Fast and Accurate PPA Modelling using Transfer Learning

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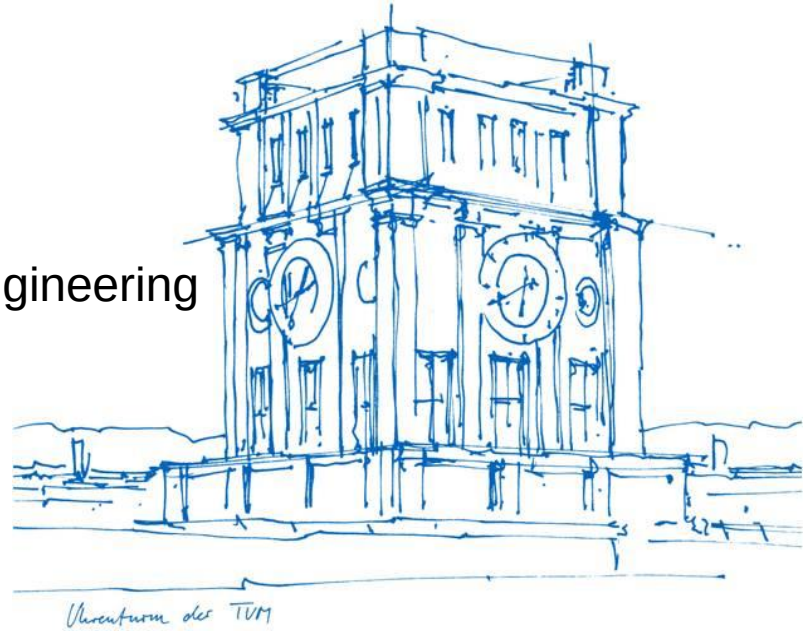

Structure

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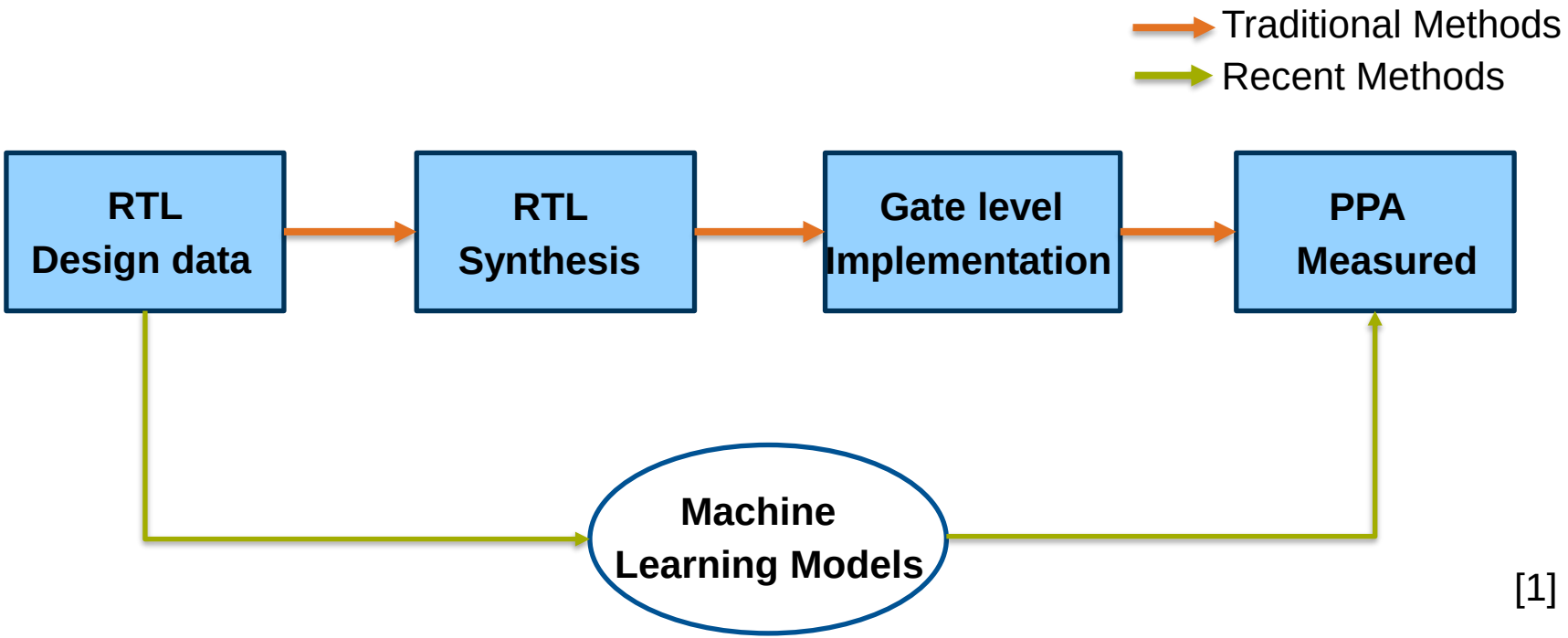
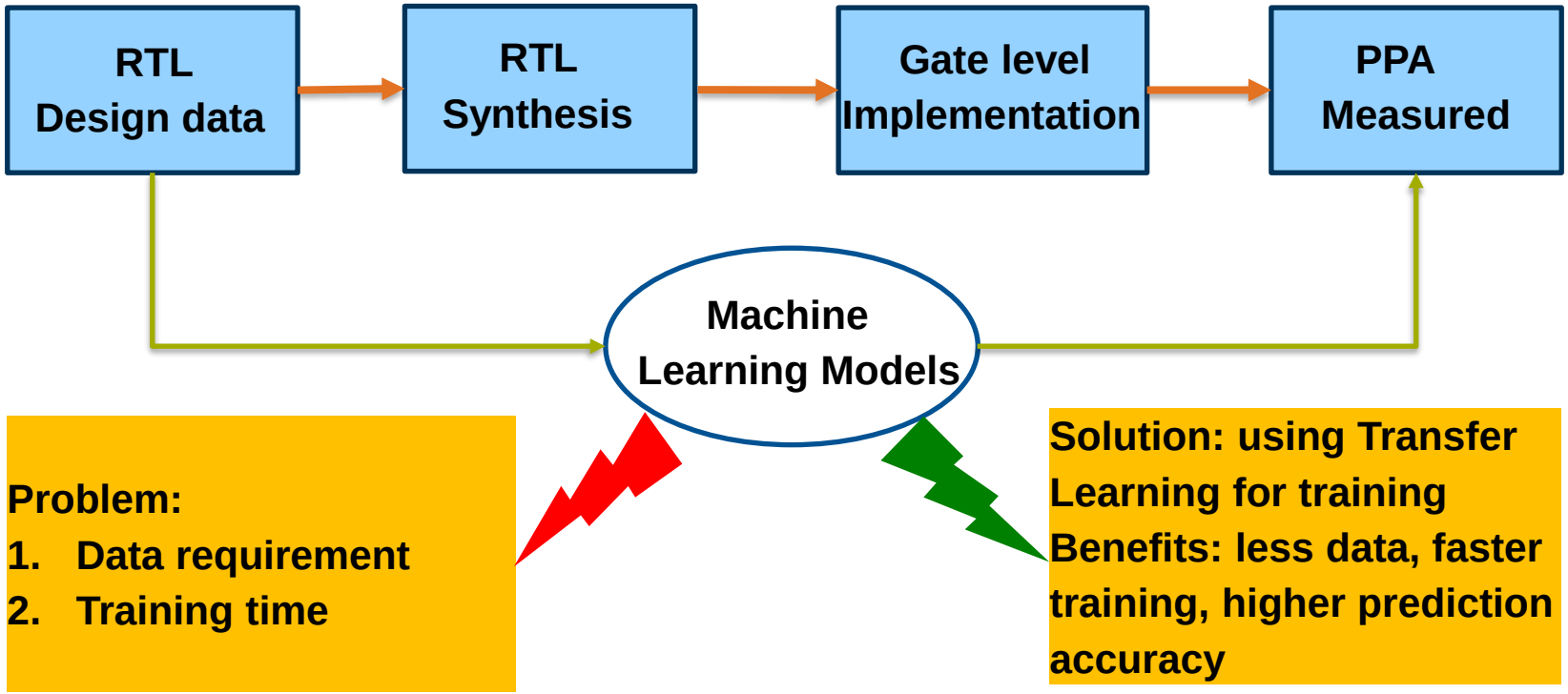
1.Introduction



