Thesis Topic Example 2

PICO-ML: Pipeline Defined Computing and the role of continuous AI in it

Keywords: AI, Automation, MLOPs, Servicing, Deployment, Sustainability, Reliability, Data Management, Production

Background

Software development and operations have experienced several paradigm shifts since the advent of Cloud computing. Concepts such as SDC – software defined computing have been introduced to solve such challenges the past. While these shifts have presented the entire industry with innovative approaches for building and deploying applications. With introduction of two concepts, namely cloud-native applications and DevOps, building, deploying and managing applications became easier. With the advent and adoption of machine learning into enterprises a new paradigm has been introduced called MLOPs. This requires enterprises to rethink their strategy regarding developing, deploying and monitoring their applications that are built with AI – especially when data is constantly on the move. This further adds cost burden on organizations , especially with deep learning (DL), using various niche AI architectures such as transformer algorithms and their application in domains such as natural language processing (NLP), machine/computer vision, voice recognition and synthesis, the complexity of the models makes effective management of technical debt far more difficult than for application development.

Aim

This thesis will focus on a systematic review and development of a PICO-ML SOTA framework that can help organizations save time and costs with a continual learning framework. The thesis will be approached based on the following border sub-topics.

1. Propose an automated PICO-ML framework that can help organizations proactively manage the rapidly-increasing AI technical debt.
2. Propose continuous AI that incorporates the following:
    a. dynamic software infrastructures such as AI orchestration and automation platforms – cloud, hybrid and on-premise.
    b. Use of flexible software stacks that can pave path to modular, microservices architectures and modules such that factors reusability are enhanced across organization that are focused towards embedded business rules
    c. Propose use of standard systems-integration approaches, resulting in a proliferation of point-to-point integration across applications