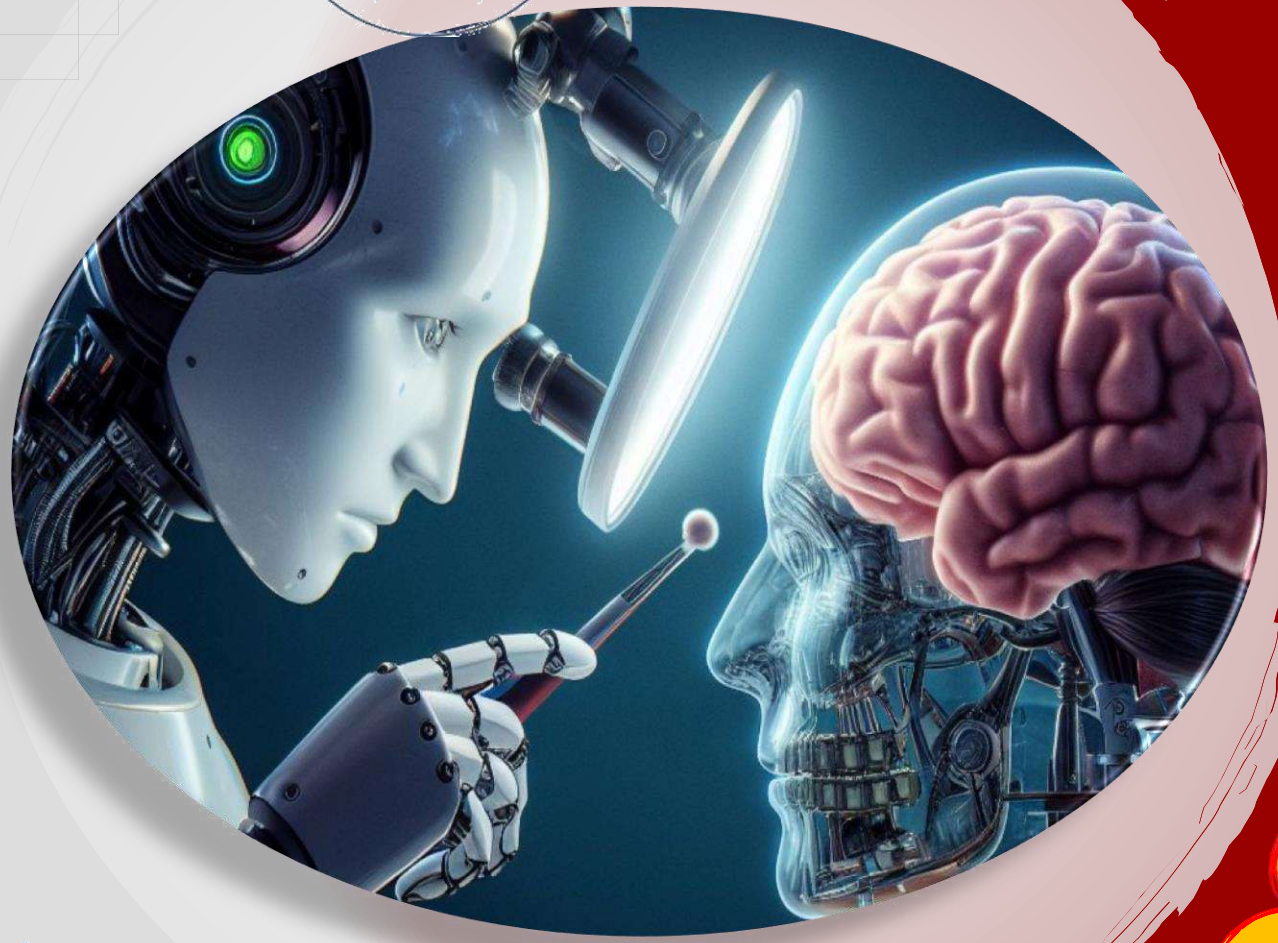
Artificial Intelligence
&
Scientific Research



Artificial Intelligence & Scientific Research

Prof Ahmed Hassan Fahal
MBBS, FRCS, FRCSI, FRCS (Gla), MS, MD,
FRCP(London), FRCPath

