Intelligently Identifying and Locating Electronic Components in Power System Circuit Diagrams

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Problem Statement

DESIGN EXPO

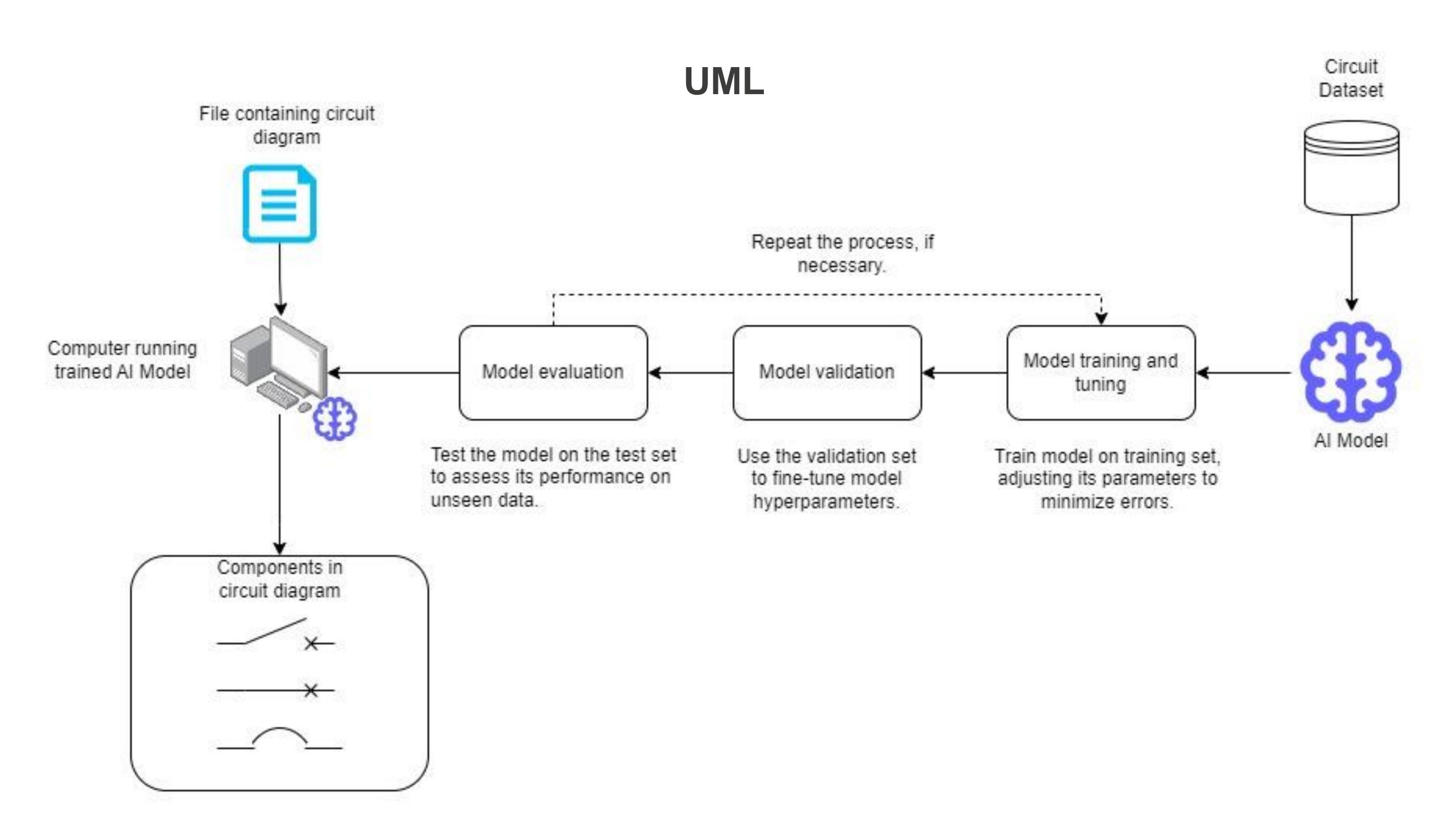
Given the large volume of diagrams handled by power companies, manual analysis is often inefficient and error-prone. By leveraging artificial intelligence and image processing techniques, this project seeks to detect various components and accurately determine their positions within these diagrams. This approach will enhance efficiency in power system design, planning, analysis, and troubleshooting.

Objectives

- Define key electronic components to be designed and collected into a dataset for training
- Process data into multiple formats suited to test and train the model on more images
- Design a machine learning model using PyTorch for image-based recognition
- Train the model on annotated diagrams while adjusting parameters to achieve desired accuracy Expand the ML model to be able to handle further information
- gathering from the diagrams regarding location of each component Develop more complex system diagrams using AutoCAD to be added

to the dataset for further testing and training

Conduct final testing after training on the new images to achieve the required level of performance and reliability



High Level Design Client Creates a Power System Circuit Diagram Input Power System Circuit Diagram into Al Model Epoch 3/10 - Train loss: 3.6980475594357745, Validation loss: 3.5945766262891814, Accuracy: 0.042682926829268296 Artificial neural networks och 5/10 - Train loss: 3.5217146262889956, Validation loss: 3.6554547991694473, Accuracy: 0.07317073170731707 och 6/10 - Train loss: 3.235886367355905, Validation loss: 2.7562220663559147, Accuracy: 0.11585365853658537 Training and Validation Loss och 7/10 - Train loss: 2.927629398136604, Validation loss: 2.9887383158613994, Accuracy: 0.13414634146341464 Validation Loss och 8/10 - Train loss: 2.8829157817654494, Validation loss: 2.4010117213900495, Accuracy: 0.2073170731707317 ooch 9/10 - Train loss: 2.6575204090374274, Validation loss: 2.2112414182686226, Accuracy: 0.2926829268292683 Client Recieves a List and Location of Electronic Components Client

