Infoscapes
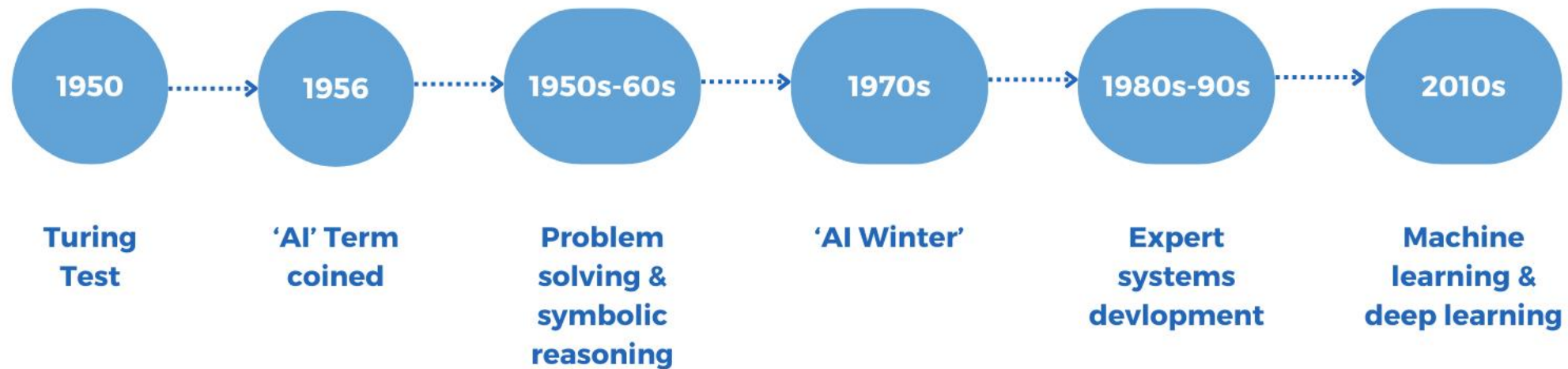## Libraries Engineering Knowledge Futures

Josh Sendall

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Part one

What's all this AI stuff about then?
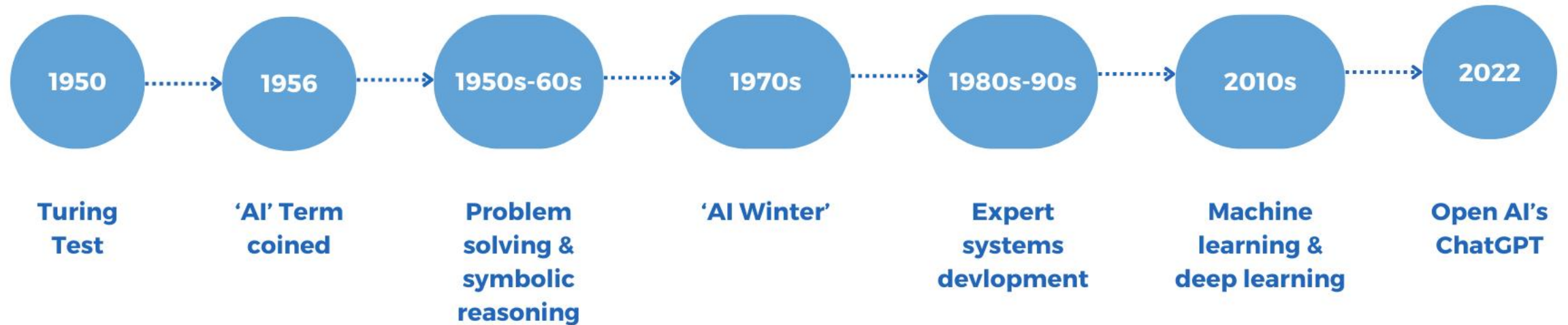
What's all this AI stuff about then?

AI, or Artificial Intelligence, is like a smart computer program that can learn. It's able to do things that we typically associate with human intelligence, like understanding language, recognising images, and making decisions.

Is AI a new development?

1950	1956	1950s-60s	1970s	1980s-90s	2010s
Turing Test	'AI' Term coined	Problem solving & symbolic reasoning	'AI Winter'	Expert systems devlopment	Machine learning & deep learning

Is AI a new development?

1950	1956	1950s-60s	1970s	1980s-90s	2010s	2022
Turing Test	'AI' Term coined	Problem solving & symbolic reasoning	'AI Winter'	Expert systems devlopment	Machine learning & deep learning	Open AI's ChatGPT

So what's this GenAI, LLM, ChatGPT malarky?

