PART B: Industry DL Product – here BARD is chosen – white paper

Objective of the Product Bard is an experiment by Google that uses large language models (LLMs) to make information and computing more accessible and useful to people. It is designed as an interface to an LLM, enabling users to collaborate directly with generative AI.

Solution Technology: The technology behind Bard is based on LLMs. These models have been applied in the background to improve many Google products, such as autocompleting sentences in Gmail, expanding Google Translate, and helping to better understand queries in Google Search. The LLMs power Bard, allowing people to collaborate directly with generative AI.

Frameworks, Algorithms, Tools: The specific frameworks, algorithms, and tools used in developing Bard are not explicitly mentioned in the document. However, it is mentioned that Bard leverages state-of-the-art machine learning algorithms and neural networks to comprehend the context, semantics, and nuances of human language. Based on the information available online, we can comment that

Frameworks: a) Tensorflow for building and training LLMs

b) JAX for high performance numerical computation library for automatic differentiation and composable function transformations

c) PyTorch (popular deep learning framework)

Algorithms: a) Transformer Architecture (powerful neural network architecture)

b) Attention Mechanisms: A key component of the Transformer architecture that allows the model to focus on specific parts of the input text, improving its ability to understand long-range dependencies.

c) Sparse Transformers: Techniques that reduce computational cost and memory requirements of Transformers by selectively attending to only a subset of input tokens, enabling larger and more efficient models.

Tools: a) Cloud TPUs (Tensor Processing Units): Specialized hardware accelerators designed for machine learning workloads

b) Large Language Model Datasets: Massive amounts of text data are crucial for training large language models. Common sources include books, articles, web pages, code, and social media text.

Issues in the Current Solution: While Bard is a powerful tool, it currently cannot read linked PDFs or web links (URLs). If users need Bard to answer questions from PDF or website content, the user will need to copy/paste the text into the prompt.

Future Scope: The future scope of products like Bard is immense. As technology advances, the capabilities of LLMs are likely to expand, leading to more sophisticated and useful applications. Bard is seen as a complementary experience to Google Search, and its use cases are expected to grow over time.