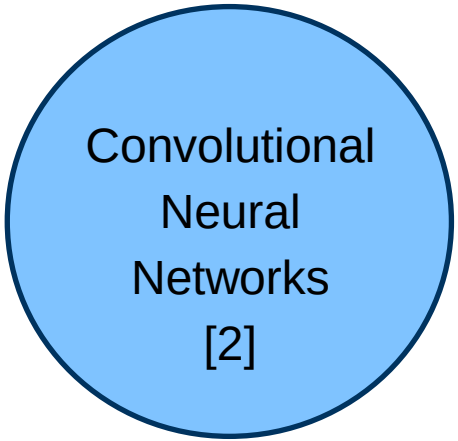
[1]

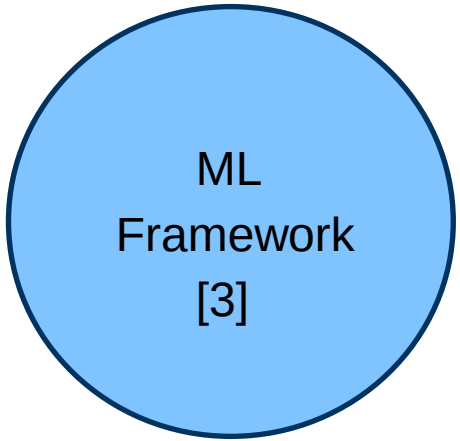
1.Introduction

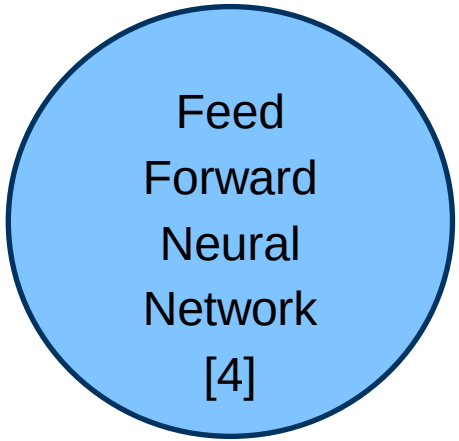


[1]

