XERXEZ SOLUTIONS
DEVELOPMENT – TRAINING – RESEARCH

Project Name: LLM Science Exam Cracker - Generative AI

ABSTRACT: This study focuses on the utilization of Large Language Models (LLMs) for the rapid development of applications, with a spotlight on LangChain, an open-source software library. LLMs have been rapidly adopted due to their capabilities in a range of tasks, including essay composition, code writing, explanation, and debugging, with OpenAI's ChatGPT popularizing their usage among millions of users. The crux of the study centers around LangChain, designed to expedite the development of bespoke AI applications using LLMs. LangChain has been widely recognized in the AI community for its ability to seamlessly interact with various data sources and applications. The paper provides an examination of LangChain's core features, including its components and chains, acting as modular abstractions and customizable, use-case-specific pipelines, respectively. Through a series of practical examples, the study elucidates the potential of this framework in fostering the swift development of LLM-based applications.

INTRODUCTION: The past decade has witnessed an unparalleled evolution in the realm of artificial intelligence (AI). This period, characterized by the ascendancy of deep learning through the utilization of neural networks, has resulted in significant enhancements in capabilities pertaining to image and speech recognition. One salient milestone highlighting this progress is the ImageNet Large Scale Visual Recognition Challenge, which effectively demonstrated the prowess of AI capabilities in image recognition. Another major milestone in the AI landscape is the successful implementation of reinforcement learning, as exemplified by DeepMind's AlphaGo and AlphaZero. These innovations have demonstrated extraordinary performance in complex games, such as Go and Chess, using selfplay algorithms, thereby signifying a leap forward in reinforcement learning techniques. In parallel, the evolution of generative models has facilitated the creation of convincingly realistic synthetic multimedia content.

During the same period, the field of natural language processing (NLP) experienced remarkable transformations. The advent of advanced models, exemplified by the likes of BERT (Bidirectional Encoder Representations from Transformers) by Google and GPT (Generative Pretrained Transformer) by OpenAI [5], and T5 (Text-to-Text Transfer Transformer) by Google has fostered significant improvements in

machine translation, sentiment analysis, and text generation, thus ushering in a new era for NLP. BERT, GPT, T5 and similar technologies all utilized transformers architecture and were trained on huge amount of data and hence named as Large Language Models (LLMs). As LLMs were trained using more and more data, and encompassed more parameters, their capabilities increased. For example, GPT-1 (June 2018), GPT2 (February 2019), and GPT-3 (June 2020) had 117 million, 1.5 billion, and 175 billion parameters, respectively.

A large language model (LLM) is a subtype of artificial intelligence model that generates text with human-like proficiency. Characterized by a sizable number of parameters and trained on expansive text corpora, these models are equipped to produce contextually pertinent and grammatically coherent outputs. Utilizing machine learning techniques such as deep learning, these models are trained to predict subsequent words in a sentence based on prior context, thereby enabling the generation of comprehensive sentences and paragraphs that bear a resemblance to human-authored text. Even though the LLMs present limitations, such as occasionally producing erroneous or illogical outputs (also called hallucination), they achieved rapid success due to their performance in doing various tasks such as composing essays, writing, explaining, and debugging code. The recent OpenAI's LLM, ChatGPT, made the technology known to most, acquiring millions of users in a short amount of time. The capabilities of GPTs have become even more impressive with the release of GPT4. Many started to think about how to leverage this technology to provide solutions for fields like education, research, customer service, content creation, healthcare, entertainment, etc. It became possible to develop AI applications much faster than ever before by interacting with an LLM. However, custom AI apps require more than just interacting via a web interface. A recent opensource software library called LangChain, started providing solutions for the steps of developing a custom AI app utilizing LLMs and gained much attention from the AI community. [9][10] In this article, we describe the capabilities of LangChain and provide a primer on developing large language model applications rapidly utilizing LangChain.

RELATED WORK & EXISTING PROBLEM: LangChain is a framework for developing applications utilizing large language models, and its goal is to enable developers to conveniently utilize other data sources and interact with other applications. To enable this, LangChain provides components (modular abstractions) and chains (customizable use case-specific pipelines). We first provide an overview of components and then describe several use cases.

TECHNOLOGY WE COVER:

1. Python Programming
2. Machine Learning/Deep Learning/Segmentations
3. Django – Front End
4. PostgreSQL – Database
5. MLOps using MLFLow – Model Orchestration
6. Github Action - CI/CD Pipeline
7. DVC for Data Tracking
8. DagsHub
9. Docker and Kubernetes

OUR OFFERING:

1. Complete Implementation of Project
2. Training and Project Deployment on local system
3. Project Completion Certificate
4. Paper Publication in IJera International
5. Project Report
6. Xerxez T-Shirts

DISCLOSURE:

1. Students must prepare the PPT for demonstration.
2. 50% Advance and 50% during project submission.
3. Once Payment is done, cannot be refundable.

CONTACT US

WHATSAPP: 9164315460
Email: info@xerxez.in