**Objective(s):**

* To develop highly accurate/computationally efficient machine learning-based models for VLSI circuits subjected to PVTA variations.
  + Using library/syntax (for testing)
  + From scratch to improve the accuracy, etc. may be for application specific problem.
* To develop an artificial intelligent “top level control unit” over ML models for automated selection of suitable model for the circuit under test.
  + Based on internal relations of the circuit under test
* To develop a framework of optimization algorithms to optimize the circuit performances.
* Run optimization algorithms on the developed ML models, managed by top level AI unit.

**Progress:**

**Task 1: ML algorithms developed from scratch**

Linear, Polynomial, Ridge regressions, Decision tree, Gradient Boosting algorithm. More algorithms need to be added.

**Improvements needed in developed algorithms:** The developed algorithms are computationally slow and less accurate compared to the library counter-parts. Need to be improved.

ANN from scratch needs to be developed.

**Task 2: Framework of ML models**

ML framework to choose predictions from best performing ML models through R2 Score is developed successfully.

Any suggestions for better performance parameters for the job are accepted.

**Task 3: Overall AI model**

An Overall model for studying the dataset characteristics - such as

* number of input parameters
* number of training samples
* selecting most dominant features
* mean and variance of input parameters, etc.

and based on that choosing a suitable ML model within the framework build using library functions is developed successfully.

Any suggestions for better performance parameters for the job are accepted.

An intelligent AI model for the job needs to be developed.

Task 4: Novel ML algorithms

Need to develop novel techniques.