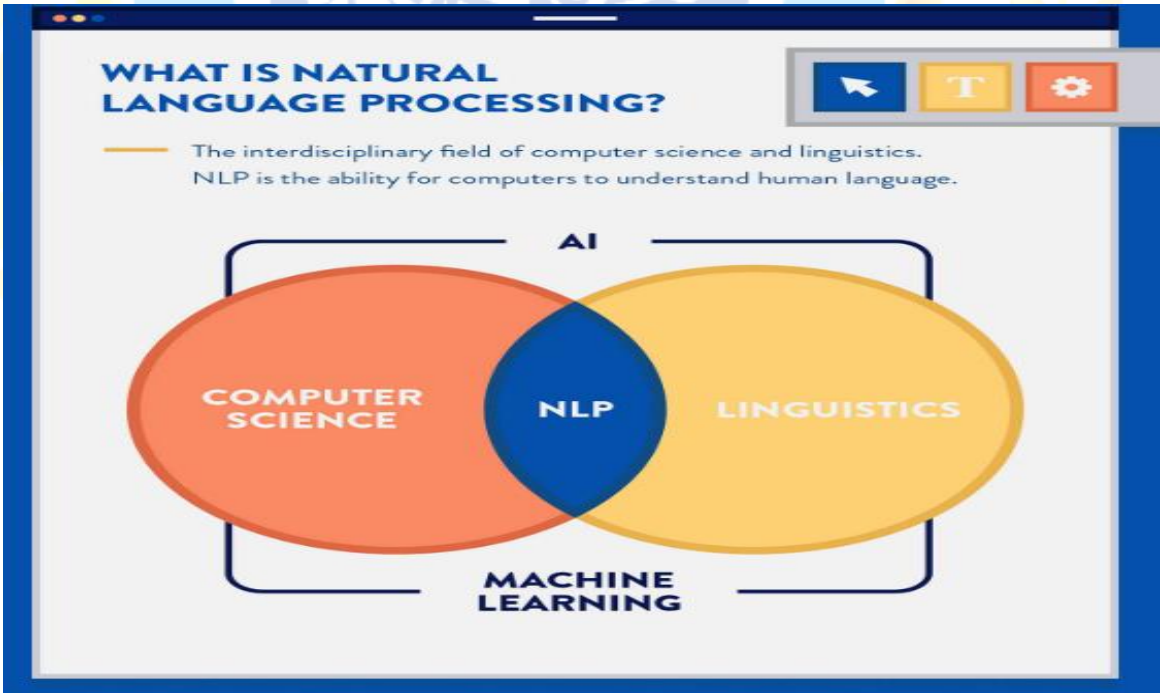
QUANTUM COMPUTING: SCIENCE & TECHNOLOGY

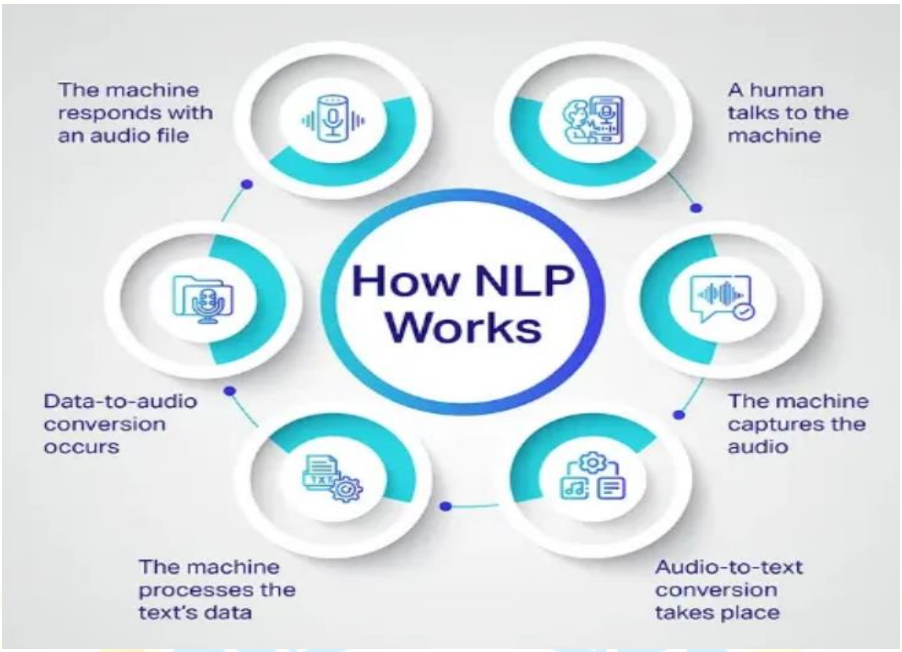
NEWS: How quantum computing can make large language models even better

WHAT'S IN THE NEWS?

