

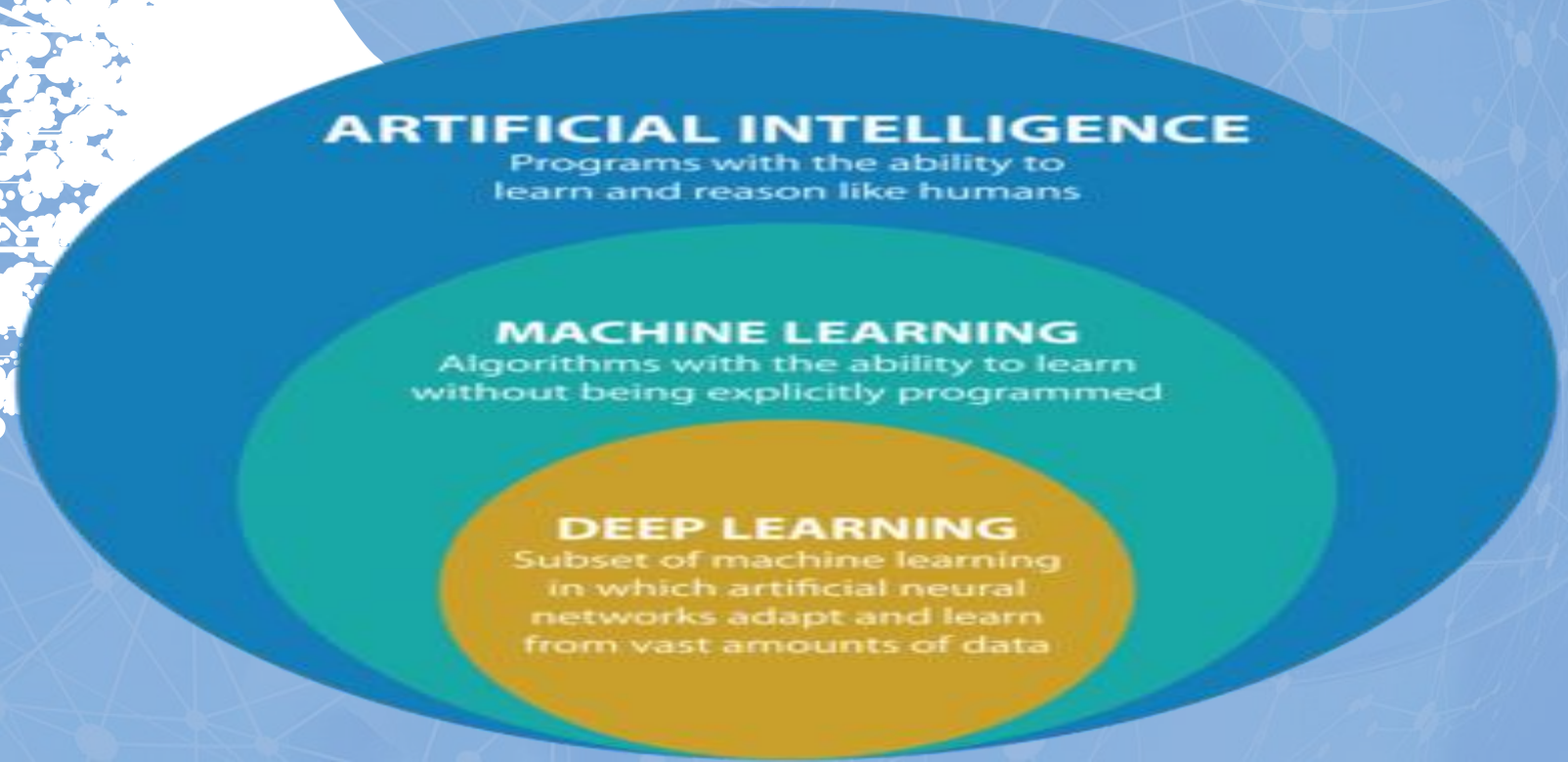
AI and Machine Learning in Healthcare

Transforming Workforce and Patient service Care

Student Name: Helena Guerin