It's important to explore the terms: GenAI, LLM,
and ChatGPT individually...
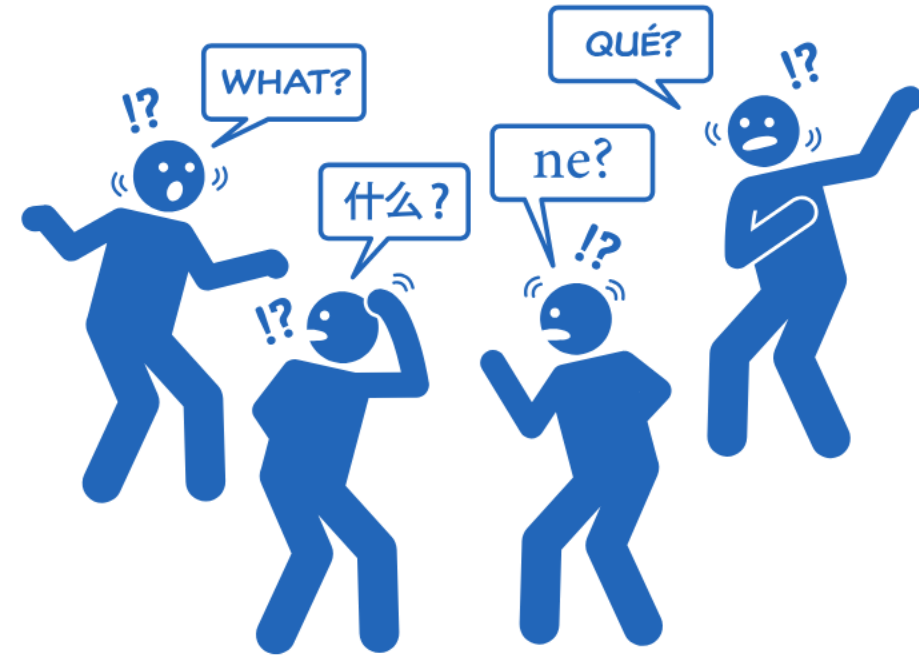
So what's this GenAI malarky?

GenAI is broad term that encompasses any AI system capable of generating new content, including text, images, music, and code. It's this generative capability that puts the 'Gen' in GenAI, shortened from GenerativeAI.

And what about this LLM ballyhoo?

LLMs (Large Language Models) are a specific type of AI model that is trained on massive amounts of text data.

They have been developed to understand and generate natural human language, this means they're great for tasks like translation, summarisation, and creative writing.

So what's the link between GenAI and LLMs?

LLMs are a powerful tool in the GenAI area, but they are not the only type of generative AI model.

Other types of GenAI include GANs (Generative Adversarial Networks) for image generation and VAEs (Variational Autoencoders) for various creative tasks.
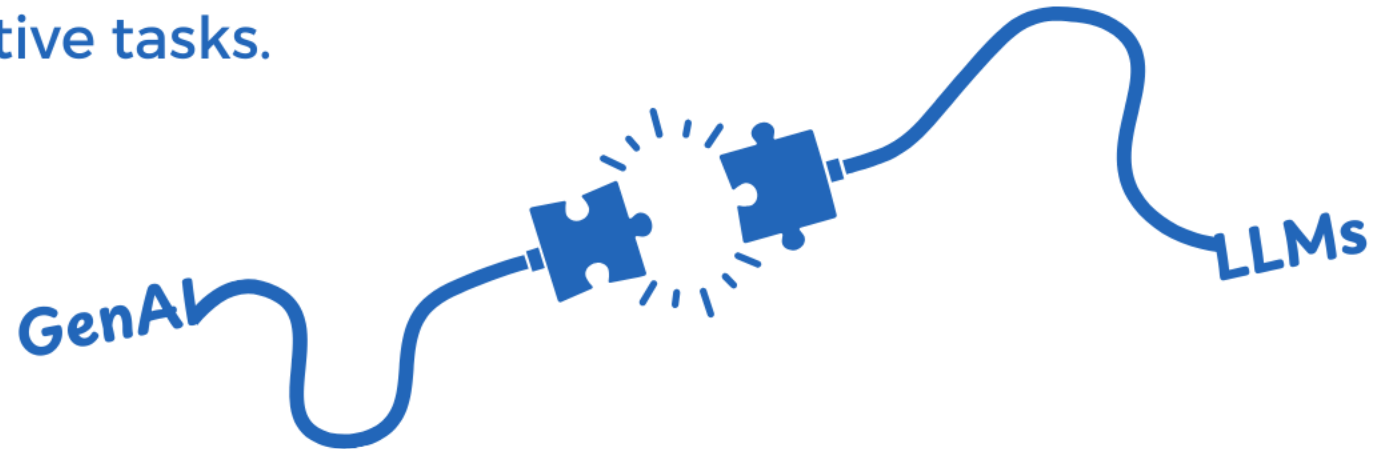
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In essence, all LLMs are GenAI, but not all GenAI is an LLM.

