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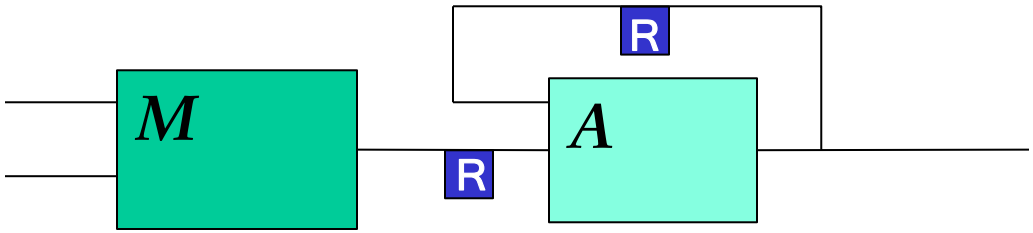

2020/12/2

Design Features

- Used only 10 multipliers and 10 adders. Less area and minimum number of blocks design.
- Combined with pipelining and parallelism design. Each neuron has only 1 multiplier and 1 adder with pipelining process. 10 neurons with parallelism structure.
- Feedback loop design allows one adder to add up all values.
- Object oriented design. Put max_selector and neuron as the sub-module and use them in Image_Classifier which is the top module

Synthesis Result

Technology	Synopsys 32nm
Core Area	Total cell area: 0.543418 mm^2 Total area: 0.932017 mm^2
Power	Internal power: 3.35 mW Switching power: 0.497 mW Leakage Power: 0.903 W Total Power: 0.942 W
Energy/Image	Ptotal*Nclk*Tclk= 0.7687 uJ/Image
Energy-Area Product	0.716 uJ*mm^2

Clock Period	1ns
N clk Cycles to finish	816
Delay	1632ns

Accuracy result

89% for 200 images

```
------------------------------------------------------------
------------ Starting to Test Image Number 2 ------------
Actual Number is 0010
          816 clks of pocessing done
Estimated Output Number is : 0010
Correct Output!! The Classifier has sucessfully classified this image -- PASSED
------------------------------------------------------------
------------------------------------------------------------
------------------------------------------------------------
---------------------- Total Success Rate =         89 Percent
------------------------------------------------------------
```

85% for 10000 images

```
# Estimated Output Number is : 0110
# Correct Output!! The Classifier has sucessfully classified this image -- PASSED
# ------------------------------------------------------------
# ------------------------------------------------------------
# ------------------------------------------------------------
# ---------------------- Total Success Rate =         85 Percent
# ------------------------------------------------------------
```

84% for 500 images

```
# Actual Number is 0110
#          816 clks of pocessing done
# Estimated Output Number is : 0110
# Correct Output!! The Classifier has sucessfully classified this image -- PASSED
# ------------------------------------------------------------
# ------------------------------------------------------------
# ------------------------------------------------------------
# ---------------------- Total Success Rate =         84 Percent
```

Improvement:

I used a lot of FSM states in my logic.
It might try to optimize the code to reduce the states.

98% for 1000 images

```
# Actual Number is 1001
#          816 clks of pocessing done
# Estimated Output Number is : 0100
# Uh Oh! Your Classfier is showing the wrong output for this Image -- FAILED
# ------------------------------------------------------------
# ------------------------------------------------------------
# ------------------------------------------------------------
# ---------------------- Total Success Rate =         83 Percent
# ------------------------------------------------------------
```