Federation of
Arab Scientific Research Councils

AI & Scientific Research

I declare
No conflict of interest

Objectives

AI & Scientific Research

To give a comprehensive account on

AI & Scientific Research

Outline

AI & Scientific Research

AI

Pros

Cons

FASRC

Take Home Messages

Conclusion

AI
Is Here To Stay

The AI

AI & Scientific Research

AI is the simulation of human intelligence in **Machines** that are Programmed to think like Humans and mimic their actions

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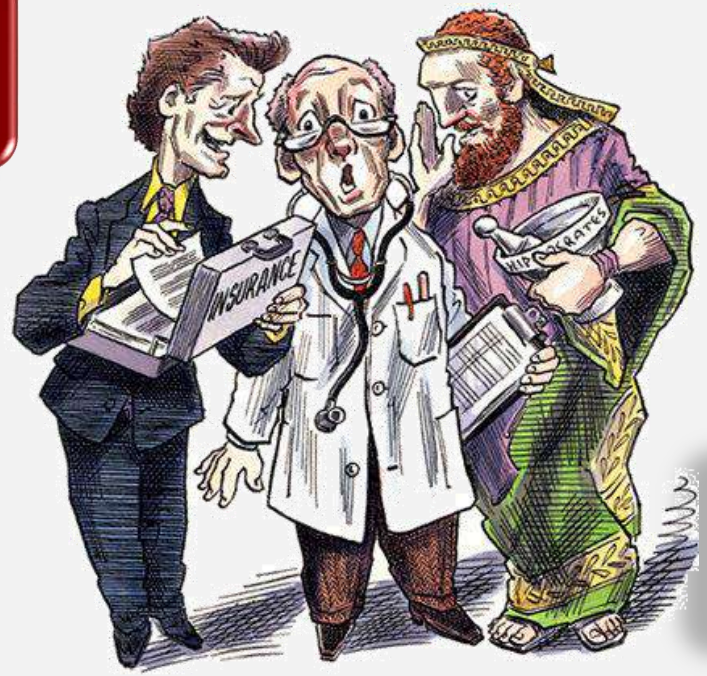
The Pros



The Cons

AI Applications

AI & Scientific Research

The Applications

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The Pros

Enhanced Data Analysis

- AI algorithms can process and analyse vast amounts of data at unprecedented speeds.
- Identifying patterns and correlations that may be missed by human researchers.
- This capability accelerates discoveries and improves the accuracy of scientific conclusions.

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The Pros

Automation of Routine Tasks

- AI can automate repetitive and time-consuming tasks, such as data entry, image analysis, and literature review.

- This allows researchers to focus on more complex and creative aspects of their work.

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The Pros

Predictive Modeling

- Machine learning models can predict outcomes and trends based on existing data, aiding in hypothesis generation and experimental design.

- AI can predict the spread of diseases, the impact of climate change, or the behaviour of complex systems.

The Pros

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Personalised Medicine

- AI can analyse genetic and molecular data to develop personalised treatment plans, improving patient outcomes.

- This approach is crucial for the advancement of precision medicine.

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The Pros

Accelerated Drug Discovery

- AI can rapidly screen potential drug candidates and predict their effectiveness and safety.

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The Pros

Accelerated Drug Discovery

Target Identification	Target Validation	Lead Discovery	Lead Optimization	Drug Development
Bioinformatics	Cavity Searching	Docking	QSAR	Pre-Clinical Tests
Inverse Docking	Binding Site Prediction	Molecular Dynamics	Pharmacophore Modelling	Phase I, Phase II, Phase III — Clinical Trials
Inverse QSAR		Library Screening	*In vitro* ADME	Phase IV — Pharmaco vigilance
		De novo design		

Significantly reducing the time and cost associated with traditional drug discovery processes.

