Use of Machine Learning and Neural Networks for predicting circuit and system behaviour in the presence of manufacturing variability.

It is very important for circuit and system designers to be able to predict the effect of manufacturing variability on system performance. Such variability can cause signal integrity issues and poor system performance. In this project, the focus is on the machine learning aspects and not on the circuit elements or specific systems. The goal is to implement two or more different machine learning algorithms to aid in predicting system behaviour and for design purposes.

The initial steps would involve researching existing machine learning techniques used in relation to circuit design and analysis. The availability of datasets would be considered. Datasets could be generated that could be used for the training and testing. The focus is not on the tools to generate the datasets but on the machine learning algorithms and their performance.

Two papers to look at and the focus is on the machine learning and its implementation and not on the specific circuits/systems

Mina, R., Jabbour, C., & Sakr, G. E. (2022). A Review of Machine Learning Techniques in Analog Integrated Circuit Design Automation. *Electronics (Basel)*, *11*(3), 435. https://doi.org/10.3390/electronics11030435

Zhou, Z. (2024). Signal Integrity Analysis of Electronic Circuits Based on Machine Learning. *IEEE International Conference on Automation, Electronics and Electrical Engineering (Online)*, 861–867. https://doi.org/10.1109/AUTEEE62881.2024.10869746