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attendance



The Rise of AI

The Changing Business Environment
(BMBM4010)

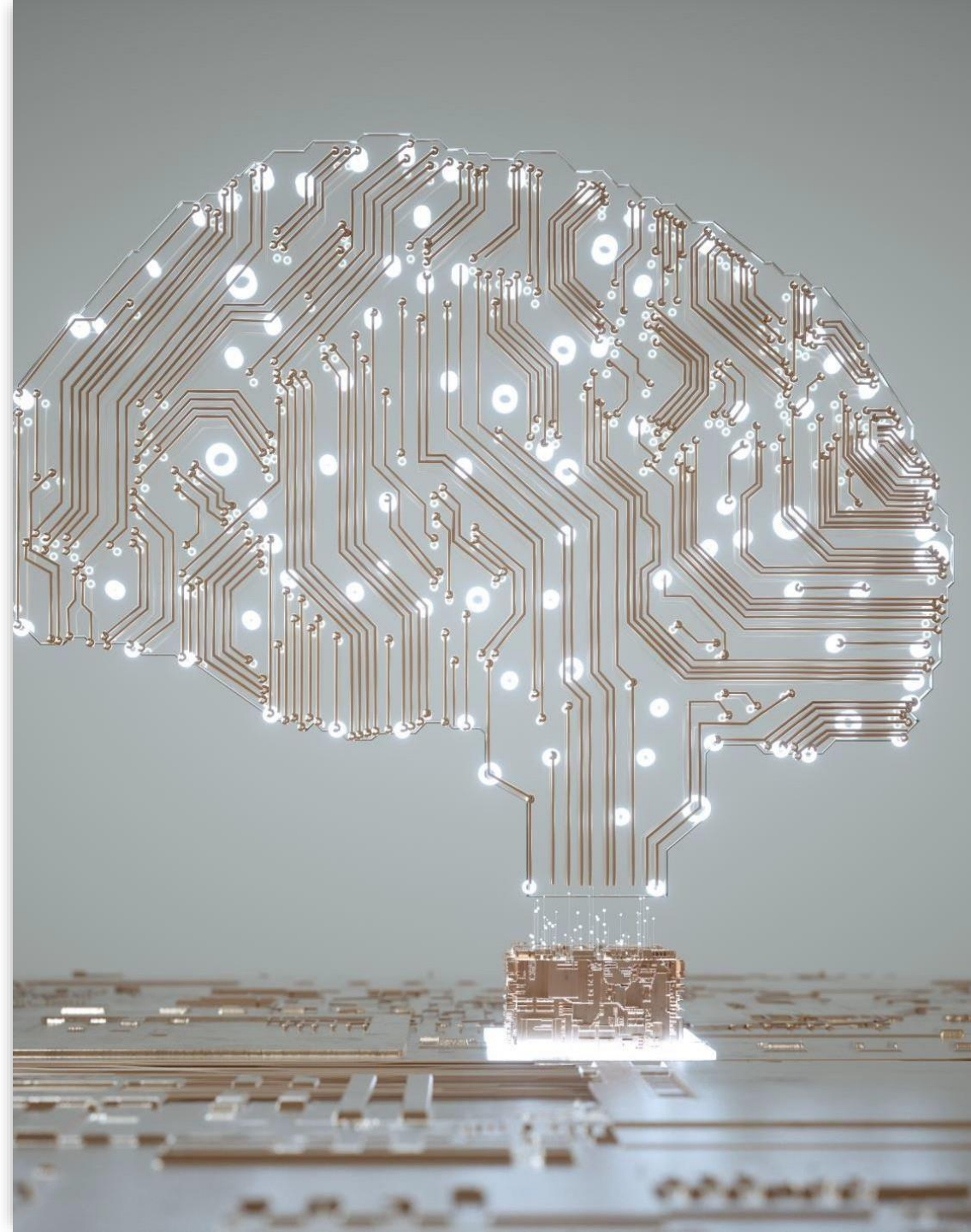
Week 3

Zoe Williams



Introduction to AI

- Definition and core concepts of Artificial Intelligence.
- Narrow AI (designed for specific tasks)
- General AI (capable of understanding and learning any intellectual task).
- AI technologies in use today
- Potential and limitations of AI from a current technological standpoint.