2. State of the Art

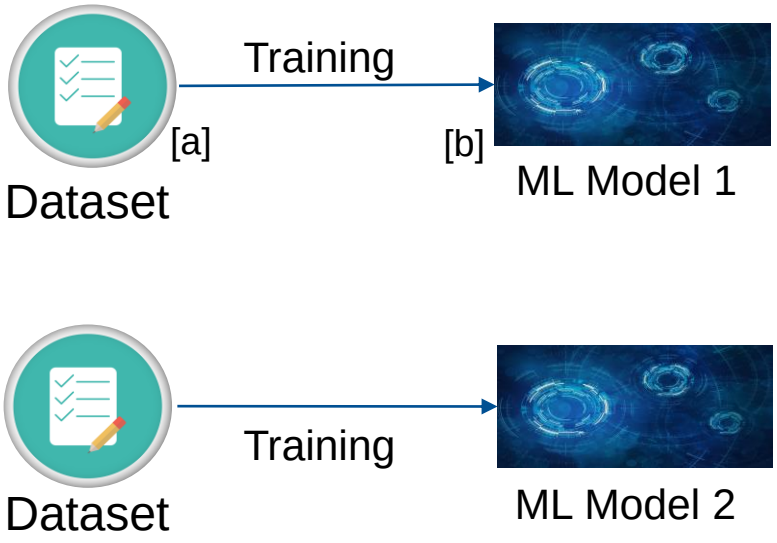




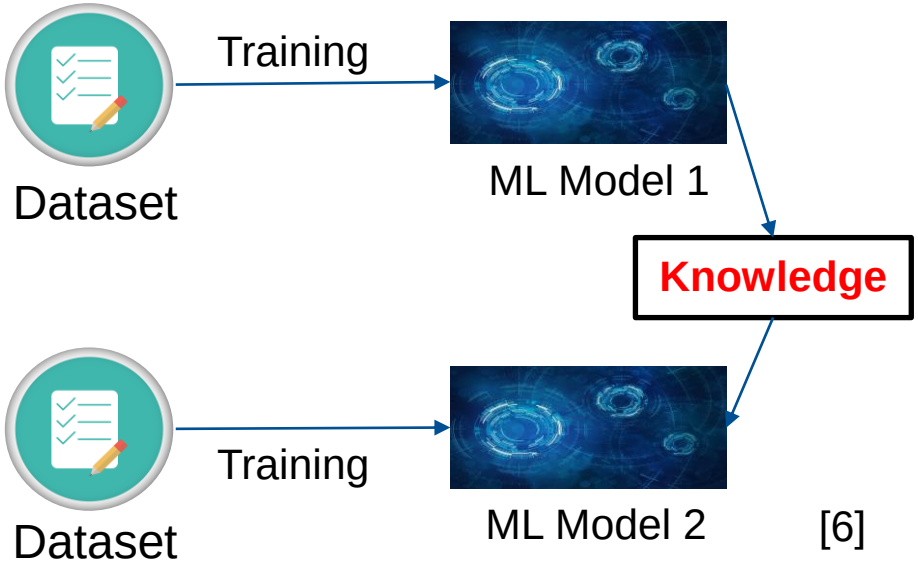


3. Transfer Learning

Training in traditional Machine Learning (ML) methods.



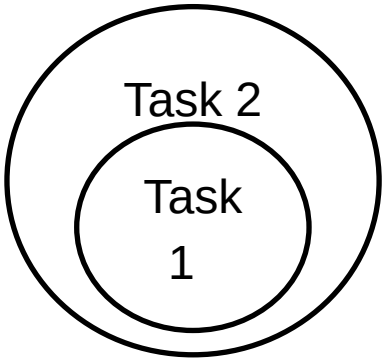
Training using Transfer Learning



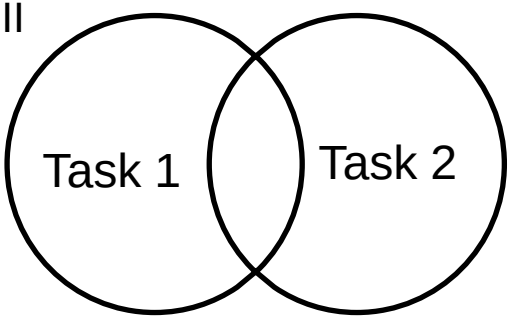
[6]

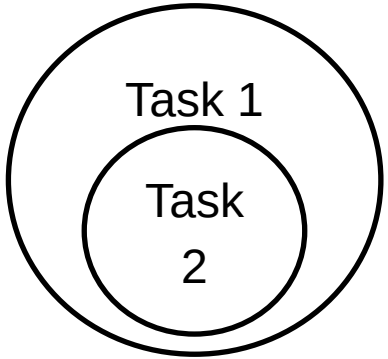
3.1 Where can Transfer Learning be used ?

Case I



Case II



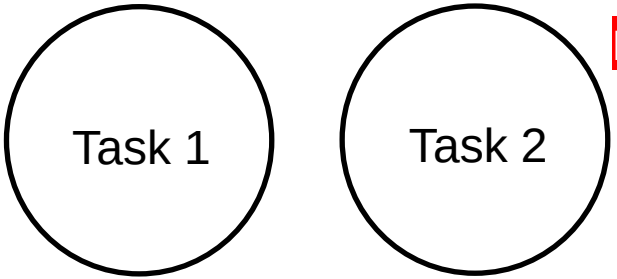


Case III

Trivial

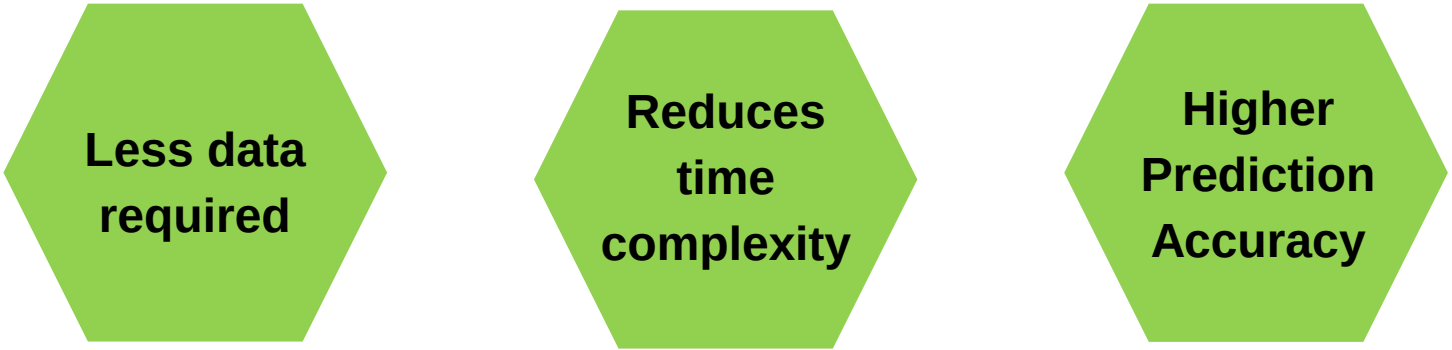
Case IV

Not possible



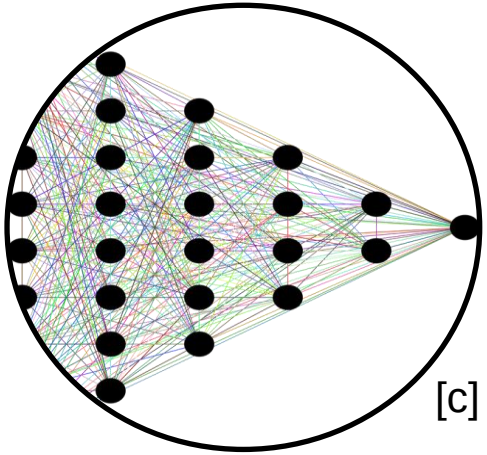
[5]

