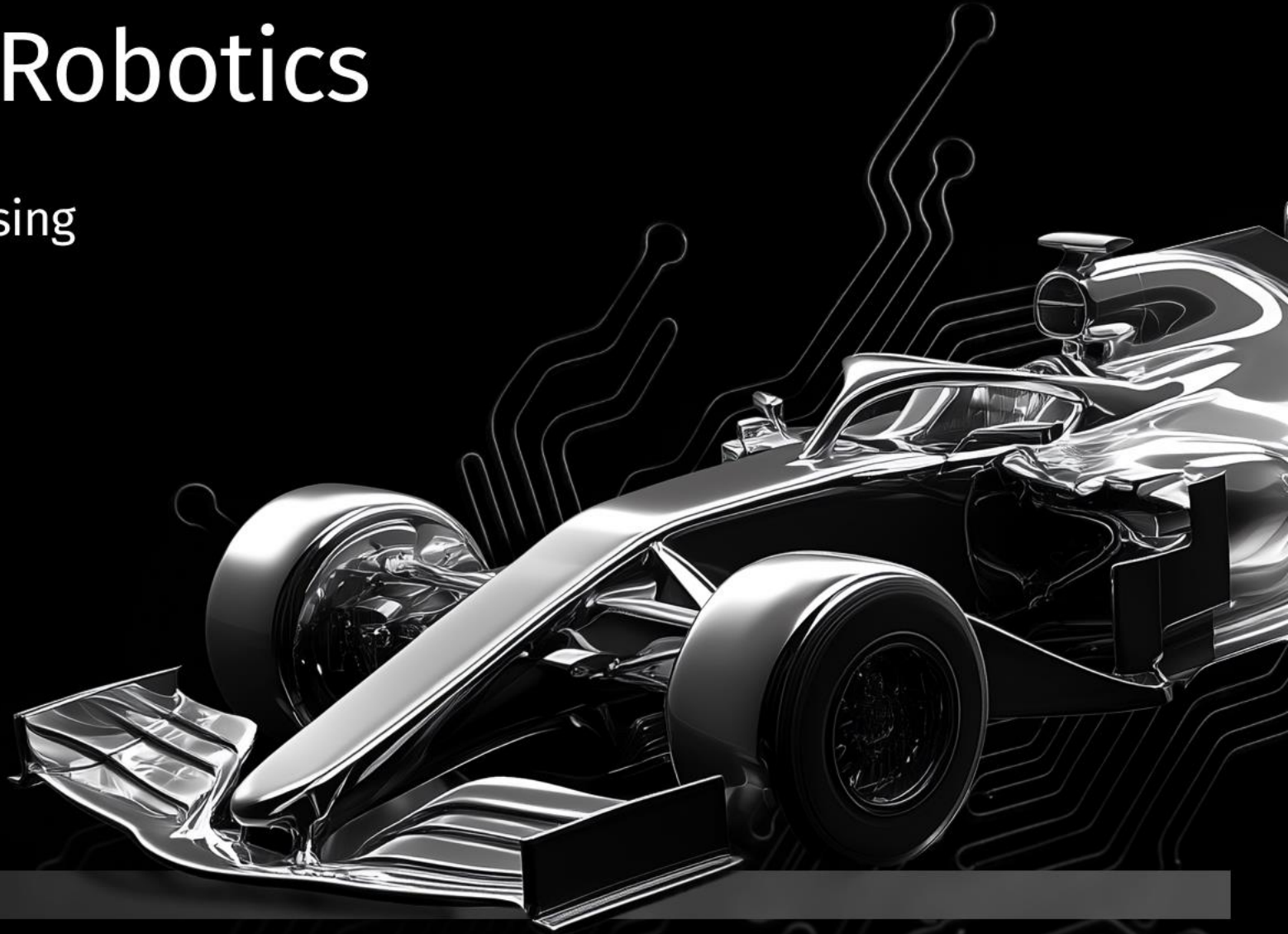


No real adaptability

Production bottlenecks & costly downtime

Formula 1 vs. Robotics

- Real-time data processing
- Continuous adaption
- Milliseconds decide



Why classic control systems are not enough

SPS & CPUs

Traditional control

good for predictable processes, but slow for real-time decisions

VS.

FPGAs

Real-time intelligence

process data in microseconds – enabling real-time responses

Reflex robotics in industry – today

- High-speed pick-and-place robot with FPGA-supported image processing
- Adaptive grippers that adapt to different objects
- AI-supported pattern recognition for error avoidance

Reflex robotics in industry – tomorrow

- robots in flexible assembly
- Autonomous transport systems (AGVs)
- Collaborative robots (cobots)

AI + FPGA = reflex-like robotics



AI

Learns & optimises autonomously



FPGAs

Calculates reactions without delay



Real-time sensor technology

recognises changes in milliseconds

Why is reflex robotics not yet standard?