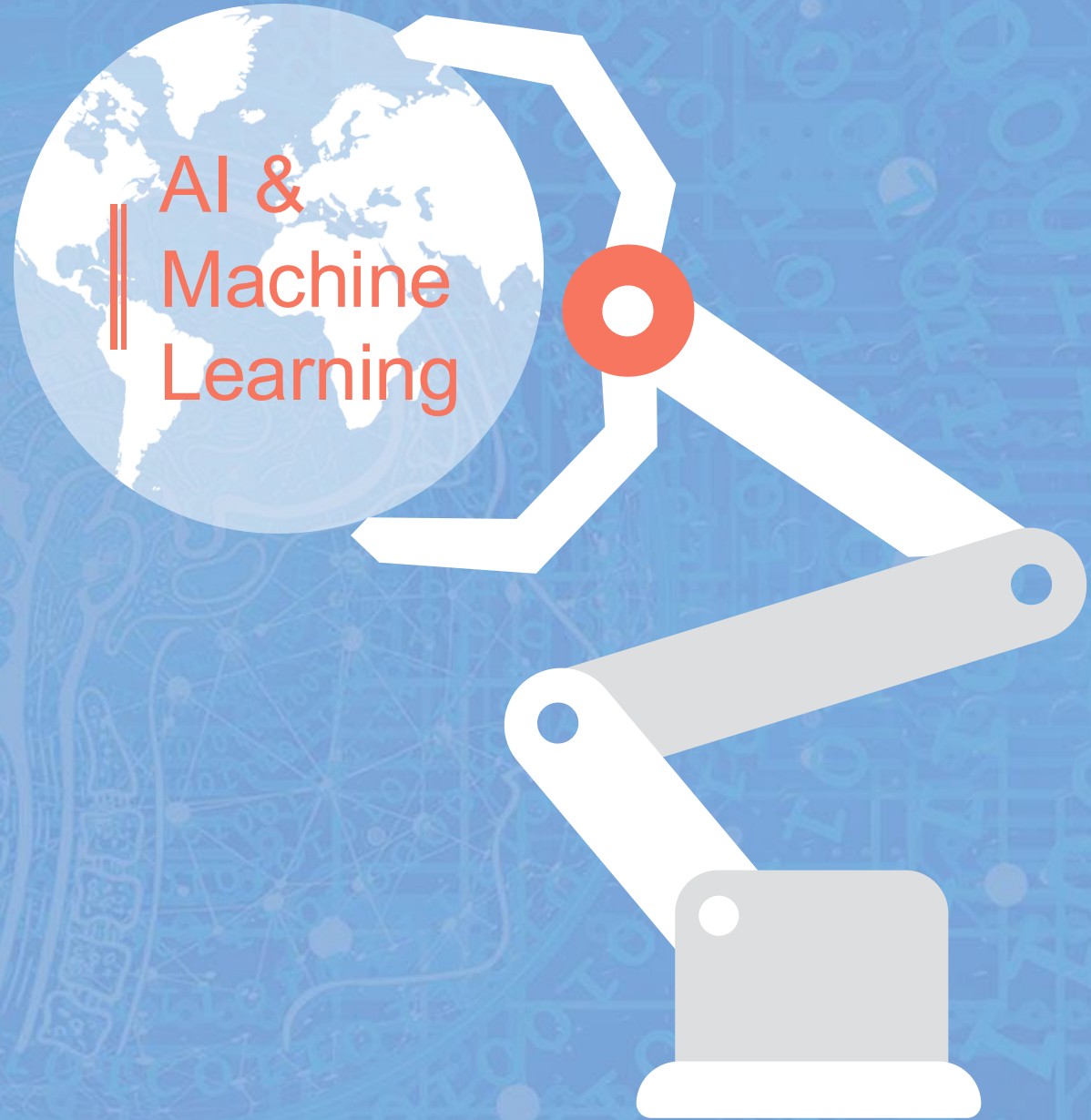
Student ID: 2212220

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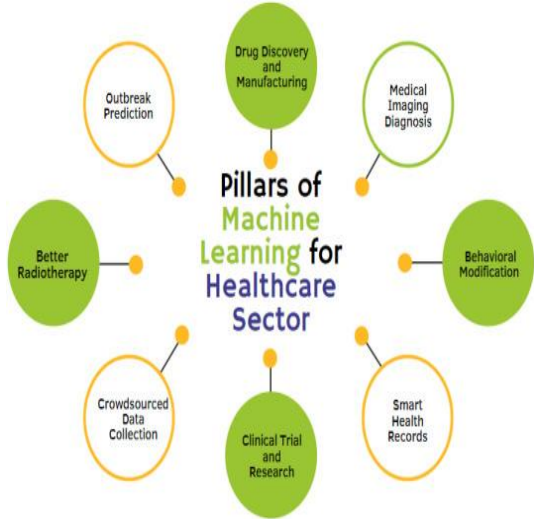