- An umbrella term for a range of algorithm-based technologies that solve complex tasks by carrying out functions that previously required human thinking.

Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy.

- The ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.

History of Artificial Intelligence: Key Milestones

1950 – Alan Turing publishes 'Computing Machinery and Intelligence' and proposes the Turing Test, asking: 'Can machines think?'

1956 – John McCarthy coins the term 'Artificial Intelligence' at the Dartmouth Conference. Newell and Simon create the Logic Theorist.

1967 – Frank Rosenblatt builds the Mark 1 Perceptron, an early neural network system.

1980 – Neural networks gain popularity through backpropagation algorithms.

1995 – Russell and Norvig publish 'Artificial Intelligence: A Modern Approach,' defining core AI goals.

1997 – IBM Deep Blue defeats world chess champion Garry Kasparov.

2004 – John McCarthy publishes 'What Is Artificial Intelligence?' as big data and cloud computing emerge.

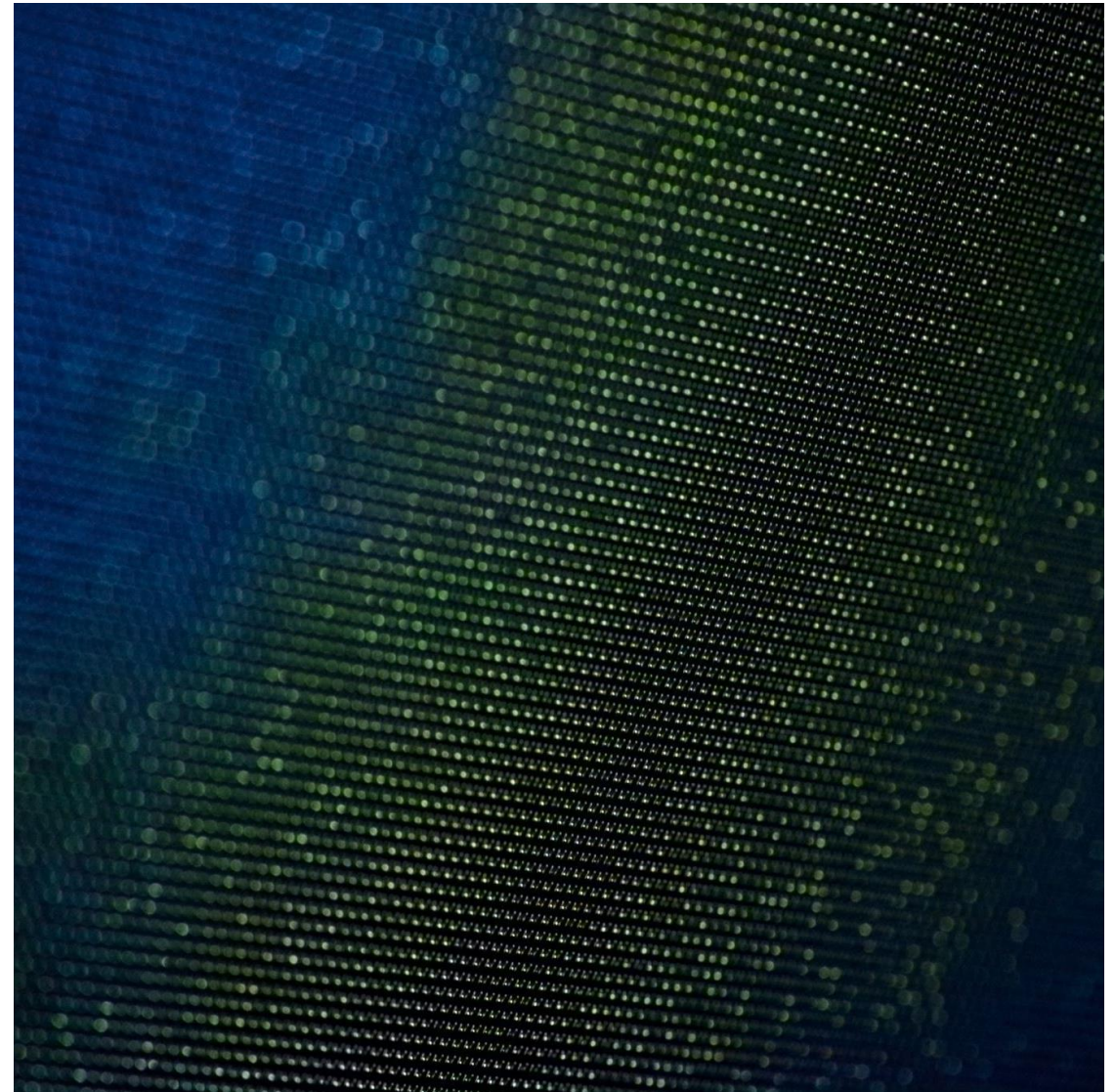
2011 – IBM Watson wins Jeopardy!, and data science rises as a discipline.