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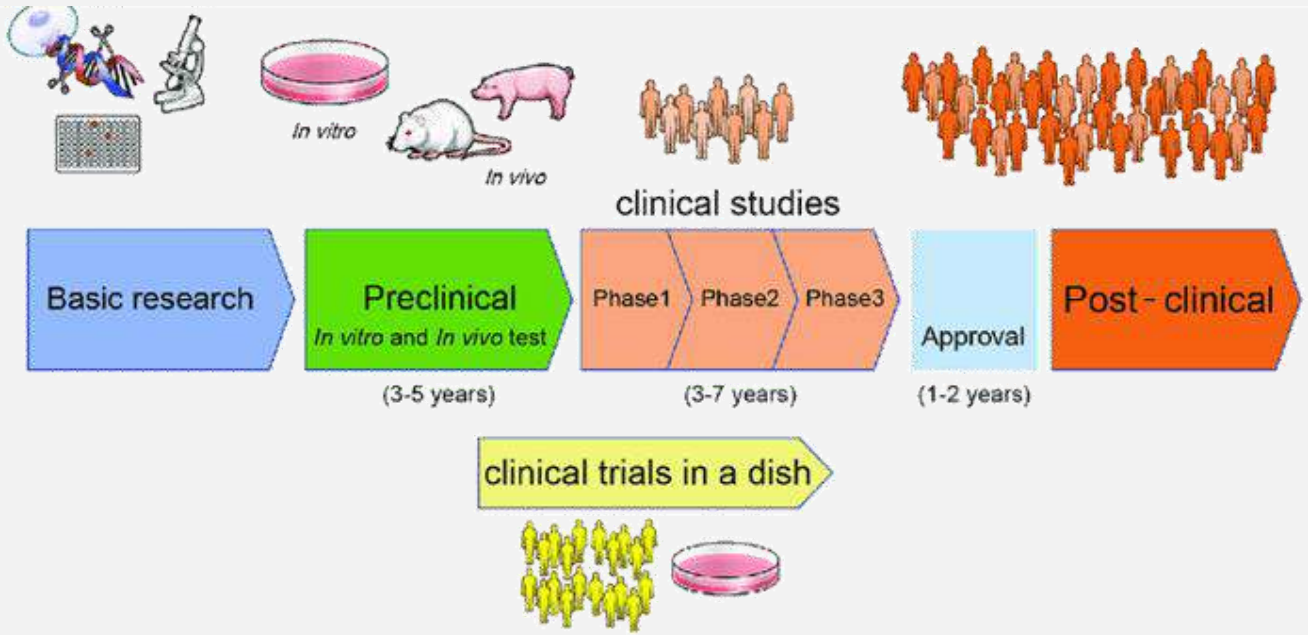
The Pros

Accelerated Drug Discovery



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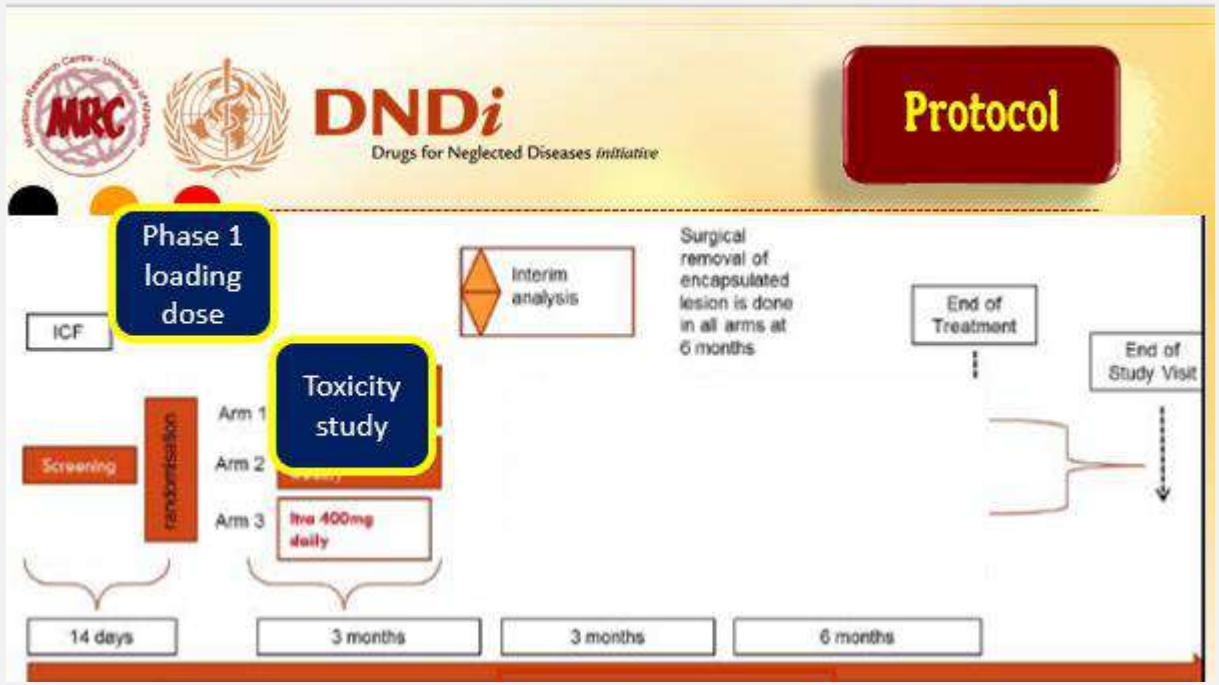
The Pros