3.2 Why is Transfer Learning used?

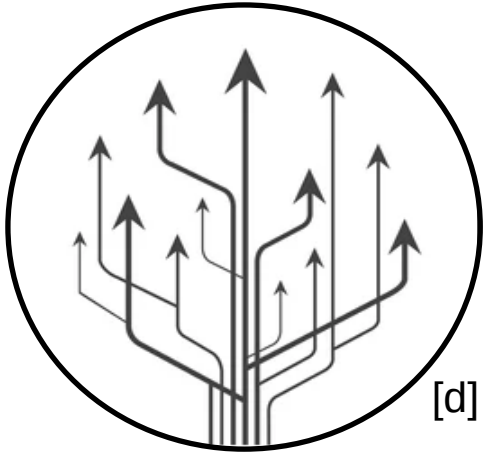


[1]

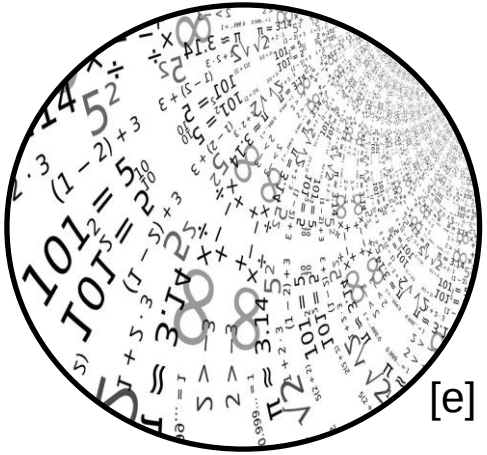
4. Machine Learning Models


[c]

Neural Networks

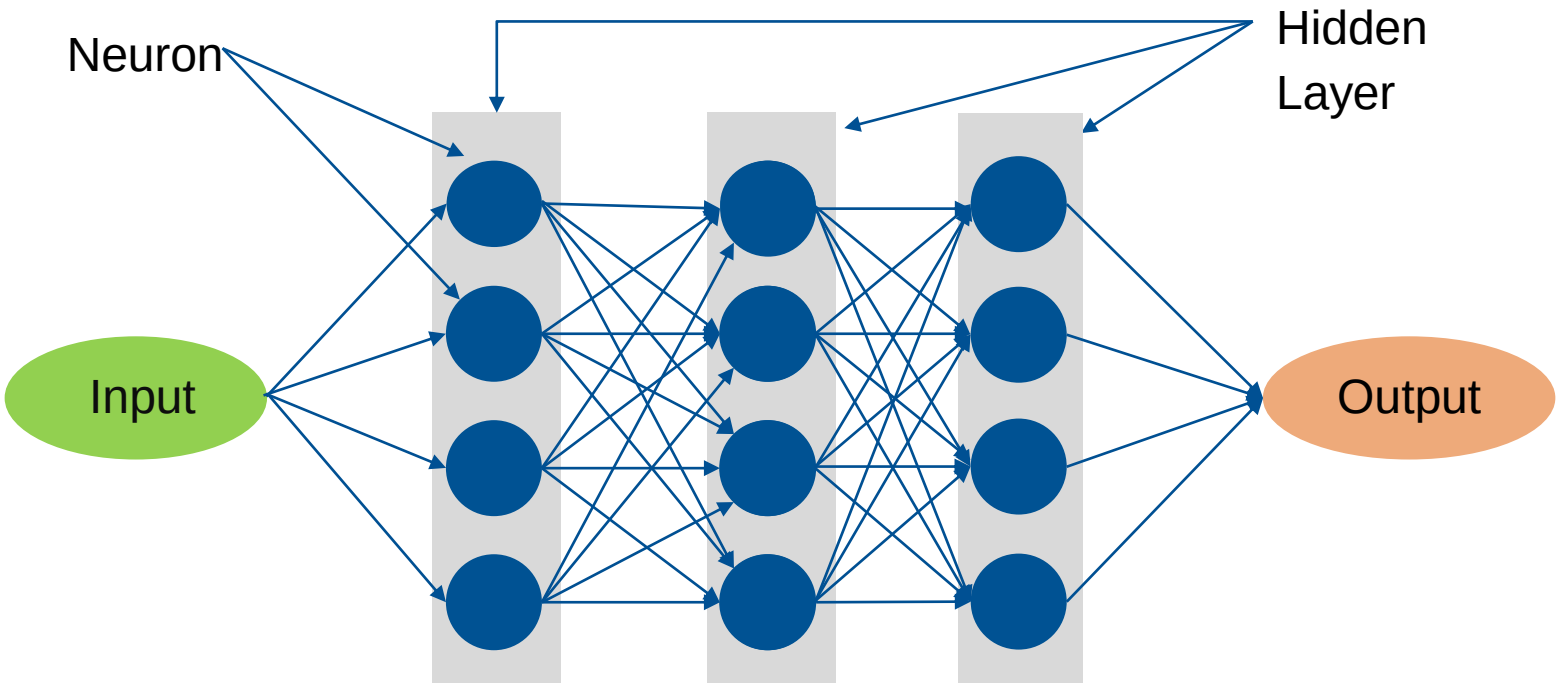

[d]

