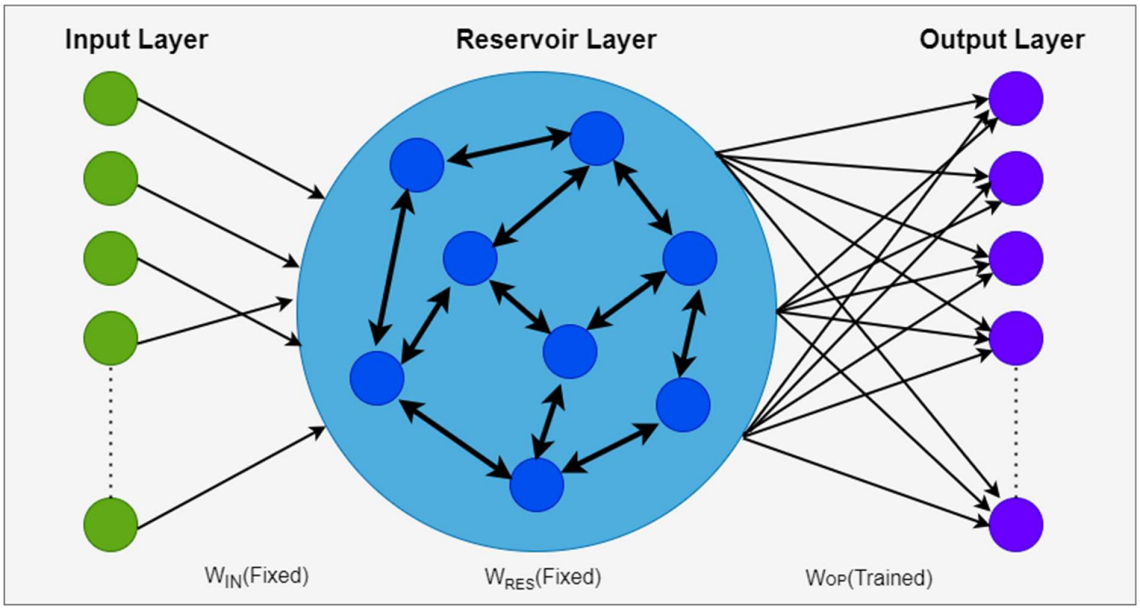
ASIC² ARCHITECTURES SYSTEMS INTELLIGENT COMPUTING INTEGRATED CIRCUITS

Reservoir Computing for Static and Temporal Tasks

Reservoir computing is a kind of neural network architecture that is derived from recurrent neural networks. It consists of a dynamic and non-linear reservoir module that maps the input data into high dimensional space. This is then read-out using a fully connected readout layer. The advantage of this network is that only the readout layer requires training, usually by regression.



Project goals:
In this project, you will demonstrate the use of reservoir computing for static and temporal tasks, These tasks include:

1. Time series prediction - regression task
2. Image recognition / classification
3. Spoken digit classification
4. Chaotic time series prediction - Mackey-Glass

You will perform the above tasks using reservoir computing and conventional neural networks and compare them with metrics like accuracy, training and inference time, network size (no. of weights and activations), memory required, etc.

Tools Required: Matlab/Python, SPICE

Prerequisite Courses: Machine Learning, Introduction to VLSI is a plus

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