Accelerated scientific writing and publications



The Cons

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The Cons

Data Quality and Bias

- AI systems are only as good as the data they are trained on.
- Poor-quality or biased data can lead to inaccurate or misleading results
- Potentially harming scientific integrity and public trust.

The Cons

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Overreliance on AI

There is a risk of overreliance on AI, where researchers may overlook the importance of human instinct and expertise.

The Cons

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Overreliance on AI

This can lead to a lack of critical thinking and a potential disregard for unexpected findings.

The Cons

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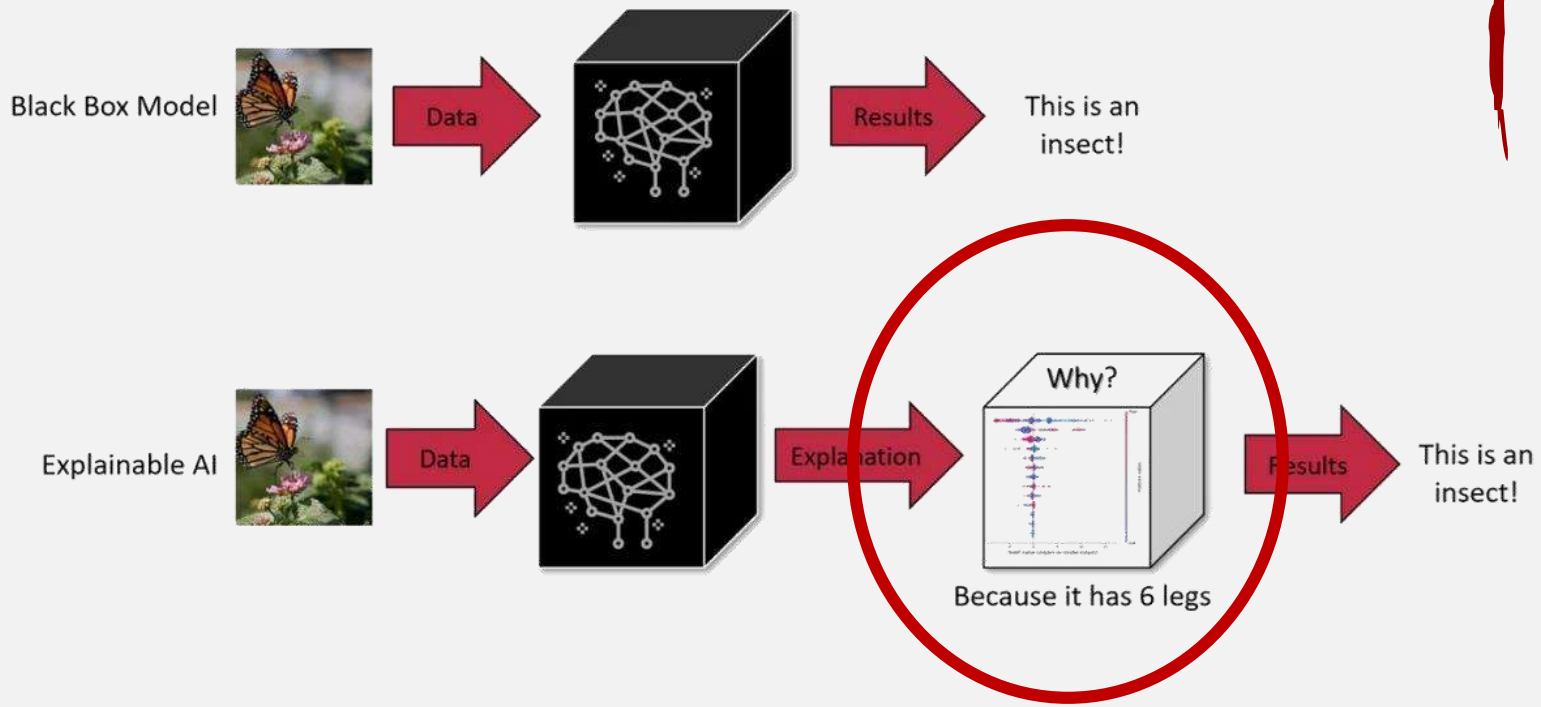
Many AI models, particularly deep learning algorithms, are complex and operate as "Black Boxes."