2015 – Baidu's Minwa supercomputer outperforms humans in image recognition.

2016 – DeepMind's AlphaGo defeats world Go champion Lee Sedol.

2022 – Large Language Models (LLMs) like ChatGPT drive major enterprise value.

2024 – Multimodal and smaller AI models signal a new AI renaissance.



AI vs.

Machine

Learning





Narrow AI

Artificial intelligence systems that are designed to perform one specific task or a limited range of tasks. These systems do not understand or think beyond what they are programmed or trained to do.

Key Characteristic:

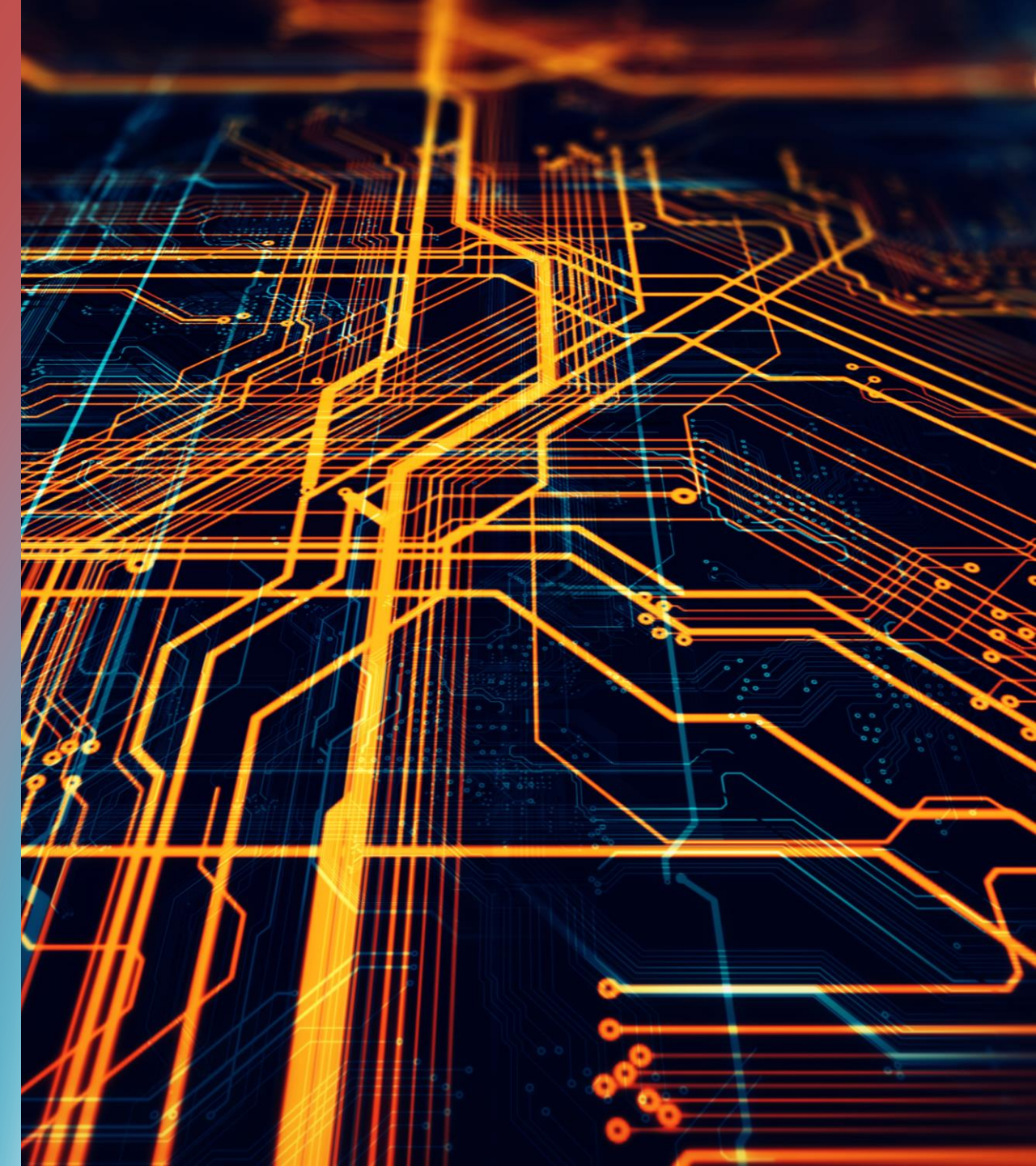
- Task-specific
- Operates within predefined boundaries
- Cannot transfer learning to unrelated tasks
- Most common form of AI today