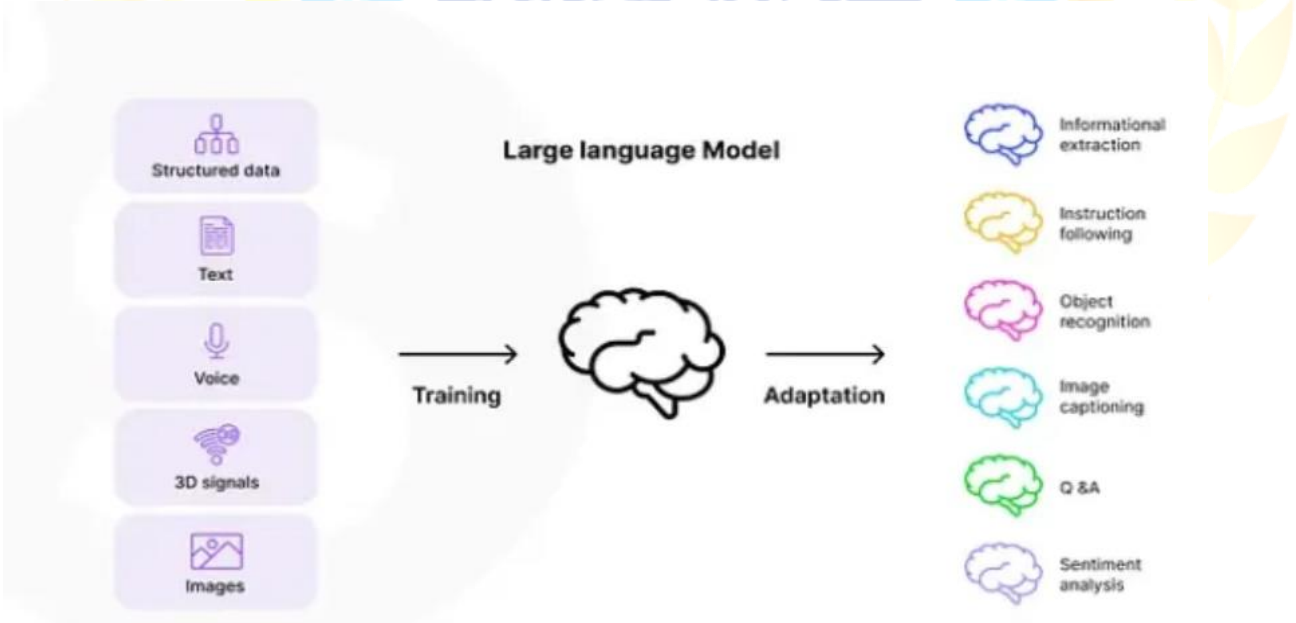
Embracing QNLP and QGen-AI, and advancements in time-series forecasting, can pave the way for more efficient and performant AI systems

- **High Energy Consumption**:
  Large language Models (LLMs) like GPT-3 consume vast energy—1,287 MWh for training, equivalent to 120 years of an average household's energy use, raising sustainability concerns.
- **Hallucinations & Pre-training Limitations**:
  LLMs often produce factually incorrect outputs ("hallucinations") due to reliance on pre-trained data, lacking real-time verification, which limits their accuracy.
- **Syntactic Struggles**:
  While LLMs excel at semantics, they often misinterpret complex grammatical structures, leading to inaccurate text generation.
- **Quantum Computing**:
  Quantum computing can reduce LLMs' energy needs by leveraging quantum phenomena like superposition, enhancing efficiency.
- **Quantum NLP (QNLP)**:
  Quantum Natural Language Processing (QNLP) integrates syntax and semantics more effectively, reducing hallucinations and improving text comprehension.





- **Quantum Generative Model (QGen)**:
  QGen handles time-series data with fewer parameters, offering more efficient pattern recognition and problem-solving.
- **Research Insights**:
  A Japanese study showed QGen AI outperforms classical models in financial problem-



solving with fewer resources, highlighting quantum AI's potential.
- **Future of AI**:
  Quantum computing could address LLMs' challenges, offering more sustainable, accurate, and efficient AI models.

Source : https://www.thehindu.com/sci-tech/science/how-quantum-computing-can-make-large-language-models-even-better/article68647764.ece