Decision Trees

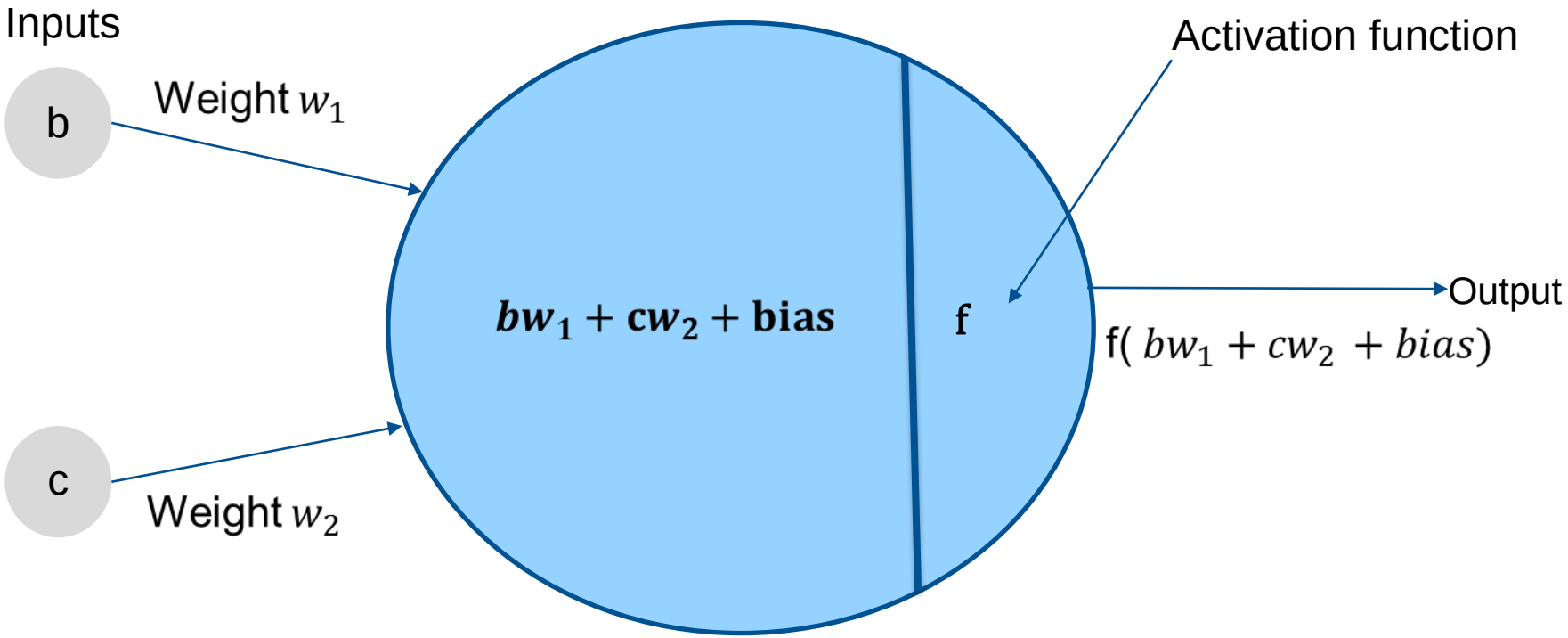

[e]