Examples:

- Voice assistants (e.g. speech recognition)
- Recommendation systems (Netflix, Amazon)
- Chatbots for customer service
- Fraud detection systems
- Image recognition software

Business relevance:

- Widely used across industries
- Improves efficiency and accuracy
- Lowers costs and supports decision-making
- Easy to justify through return on investment (ROI)



General AI

Often called Artificial General Intelligence (AGI) refers to a hypothetical type of AI that could understand, learn and apply knowledge across a wide range of tasks, similar to a human.

Key characteristics

- Flexible and adaptable
- Learns across domains
- Can reason, plan, and problem-solve in new situations
- Not currently achieved

Examples

- Human-level intelligence in machines (theoretical)
- AI that could perform any job a human can
- Self-directed learning across different environments

Business relevance

- Potential to transform entire industries
- Could replace or augment human workers across roles
- Raises major ethical, legal, and economic questions
- High uncertainty and risk

Impact of AI on Academic & Industrial Research



Enhancing data analysis



Automating repetitive tasks



Enabling new research methodologies.



AI systems can learn from data, adapt, and evolve, which is particularly beneficial in complex scientific fields.



AI's ability to identify patterns in vast datasets and predict outcomes with high accuracy is reshaping how research is conducted and outcomes are achieved.



AI in Today's Business World

- The growing role of AI in transforming industries.
- AI adoption rates across different sectors
- Examples of increased efficiency and innovation due to AI integration.
- The economic impact of AI: job creation vs. displacement concerns.