INTRODUCTION

- ✓ The digital revolution is transforming healthcare delivery.
- ✓ Artificial Intelligence (AI) and Machine Learning (ML) enhance efficiency, patient care, and diagnostics.
- ✓ Focus areas include workforce transformation, service delivery, and patient experience.
- ✓ **Key importance:** improved access, personalisation, and outcomes.
- ✓ Ethical and practical challenges remain critical considerations.



Overview of Innovation: What AI and ML in Healthcare



AI replicates human intelligence to analyse medical data and support clinical decision-making.



ML identifies patterns to improve predictions, diagnostics, and outcomes.

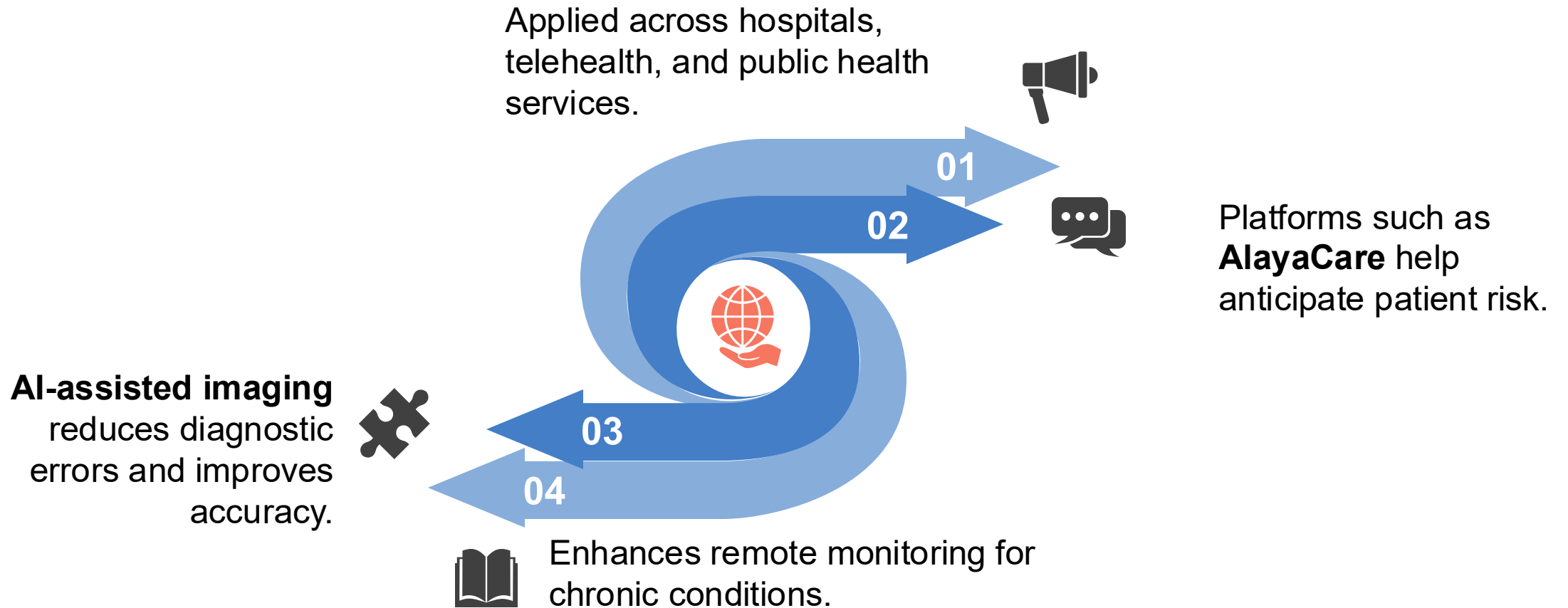


Key applications: image processing, remote patient monitoring, and electronic health records (EHR).