Gradient Boost Regressor

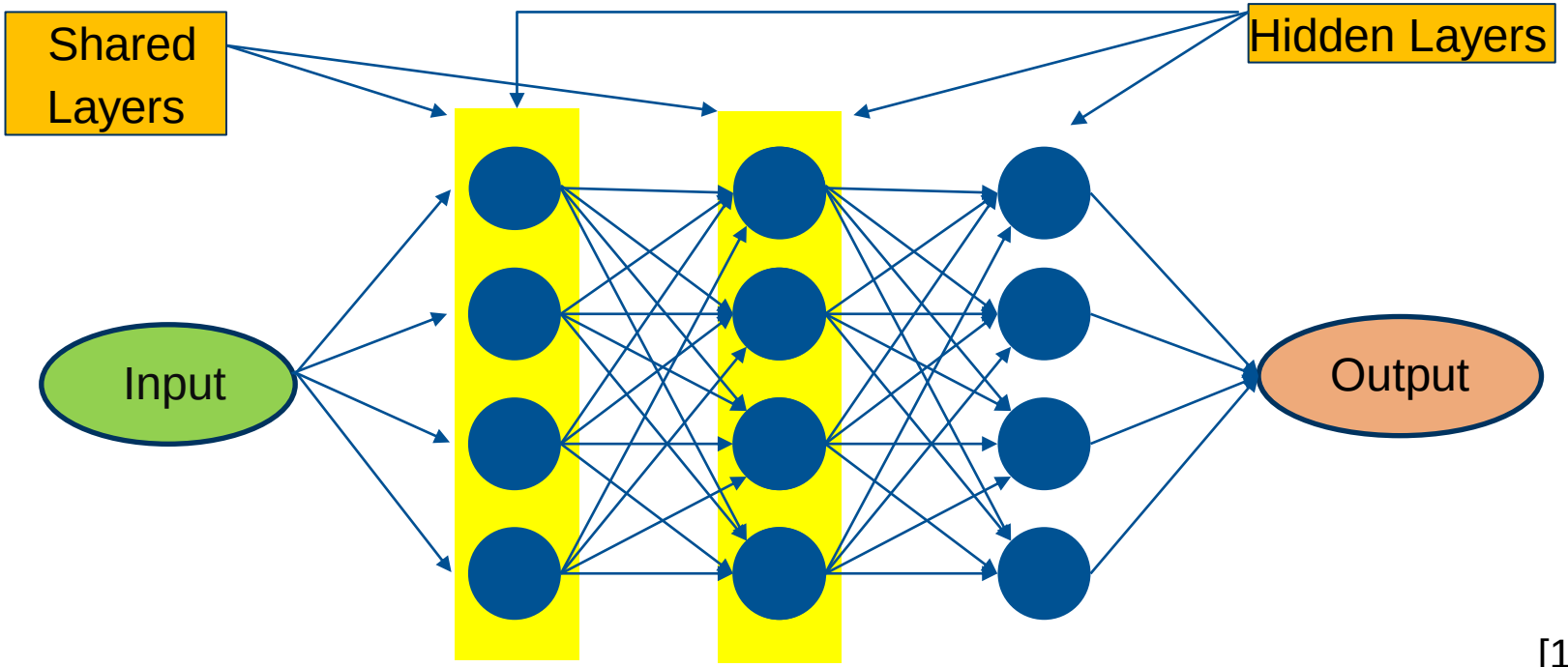
4.1.1 Neural Networks



4.1.2 Inside a Neuron



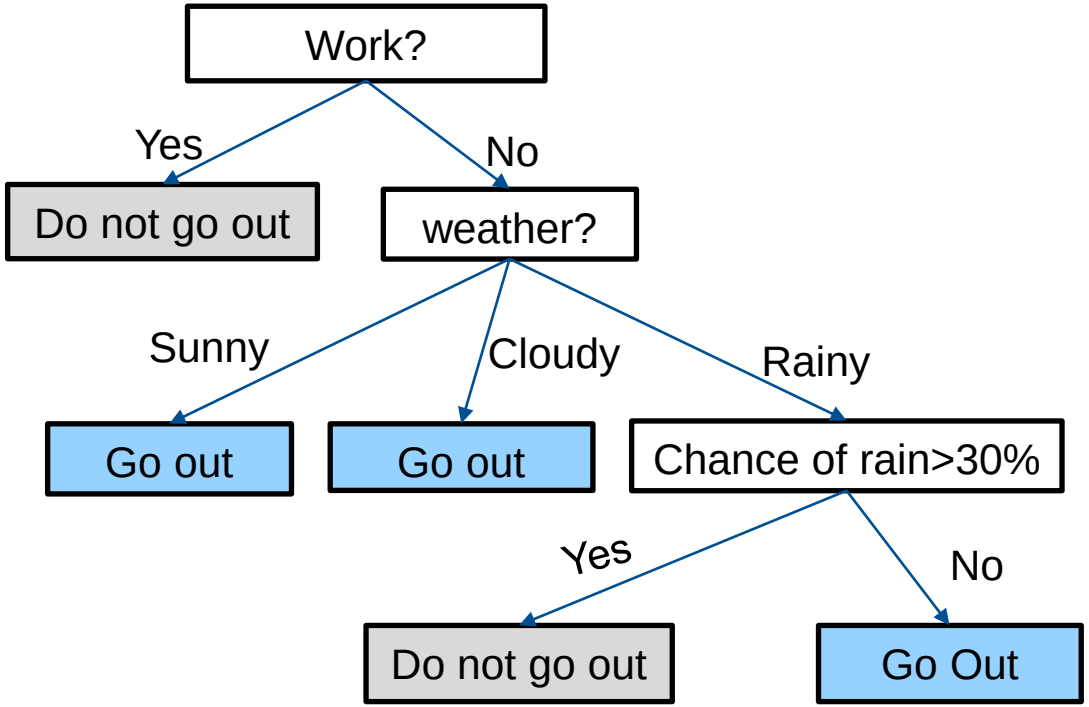
4.1.3 Transfer Learning in Neural Networks



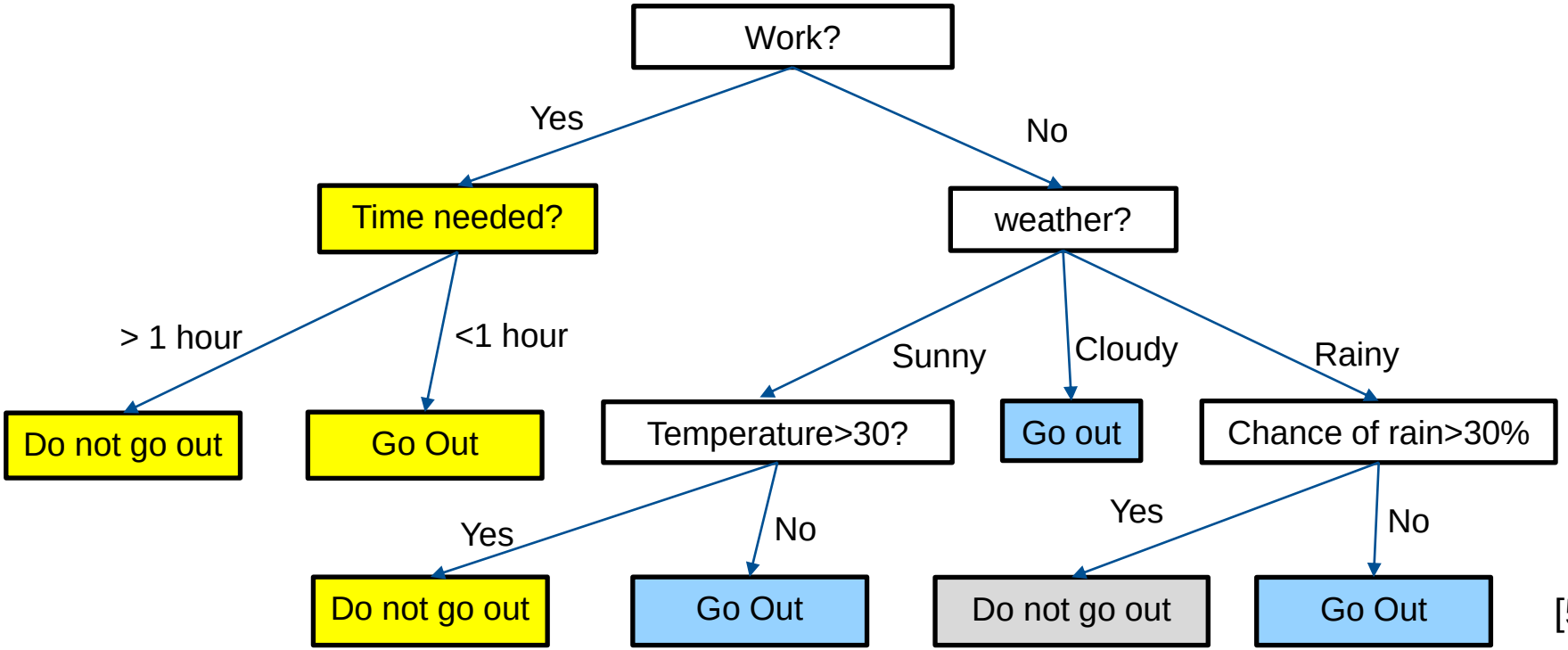
[1]