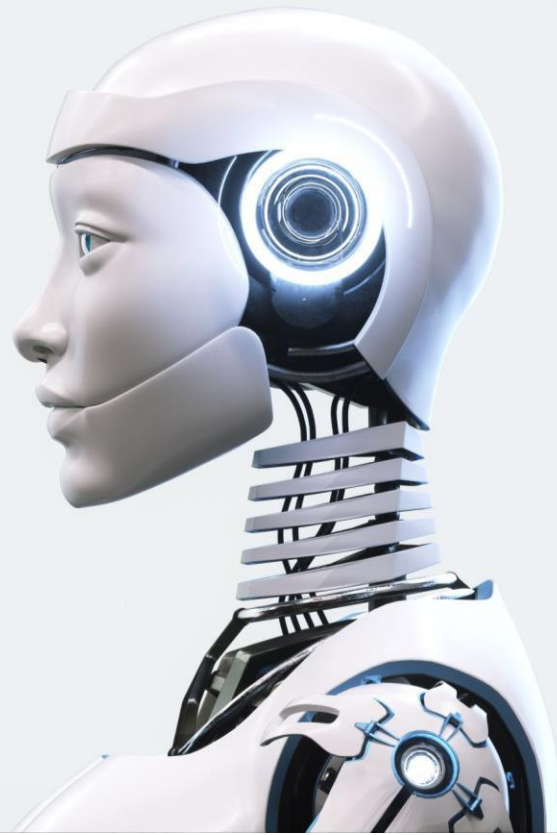
Benefits of AI

- **Automation of repetitive tasks** -AI can automate routine, repetitive and often tedious tasks including digital tasks such as data collection, entering and preprocessing and physical tasks such as warehouse stock-picking and manufacturing processes. This automation frees to work on higher value or more creative work.
- **More and faster insight from data** - enabling organisations to process, interpret and gain insights from large volumes of complex data efficiently.
- **Enhanced decision-making** - enables faster, more accurate predictions and reliable, data-driven decisions. Combined with automation AI enables businesses to act on opportunities and respond to crises as they emerge in real time and without human intervention.
- **Fewer human errors** - guiding people through the proper steps of a process, to flagging potential errors before they occur and fully automating processes without human intervention. This is especially important in industries such as healthcare where, for example, AI-guided surgical robotics enable consistent precision. Machine learning algorithms can continually improve their accuracy and further reduce errors as they're exposed to more data and "learn" from experience.
- **24x7 availability** - AI is always on, available around the clock and delivers consistent performance every time. Tools such as AI chatbots or virtual assistants can lighten staffing demands for customer service or support. In other applications such as materials processing or production lines, AI can help maintain consistent work quality and output levels when used to complete repetitive or tedious tasks.
- **Reduced physical risks** - automating dangerous work such as animal control, handling explosives, performing tasks in deep ocean water, high altitudes or in outer space, AI can eliminate the need to put human workers at risk of injury or worse i.e. self-driving cars

AI in Healthcare

- 2025 UK joins Global network of Health regulators focused on safe, effective use of AI in Healthcare.
- AI applications in diagnostics, including image analysis and patient data interpretation.
- Use of AI in personalised medicine and treatment planning.
- AI-driven operational improvements in healthcare facilities.
- Ethical considerations and patient privacy in AI healthcare applications.





AI in Customer Service

- Implementation of AI chatbots for 24/7 customer support.
- Use of AI for personalised customer experiences and product recommendations.
- Integration of AI in CRM systems for deeper customer insights.
- Challenges and considerations in deploying AI customer service solutions.

Challenges and Considerations in Deploying AI Customer Service Solutions

- Balancing Automation and the Human Touch
- Limited Understanding and Accuracy
- Bias and Fairness Issues
- Data Privacy and Data Security Concerns
- Integration with Existing Systems
- Over-Reliance on Automation
- Customer Acceptance and Trust
- Workforce Impact and Skills Gaps

