Name of student : FAKIR Yasmine

Name of your level 1: IGUEME Merveille

Title: Artificial Neural Network Model for Automatic Code Generation in Graphical Interface Applications

Key words: Machine learning, natural language processing, graphical interface, transformers, Tkinter, deep learning, automatic code generation.

Summary:

This article outlines the development of an artificial neural network model designed to automate the generation of source code for graphical user interfaces (GUIs) using the Python programming language. Driven by the industry's challenges in meeting project demands efficiently, the study presents a comprehensive methodology involving the creation of a natural language dataset describing Python-programmed GUIs. The dataset serves as the foundation for training a deep neural network, specifically employing a transformer architecture, to achieve automatic source code generation. The trained model demonstrates promising results, avoiding overfitting and showcasing its potential in enhancing code generation processes for GUIs.

In response to the dynamic landscape of software development, the article addresses the industry's need for efficient solutions amid growing project complexity. Leveraging advancements in artificial intelligence, the authors propose a methodology focused on utilizing a recurrent neural network for the automatic generation of Python source code for graphical user interfaces.

The primary objective is to present a methodology for constructing and training a recurrent neural network model tailored for the automatic generation of source code for graphical user interfaces using the Python programming language.
The authors meticulously construct a dataset comprising natural language descriptions of Python-programmed GUIs. This dataset becomes the cornerstone for training a deep neural network model, specifically adopting a transformer architecture. The training process involves optimizing key parameters, and the model's performance is evaluated based on critical metrics such as loss and perplexity.

The trained model excels during the validation stage, exhibiting low loss and perplexity values (1.57 and 4.82, respectively). These metrics signify successful training, indicating the model's ability to generalize effectively without succumbing to overfitting. The article underscores the potential of the proposed approach in automating the creation of Python code for diverse GUI scenarios.

The article concludes with a testament to the neural network model's efficacy in processing natural language requests related to GUI creation in Python, facilitating the automatic generation of executable source code. As a forward-looking perspective, the authors suggest enriching the dataset with more diverse GUI scenarios and expanding the model's capabilities to generate source code for web components.

Machine learning, natural language processing, graphical interface, transformers, Tkinter, deep learning, automatic code generation.

AI Model Used: Recurrent Neural Network (RNN), Transformer Architecture, Deep Neural Networks, Encoder-Decoder Architecture.