

TECHNOLOGY

SNAPSHOTS

Artificial Intelligence in Medical Devices

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What is AI?

- Artificial intelligence (AI) is a broad field of computer science aimed at creating machines that can perform tasks that typically require human intelligence.
- It's about enabling computers to think, learn, and act intelligently.





Smart Medical Device





- A device that uses technology to collect, analyze, and interpret a patient's health data:
 - Sensors: Collect health data, such as heart rate, blood oxygen levels, and body temperature
 - Al and machine learning: Analyze the data to help diagnose and treat patients
 - **Connectivity**: Communicate with healthcare professionals to provide personalized care





Large Language Models (LLM)







LLM Comparison



Wolfram Ravenwolf's MMLU-Pro Computer Science LLM Benchmark Results (2025-01-02)





AI for Clinical Decision Support





Ethical Concerns

- Data privacy
- Algorithmic bias
- Lack of transparency
- Accountability
- Potential job displacement





HIPAA and GDPR (data privacy)

• HIPAA

- Focuses on healthcare organizations in the US
- Requires healthcare organizations to provide patients with a Notice of Privacy Practices
- Gives patients the right to view and request copies of their health records
- Requires healthcare organizations to report breaches affecting 500 or more people within 60 days



• GDPR

- Applies to organizations that handle personal data of EU or UK citizens
- Requires organizations to obtain consent before collecting, storing, or processing personal data
- Requires organizations to report all breaches to a designated GDPR regulator within 72 hours
- Gives data subjects the right to request the erasure of their personal data





Algorithmic bias

- Data bias: When data is limited or inaccurate, or doesn't tell the whole story
- **Historical bias**: When data used to train the algorithm is out of date
- **Representation bias**: When the training data is defined or sampled in a way that creates bias
- Explicit bias: When human prejudices are encoded into the algorithm through biased data or algorithms
- **Biases in evaluation**: When algorithm results are interpreted based on preconceptions, rather than the objective findings





Explainable AI (xAI)







The Future Of Work

- World Economic Forum's Future of Jobs Report:
 - By 2025, 85 million jobs may be displaced by automation
 - By 2025, an impressive 97 million new roles are projected to emerge
 - AI specialists has surged, with a 74% annual increase in job listings





Rebuilding And Redefining Clinical Engineering



- There are certain human skills that cannot be replaced by machines: Leadership, creativity, complex problem-solving and empathy
- AI can complement and support workers in these areas but cannot fully replace them







CMMS (computerized maintenance management system)







Post Market Surveilance

- Monitoring the safety and effectiveness of a product after it has been released to the public
- FDA's Medical Device Reporting (MDR) regulation:
 - report serious injuries, malfunctions, and deaths related to medical devices
 - safeguard information about device issues and potential risks to patients







Hospital Statistics and Clinical Engineering

 Seasonality is a pattern in time series data that repeats at regular intervals within a year, such as monthly, weekly, or quarterly.





Time Management

1	Urgent	Not urgent
	Quadrant I: Do it first	Quadrant II: Schedule it
rtant	High-value tasks that are time sensitive & have consequences if not completed in time.	High-value tasks that strategize around long term goals with no set deadline.
Impo	Examples: • Crises & emergencies • Pressing problems • Projects with deadlines	Examples: • Relationship building • Long-term planning • Personal improvement
	Quadrant III: Delegate it	Quadrant IV: Delete it
portant	Low-value tasks that need to be completed, but don't require your expertise.	Low-value tasks that distract focus from important tasks, wasting time & energy.
Not Im	Examples: • Busywork • Interruptions • Some regular routines	Examples: Internet browsing Pointless meetings Disruptive socializing

Generate Eisenhower Matrix

M

Al Recipes (Be Tip: Type anything of	AI Recipes (Beta v2) Tip: Type anything on the canvas with /command		
Visual Analysis	😚 Visual Analysis 🕺 Diagrams 🖬 Wireframe 🆽 Writer 🕼 Art		
Ai Recipe Maker	← 🔲 Eisenhower Matrix 🛈		
Strategy & Planning			
Business Process	Multi-LLM Agent Alchemist	Urgent an Tasks that require immediate atte	
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H Marketing	88 GPT-40 Default	Resolve customer complaints	
Ala Sales	Claude-3 Haiku Shifu+		
User Experience	1 LLaMA 3 70B Shifu+	Update inventory	
Customer Success	Claude-3.5 Sonnet Shiriu+	for trending items	
Retrospective	ol-mini Alchemist		
Jobs & Career	Pol-preview Alchemist	O Urgent, N Tasks that demand attention but	
A	Claude 3 5 Separat (Shine)	busines	



Eisenhower Matrix

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Key benefits of Al

• Early Failure Detection:

- Al algorithms can identify subtle changes in machine performance, signaling potential issues before they become critical failures.
- Optimized Maintenance Scheduling:
 - Al allows for planned downtime instead of emergency repairs, minimizing disruption to operations.

Improved Inventory Management:

- CEs can proactively manage spare parts inventory, ensuring necessary components are readily available when needed.
- Enhanced Safety:
 - Al can monitor adherence to safety protocols and identify potential hazards, contributing to a safer working environment.
- Cost Reduction:
 - Al-driven predictive maintenance significantly reduces repair costs and lost production time.

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Thank you!

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