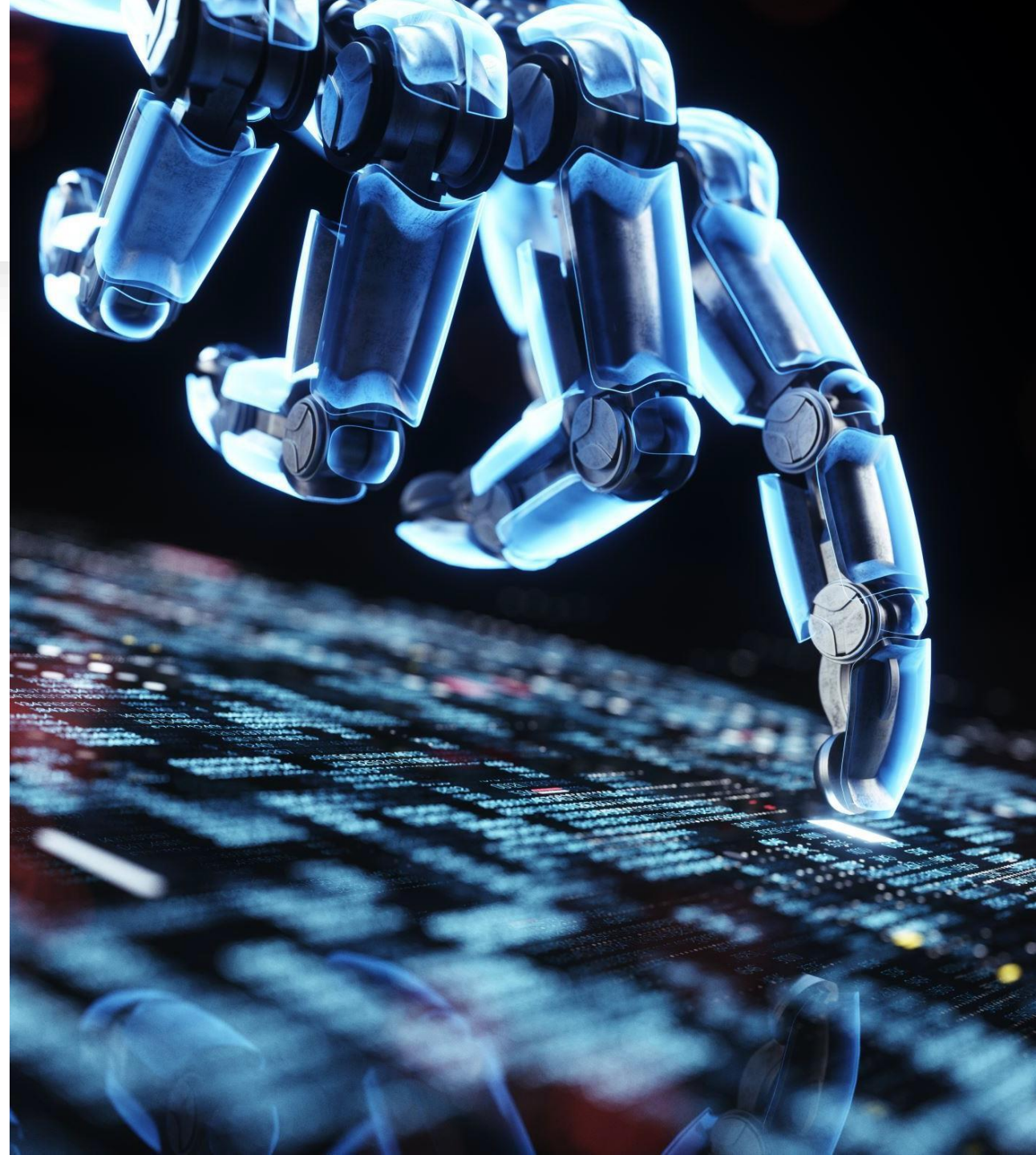
AI in Finance

- Enhancing Fraud Detection Systems and Security Measures
- Credit Scoring and Risk Assessment
- Revolutionising Algorithmic Trading and Portfolio Management
- Automating Personal Finance with AI-driven Tools
- Navigating Regulatory and Ethical Challenges
- Forecasting and Financial Planning
- Investment Management



AI in Manufacturing

- **Predictive Maintenance** – Sensors collect real-time data and predicts failures before they happen
- **Quality Control** – scan products on assembly lines for defects
- **Supply Chain Optimisation** – Analyses historical data and predicts demands, adjusts inventory and optimises logistics
- **Process Optimisation** – analyses production data to find bottlenecks and suggest workflow improvements
- **Robotics & Automation** – Collaborative robots and AI guided robots handle assembly, welding, painting or packaging
- **Energy Management** - monitors usage in real time and optimises machinery operation



AI – Key Risks for Businesses

Strategic and Competitive Risk -

Poorly planned AI adoption can lead to misallocation of resources, failed digital transformation or loss of competitive advantage.

- Overreliance on immature or unsuitable AI systems
- “AI hype” driving investments without clear ROI
- Vendor lock-in and dependence on proprietary models

Operational & Technical Risk -

AI systems are probabilistic, opaque and data-dependent which introduces unpredictability into core business operations.

- Data quality and data drift
- Lack of explainability in high-stakes decisions

Legal & regulatory Risk - Businesses deploying AI face growing compliance uncertainty, particularly in regulated sectors.

- Violations of data protection laws (e.g., GDPR)
- Liability for AI-generated harm or misinformation
- Non-compliance with emerging AI-specific regulations

Ethical & Reputational Risk -

Unethical AI use can severely damage brand trust and algorithmic bias and discrimination

- Non-transparent automated decision-making
- Public backlash and loss of consumer trust
- d corporate reputation.

AI – Key Risks for Businesses

Data Privacy & Cybersecurity Risk - expand the attack surface for cyber threats and data misuse.

- Large-scale data breaches
- Model inversion and data extraction attacks
- Surveillance concerns and misuse of customer data

Workforce & Organisational Risk - changes how work is managed, monitored, and valued, creating human capital risks.