$$LLM \subseteq GenAI$$

# ...right, so what about this ChatGPT thingymabob?

ChatGPT is a large language model (LLM). It's designed to provide a conversational interface which provides users, with information, enables the completion of tasks, and development of creative content. Essentially, it's a user-friendly model that leverages the power of an LLM to interact with humans in a natural and intuitive way.
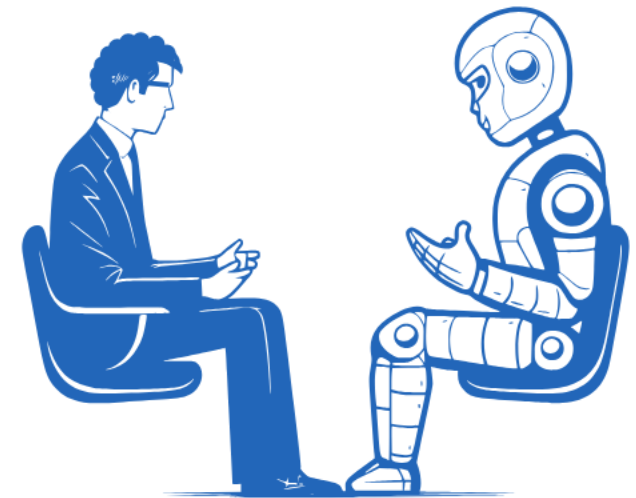
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As ChatGPT is an LLM, it's also a type of GenAI

So how does the LLM thing called ChatGPT work?
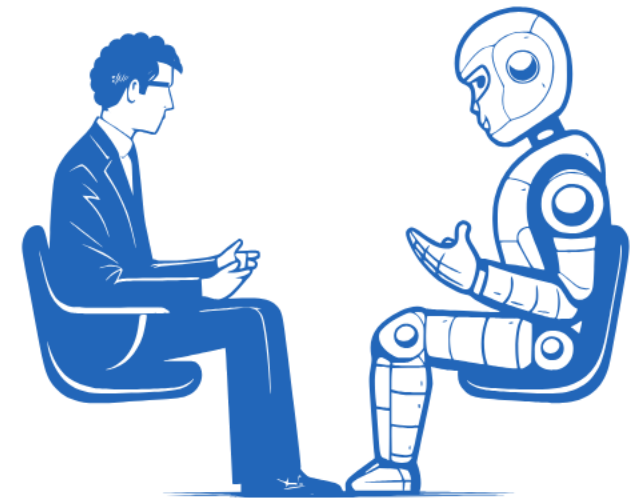
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# So how does the LLM thing called ChatGPT work?

Magic

# So how does the LLM thing called ChatGPT work?

How LLMs learn to talk the talk...

1. **Training Data**: the model is fed vast amounts of text data, such as books, articles, and code.

2. **Neural Network**: the LLM uses a neural network architecture to process this data.

3. **Learning Patterns**: the neural network learns to identify language patterns in the data, such as, discourse, pragmatics, lexis, grammar, semantics and phonetics/ phonology and morphology.
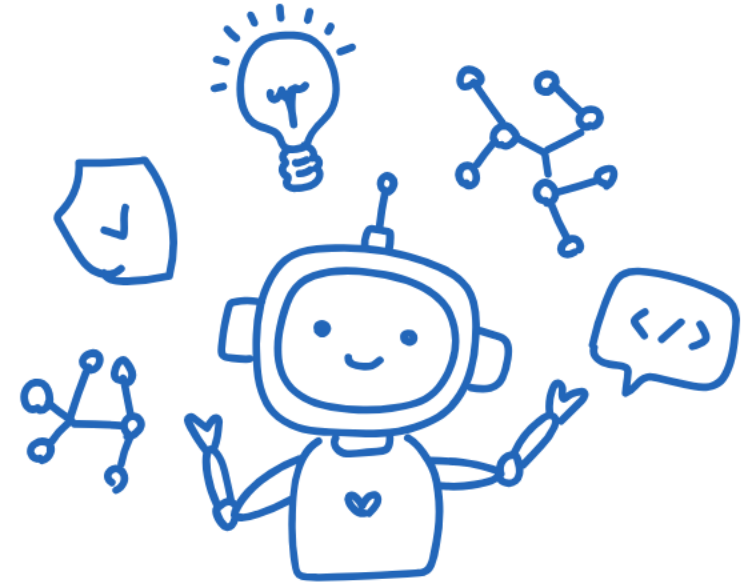
How LLMs learn to talk the talk...