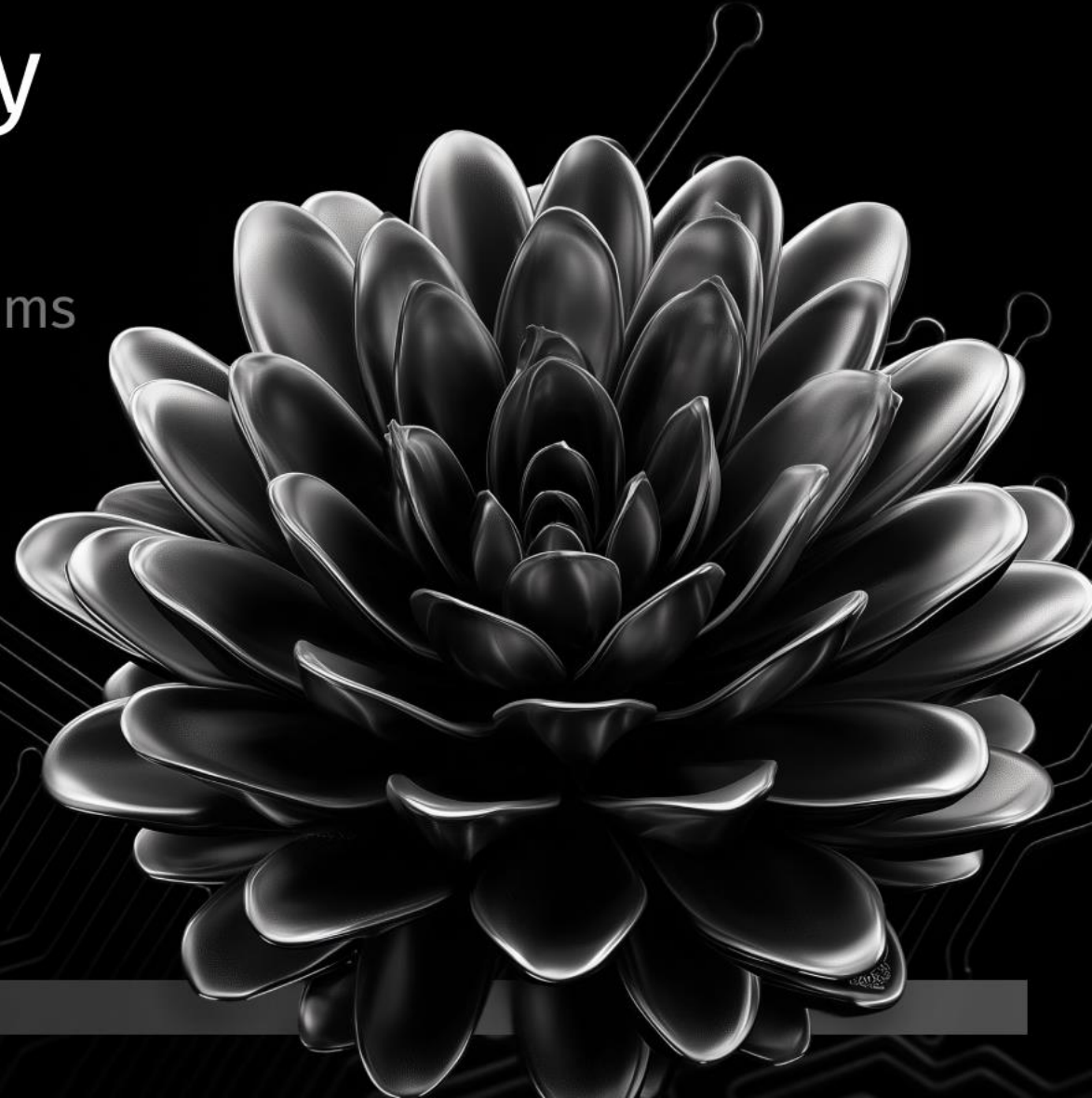
- Production systems are still designed for rigid processes
- Many control systems are not suitable for real-time
- Companies shy away from disruptive changes

Swarm intelligence as a role model

- No centralised command - yet perfectly coordinated
- Reaction to neighbours in microseconds
- Flexibility instead of rigid processes

The next evolutionary stage begins now

FPGA & AI are available – real-time systems are the key to **flexible manufacturing**



Any questions?

Reflexes make us fast.
Curiosity makes us human.

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