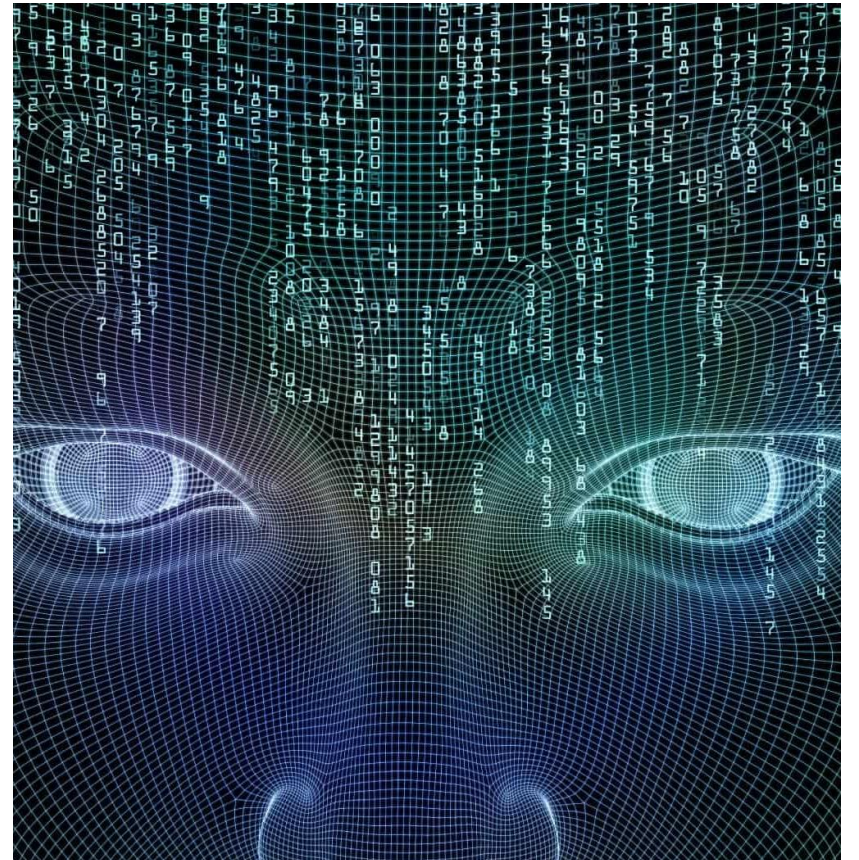
- Job displacement and deskilling
- Algorithmic management and worker surveillance
- Employee resistance and morale decline

Financial & Liability Risk - can lead to direct financial loss and long-term liability.

- Faulty automated decisions (e.g., pricing, credit scoring)
- Litigation related to discrimination or harm
- Insurance gaps for AI-related incidents