4. **Generating Text**: when given a prompt, the model uses its learned patterns to predict the most likely next word or phrase, continuing this process until it generates a complete response.

5. **Refinement**: the model's responses are often refined through a process of reinforcement learning, where human feedback is used to improve the quality of the output.
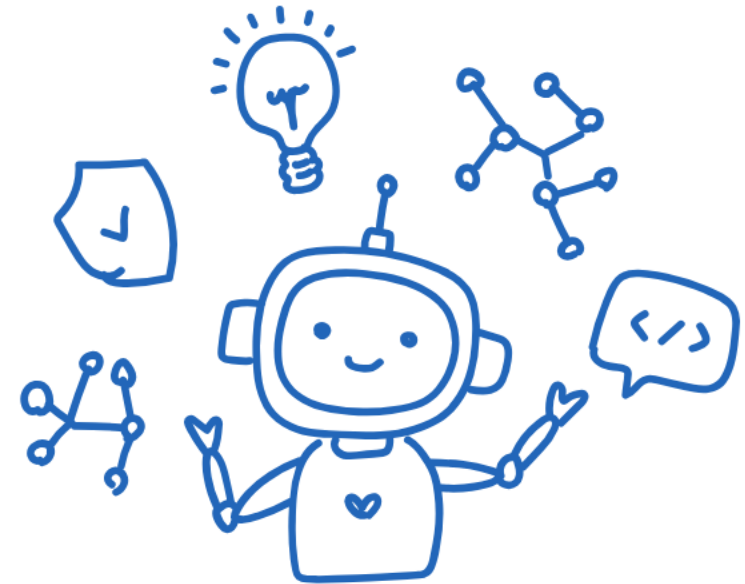
LLMs: talking the talk as they walk in our footsteps...

LLMs like ChatGPT and Gemini are trained on <u>massive</u> amounts of text data.

This training process allows them to learn patterns in language, grammar, and style. When you provide a prompt, the LLM processes it and generates a response based on its understanding of language and the information it has been trained on.

Prompt

Smart responses
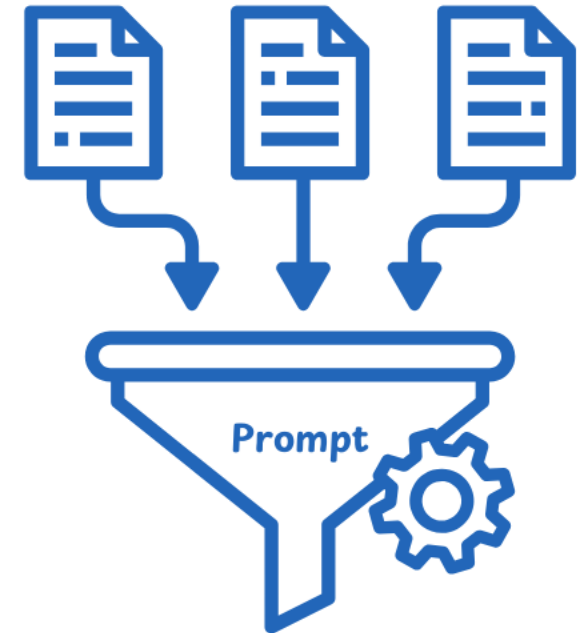
Part two

What should we do about this here AI then?

Areas of AI progress and potential

- Augmented Research Support
- Enhanced Discovery and Access
- Building Open Knowledge Networks
- Advancing Teaching and Learning
- Streamlining Operations

# Challenges in an AI Future: Ethical Dilemmas

Bias and Fairness:
- AI systems can perpetuate biases present in their training data, leading to inequitable outcomes.

Misinformation & disinformation:
- AI-generated content can spread misinformation and disinformation, undermining trust in information sources.