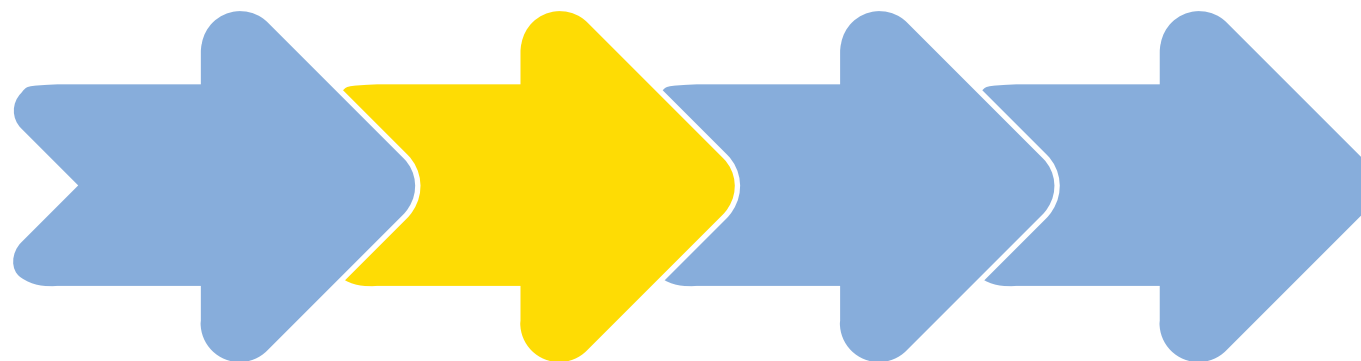


Widely used in diagnostics, scheduling, and administrative automation.

A Where and How AI and ML Works



A Impact on key Areas: Workforce Transformation



01

Automation reduces administrative workload and streamlines processes.

02

Clinicians can dedicate more time to direct patient care.

03

Emerging skills include AI literacy and data interpretation.

04

Barrier: risk of workforce deskilling.
Solution: commitment to lifelong learning and continuous professional development.

Artificial Intelligence in Service Efficiency and Delivery



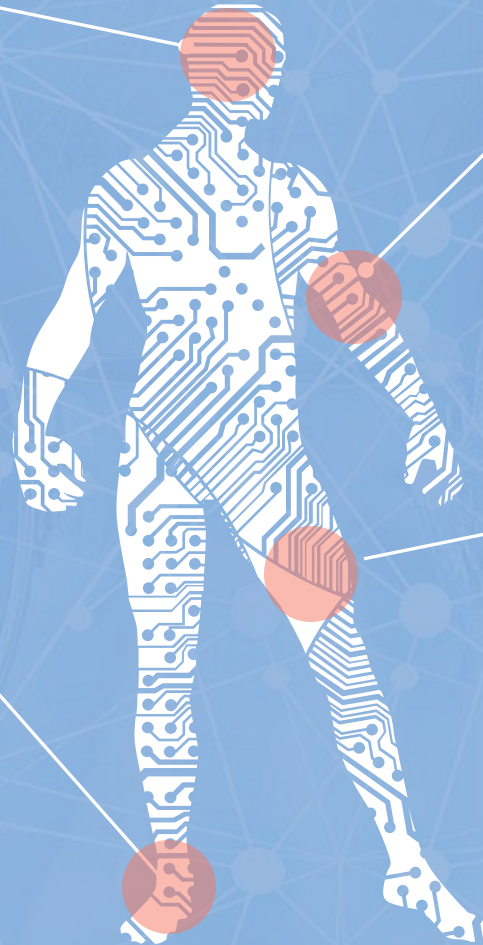
Predictive AI tools improve scheduling and workload management.

Enhance resource allocation and service coordination.



Support efficient staff deployment during periods of high demand.