Misuses of AI

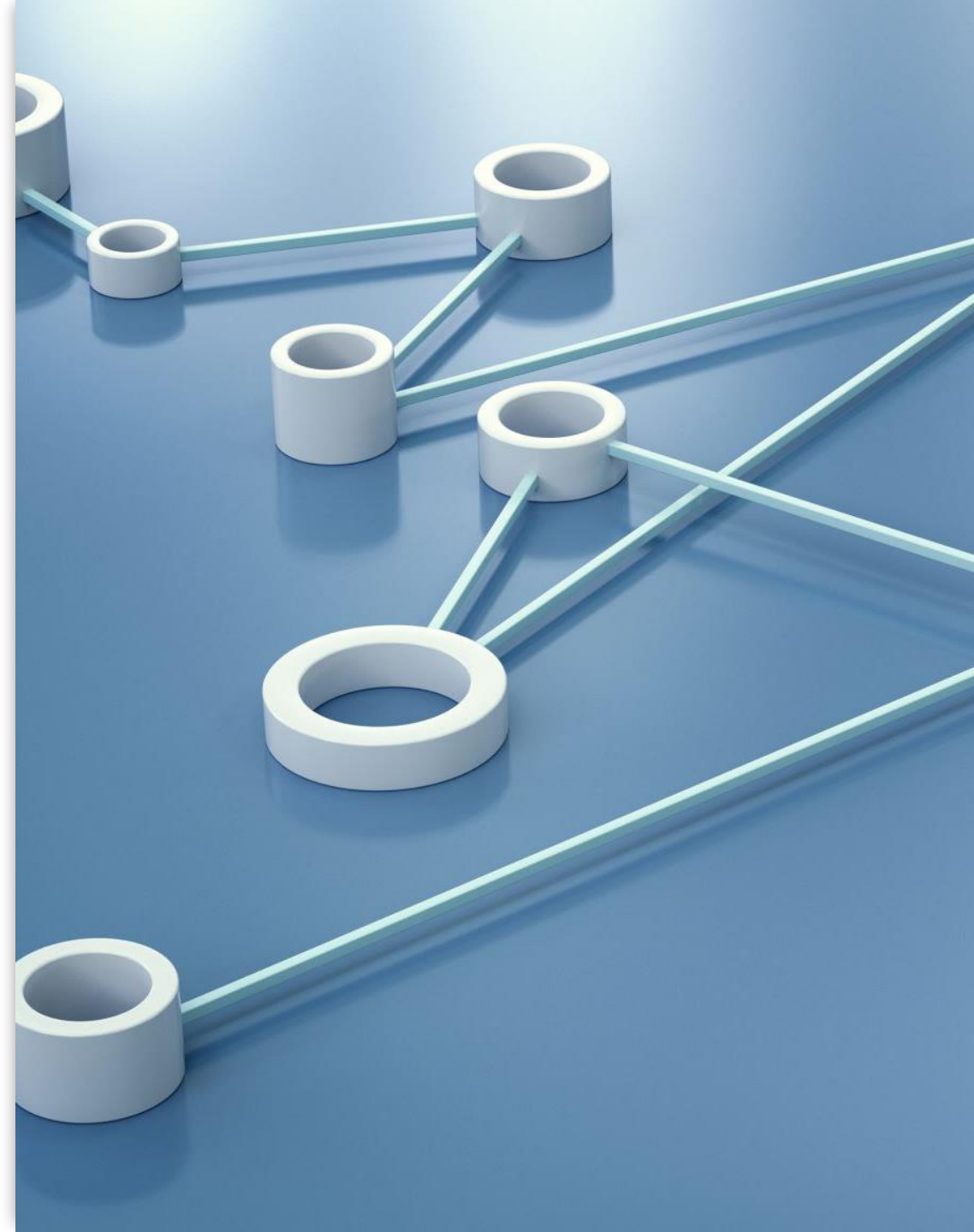
- **Misinformation, Disinformation & Deepfakes** - create convincing false content at scale, including fake news, synthetic images, videos (deepfakes) and impersonation.
- **Algorithmic Bias & Discrimination** - AI systems trained on biased or unrepresentative data often reinforce social inequalities, particularly in high-stakes domains such as hiring, policing, lending and healthcare.
- **Privacy Invasion & Mass Surveillance** - misused to collect, analyse and infer personal data at unprecedented scales, often without informed consent.
- **Academic Dishonesty & Intellectual Fraud** - increasingly misused for plagiarism, ghostwriting and falsification of academic work.
- **Autonomous Weapon & Military Applications** - misused in the development of lethal autonomous weapon systems (LAWS) that reduce human control over life-and-death decisions.
- **Economic Exploitation & Labour Displacement** - sometimes deployed primarily to maximise profit at the expense of workers, increasing inequality and job precarity.
- **Manipulation, Addiction & Psychological Harm** - AI-driven recommendation systems are misused to exploit human attention, emotions and cognitive biases.



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Future of AI in Business

- **Future Changing** – Embedded across all business functions, shift from experimentation to organisational-wide integration
- **Human-AI collaboration & Augmentation** – rather than re-placing workers AI will lead to hybrid decision-making models
- **Data-Driven & Algorithmic Decision making** – increasing shape managerial and strategic decisions. Using predictive and prescriptive analytics to guide strategy, real-time optimisation of pricing, supply chains and customer experience.
- **Industry-Specific Transformation** - will be uneven across sectors.
- Governance, Regulation & Responsible AI - as it becomes embedded in core business processes, regulation and ethical governance will shape its future – mandatory AI risk management and audits
- **Organisation and Workforce Transformation** - AI adoption will require companies to rethink their structure, leadership and skills development - continuous reskilling & upskilling, creation of new roles
- **Long-term Competitive and Economic Implications** – AI may increase productivity and innovation but could risk widening inequality between companies and economies. Power with AI-leading companies, winner takes most markets.





Group Activity

- Explore the ethical implications of AI in business scenarios
- Think – Benefits, Ethical Considerations, Mitigation of Risk
- Each Group has 10 minutes on one of the following concepts...
- Implementing AI in Hiring Processes
- Using AI for Customer Data Analysis
- AI Driven Marketing Campaign



**Any
questions?**

**Would you like a
Teams channel?**

**Next lecture –
Monday
16th February – 9.00
am**