Data Privacy:
- The collection and use of personal data for AI training raises concerns about privacy and security.
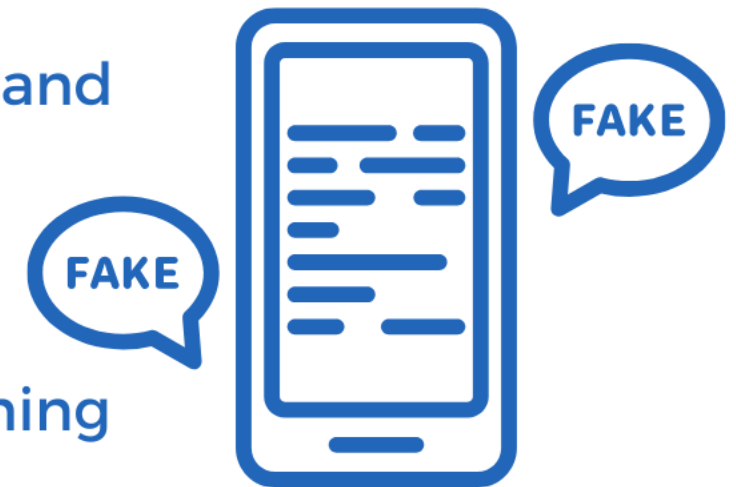
Challenges in an AI Future: Workforce

Skills Development:
- Ensuring we have frameworks to enable staff to develop their AI skills e.g., prompt engineering and systems integration.

Digital Divide:
- Unequal access to AI technologies can exacerbate existing disparities.

Challenges in an AI Future: Integration Challenges

Technical Complexity:
- Implementing and maintaining AI systems requires significant technical expertise and resources.

Interoperability:
- Integrating AI tools with existing library systems can be challenging.

Cost:
- The development and maintenance of AI systems can be expensive.

Challenges in an AI Future: Copyright & Intellectual Property Dilemmas

Copyright and Ownership:
- The ownership of AI-generated content and the rights of creators are complex legal issues. Likewise, the rights of authors whose works are used to train LLMs.

Data Licensing:
- Access to high-quality training data can be restricted by licensing fees and copyright.

Challenges in an AI Future: Information Context

Taxonomy:
- Through the wholesale use of natural language search interfaces and the use of GenAI co-pilots we may risk losing sight of the context of information.

Pedagogy:
- Engaging with theories, concepts, models and ideas outside of their pedagogical context may distort conventional approaches to sequential learning and knowledge development within established disciplines.

Community Prompts

@JSendall   UKSG Forum   5 December 2024
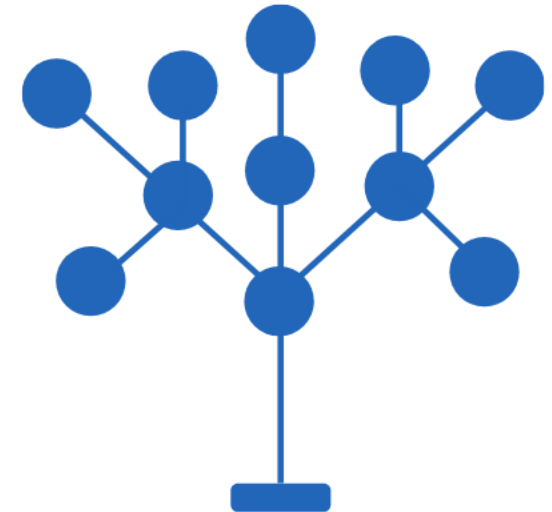
Strategic Pathways: Technical

Advocate for Open AI Systems and Data Practices:
- Promote open-source AI models and FAIR data principles.

Invest in AI-Ready Infrastructure:
- Strategic investment in technology and resources to support AI initiatives.

Strategic Pathways: Policy

Establish Ethical Frameworks:

- Develop guidelines for the ethical use of AI in academic settings.

Shape the Policy Landscape:

- Influence policies that govern AI in higher education and scholarly communication.

Ask the difficult questions.

Strategic Pathways: People

Build AI Literacy and Capabilities:
- Equip library & information professionals, academics, and students with the skills to effectively use and evaluate AI.

Build Resilient Partnerships:
- Develop partnerships across the UKSG community to coordinate and resource activities and share expertise.

Foster Cross-Sector Collaboration:
- Collaborate with vendors and other institutions to develop AI tools and shared standards.

Prioritise the Human Element:
- Maintain a human-in-the-loop approach, leveraging AI as a tool to augment, not replace, human expertise and interactions.

Resources

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