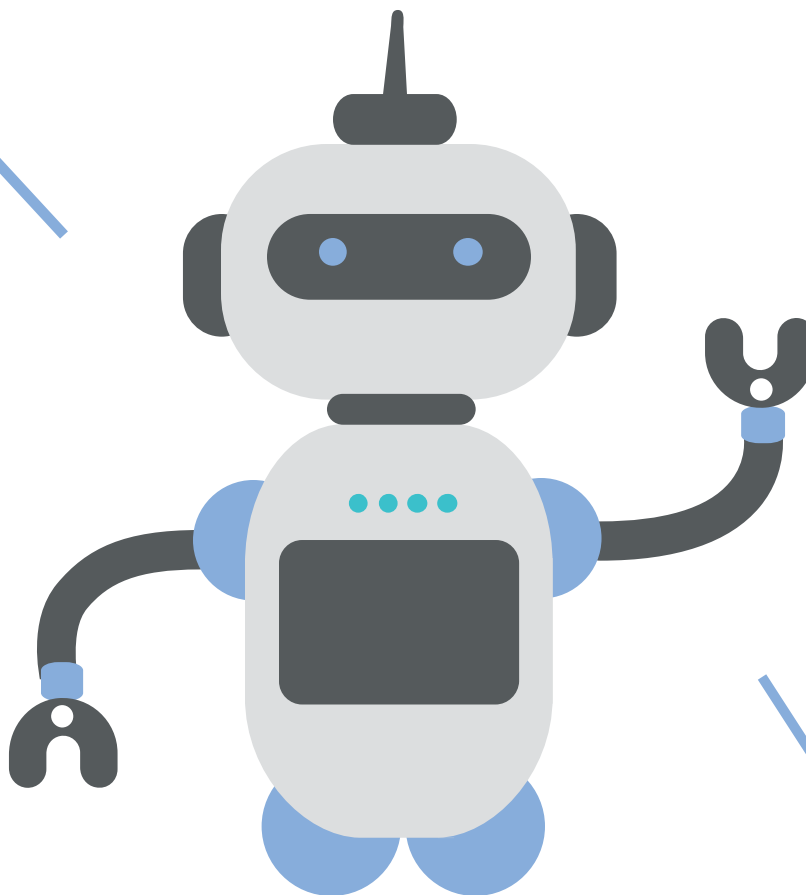
- ✓ **Obstacle:** limited digital literacy among staff.
- ✓ **Intervention:** dedicated CPD (Continuing Professional Development) and training time.