Complexity and Interpretability



The Cons

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Complexity and Interpretability

This lack of transparency makes it difficult to understand how decisions are made, which can be problematic in scientific research that requires clear and reproducible methodologies.

The Cons

Ethical and Privacy Concerns

The use of AI in research often involves handling sensitive data, raising concerns about privacy and consent.

There is also the ethical dilemma of ensuring that AI technologies are used responsibly and do not perpetuate existing inequalities or biases.

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The Cons

Resource Intensity

Developing and deploying AI systems requires significant computational resources, expertise, and financial investment.

The Cons

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This can create disparities between **Well-Funded** institutions and those with **Limited Resources.**

The Cons

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Ethical Considerations

AI-driven Scientific Research

The Ethics

AI & Scientific Research

Informed Consent and Privacy

- Researchers must ensure that participants provide informed consent for the use of their data and that privacy is maintained.
- Data should be anonymised where possible
- Secure storage practices should be implemented.

The Ethics

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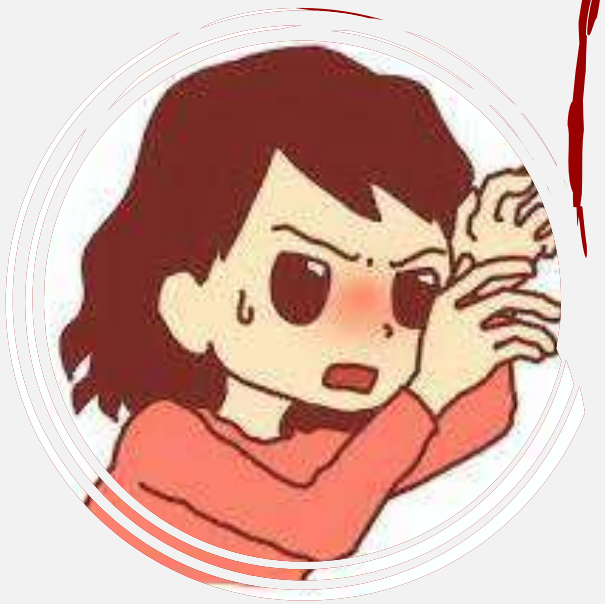
Bias & Fairness

AI models should be designed and trained to minimise biases.

The Ethics

AI & Scientific Research

- Researchers need to be **Vigilant** in detecting and mitigating any biases that may arise from the data or the algorithms themselves.