4.2.1 Decision Trees

Initial Decision Tree



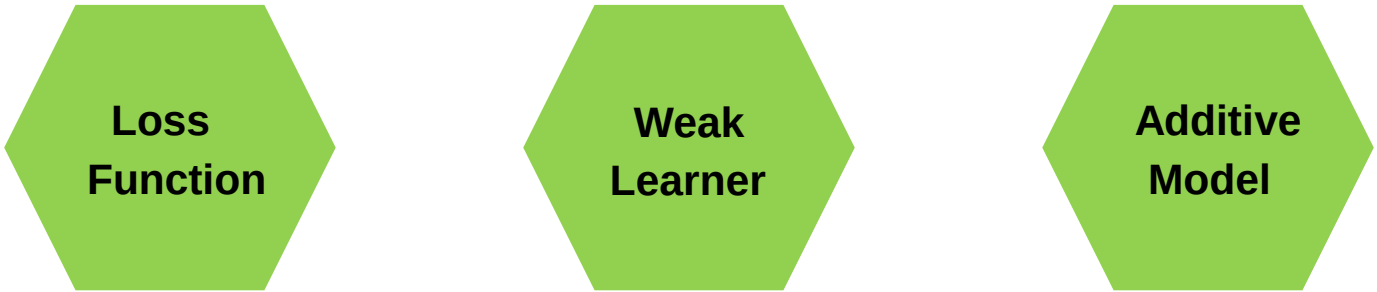
4.2.2 Transfer Learning in Decision Trees



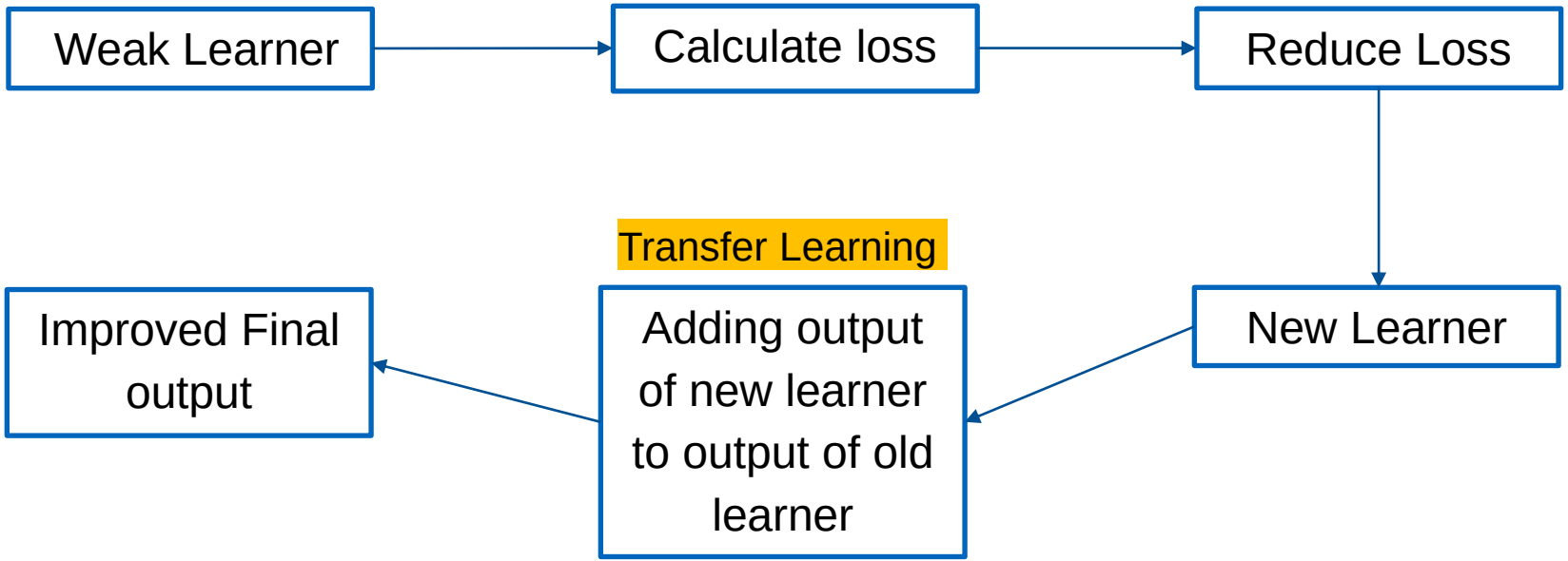
[5]

4.3.1 Gradient Boost Regressor

Elements involved in Gradient Boosting:



4.3.2 Transfer Learning in Gradient Boost Regressor



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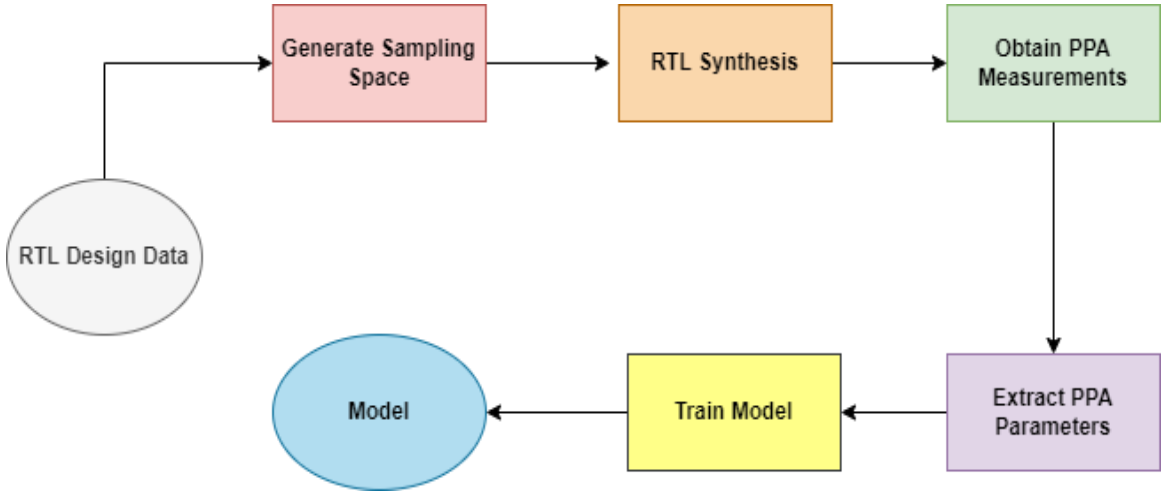
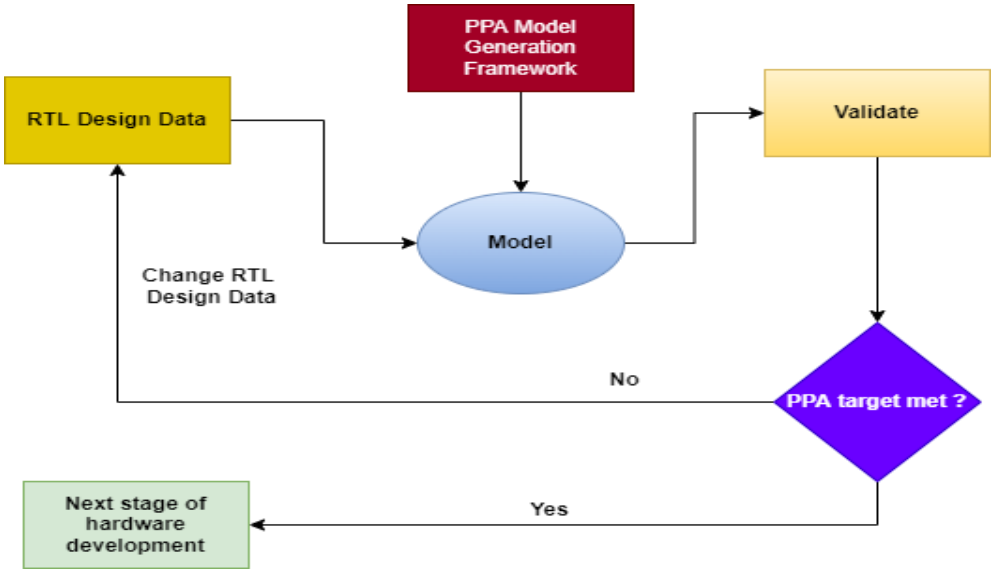
5.1 PPA Model Generation Framework