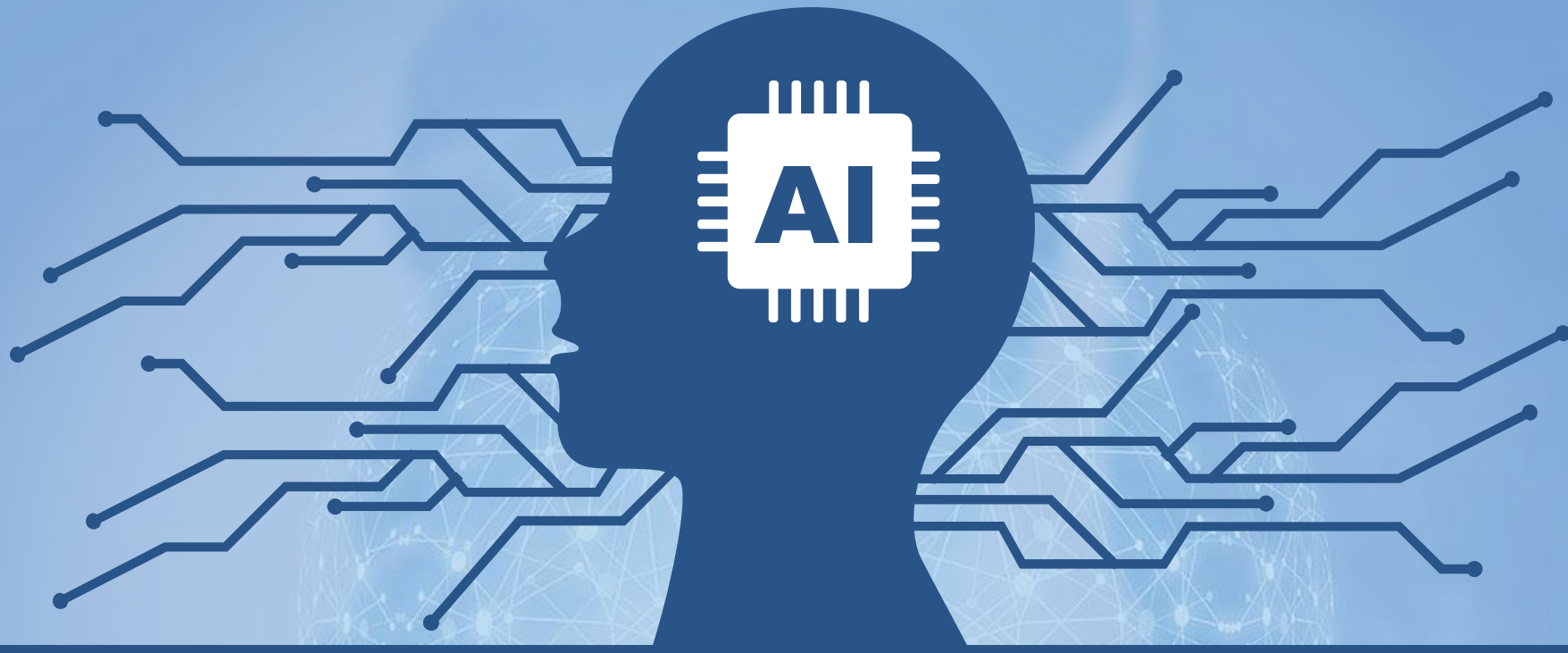


Impact on Patient and Service User

- ✓ AI enables individualised care and promotes self-management.
- ✓ Empowers patients through digital apps and online health portals.
- ✓ Enhances prevention, early intervention, and long-term condition management.



- ✓ **Obstacle:** protection of patient data and information privacy.
- ✓ **Resolution:** adoption of open data policies supported by robust cybersecurity measures.



Ethics and Social Factors

- ✓ **Key issues:** potential misuse of data, depersonalisation, and unclear accountability in AI systems.
- ✓ **Patient concern:** fear of reduced human interaction (Iqbal *et al.*, 2023).
- ✓ **Barrier:** emotional resistance and lack of trust in AI-driven care.
- ✓ **Remedy:** implementation of an AI code of ethics and development of human–AI hybrid models to maintain empathy and oversight.

- ✓ Insufficient funding and resources.
- ✓ Limited time allocated for training and professional development.
- ✓ Ongoing concerns about data security and protection.

- ✓ Increase education and training budgets for the healthcare workforce.
- ✓ Establish digital champions to lead implementation and compliance.
- ✓ Strengthen ethical regulation and promote digital education for the wider public.

- ✓ Sustainability depends on continuous cooperation, investment, and shared commitment across sectors.

- Predictive Analytics
- Medical Imaging and Diagnostics
- Personalized Medicine
- Drug Discovery and Development
- Virtual Health Assistants & Chatbots
- Robotic Process Automation (RPA)



AI/ML Case Study: Identifying Rheumatoid Arthritis from EHR Data

Synopsis of the Case Study

Wales's primary-care and specialised rheumatology records are linked.

The most pertinent drug and diagnostic codes were chosen using Random Forest and Decision Trees.

High sensitivity, specificity, and PPV were attained by the final model.

Obstacles

Primary-care coding has "large variation in accuracy and completeness."

requires training in gold-standard clinical diagnosis.

bias in favour of individuals with more severe or well-treated illnesses.

Advantages and Important Results

RA instances were swiftly and economically discovered by machine learning.

43,000+ EHR codes were reduced → 8 important predictors.

Performance is on par with clinical algorithms set by experts.

"As accurate as methods based on clinician knowledge."

Improvements

For more features, add free-text clinical notes.

Additional verification for fresh cases (incidents).

Boost data quality and training procedures.



Conclusion

- ✓ Artificial Intelligence (AI) and Machine Learning (ML) are transforming healthcare delivery.
- ✓ They improve efficiency, enhance personalization of treatments, and expand access to care.
- ✓ However, challenges remain, including ethical concerns, workforce training needs, and issues of equity and fairness.
- ✓ The future lies in effective collaboration between human expertise and intelligent systems.
- ✓ Sustainable integration of AI in healthcare requires clear regulation, continuous learning, and responsible implementation.





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Thank You