Bias & Fairness

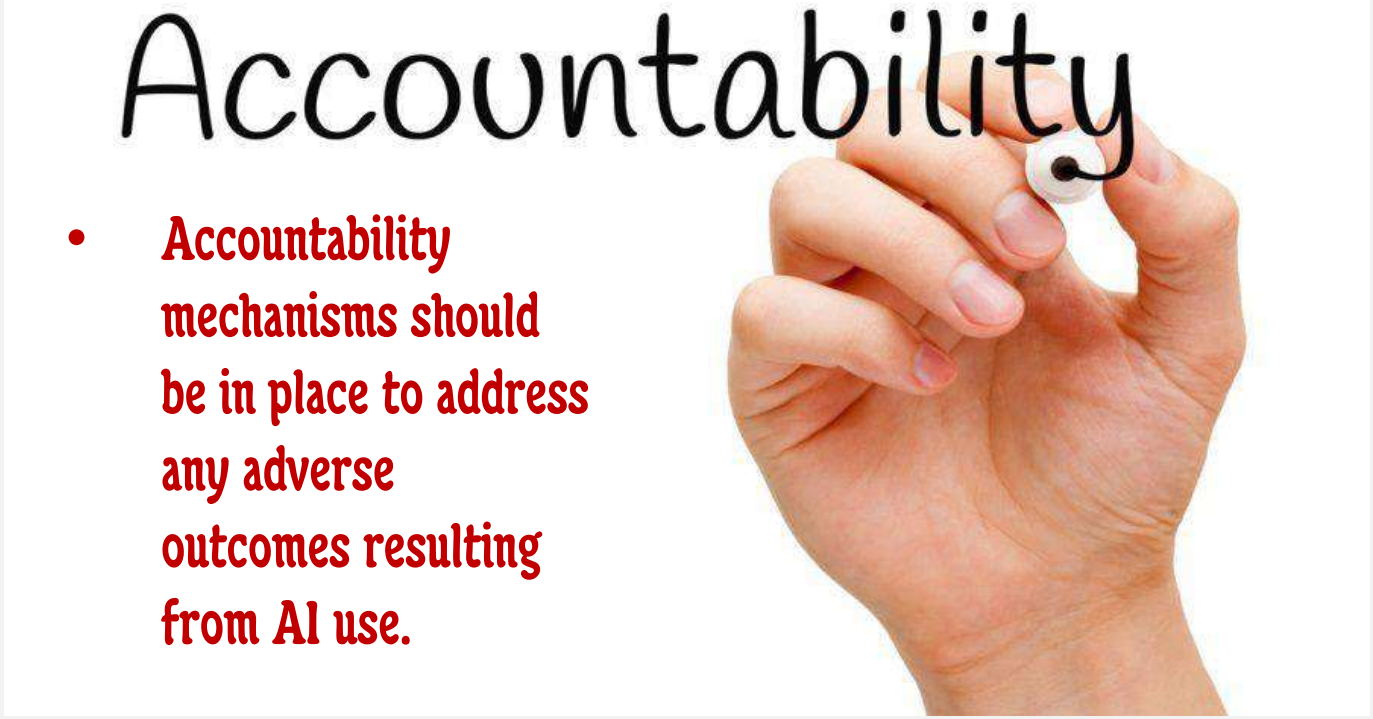
The Ethics

Transparency and Accountability

- Transparency in AI research is crucial.
- Researchers should document their methodologies and ensure that their models are interpretable and reproducible.

The Ethics

AI & Scientific Research



- Accountability mechanisms should be in place to address any adverse outcomes resulting from AI use.

Transparency
&
Accountability

The Ethics

AI & Scientific Research

Equity in Access

Efforts should be made to ensure equitable access to AI technologies and resources, particularly in low-resource settings.

The Ethics

AI & Scientific Research

Sharing knowledge and tools to democratise the benefits of AI in scientific research.

The Ethics

Ethical Use & Societal Impact

AI & Scientific Research

Researchers must consider the societal implications of their work.

Ensuring that AI applications in scientific research are aligned with ethical principles and contribute positively to society.

The Ethics

AI & Scientific Research

This includes preventing misuse of AI technologies in ways that could cause harm or exacerbate social inequalities.

AI & Scientific Research

The Federation of Arab Scientific Research (FASRC) is dedicated to the responsible use of AI in scientific research.

The Ethics

AI & Scientific Research

- One of its key initiatives is the ARICA project, which prioritises providing research funding for AI-related projects.
- FASRC has organised numerous webinars on AI applications and ethical considerations.
- The Federation also supports various networks involved in AI activities.

Conclusions

AI & Scientific Research

The Way Forward

AI
Is Here To Stay

AI
&
Scientific Research

Take Home Message

AI & Scientific Research

Thank you very
much indeed
for your kind attention

Contact

ahfahal@fasrc.org

www.ahmedfahal.net

AI
&
Scientific Research