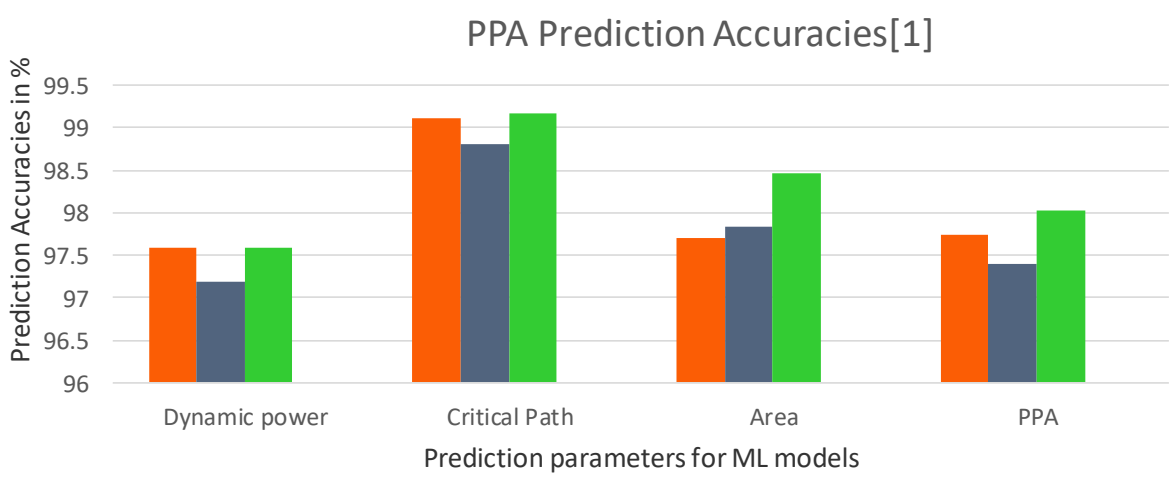
PPA Model Generation Framework [1]

5.2 PPA Model Testing Framework



PPA Model Testing Framework [1]

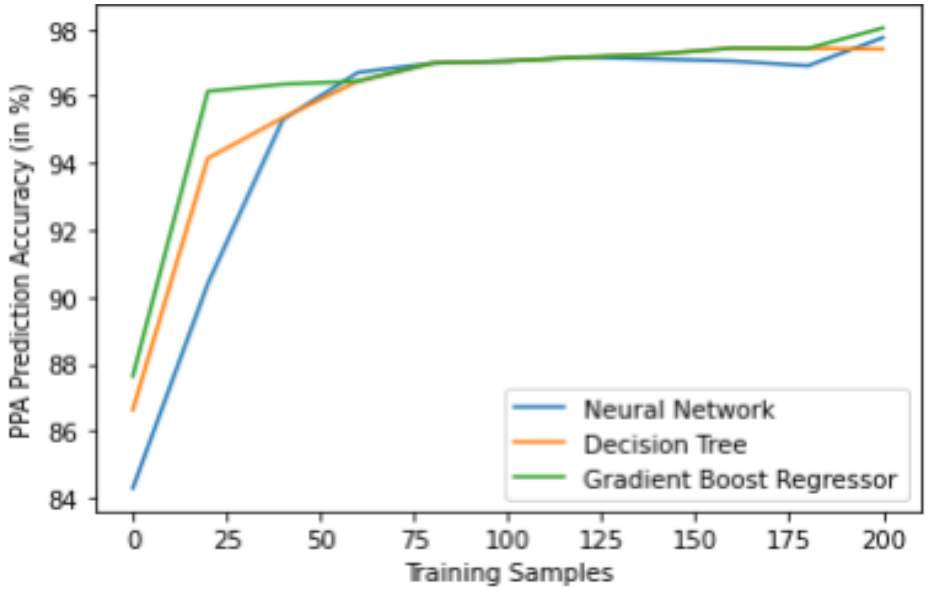
6.1 Evaluation



All predicted accuracy parameters are measured in %

Prediction accuracies = 100% - Mean Squared Error.

6.2 Evaluation



PPA prediction accuracies vs Training Samples [1]

7. Conclusion

- This paper explores the possibility of using Transfer Learning in PPA predictions.

- Transfer Learning helps in reducing the amount of data that is needed to train our models and helps attains a higher prediction accuracy using a relatively fewer number of new training samples.

- Transfer Learning also reduces the time complexity by using pre-trained models.

8. References

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[6] Dario Martinez , ”Is Transfer Learning the final step for enabling AI in Aviation?”, 2020-03-04 16:20:46.

9. Image References

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QUESTIONS?