

## CSC173 - Intelligent Systems

### Assignment, October 2, 2024

*Deadline: On or before October 6, 2024*

#### Binary Classifier Neural Network

Binary classification is **a fundamental task in machine learning, where the goal is to categorize data into one of two classes or categories**. Binary classification is used in a wide range of applications, such as spam email detection, medical diagnosis, sentiment analysis, fraud detection, and many more.

#### Example of Binary Classification

An example dataset from the website "A Visual Interactive Guide to Neural Network" found in this URL: (<https://jalammar.github.io/visual-interactive-guide-basics-neural-networks/>) about house and lot.

Area (sq ft)	Bathrooms	Classification
2,104	3	Good
1,600	3	Good
2,400	3	Good
1,416	2	Bad
3,000	4	Bad
1,985	4	Good
1,534	3	Bad
1,427	3	Good
1,380	3	Good
1,494	3	Good

The table above determines a whether the property is good or bad based on two features, the area in square feet and the number of bathrooms.

**Do some experiment with Binary Classification Network and answer the following:**

1. Design the neural network architecture that will model the classification of the house and lot based on the above dataset.
2. Identify the inputs and output variables in your model.
3. Provide the initial values for weights and biases.
4. Identify your loss (or cost) and activation functions.
5. Determine your learning rate and epochs.
6. Train your network using any of the following:
  1. Using the web-based interactive neural network from this github site: (<https://github.com/marijusGood/Interactive-neural-network>). You may install it in your computer and run it using a web browser.
  2. Write a python program similar the one found in this site: <https://victorzhou.com/blog/intro-to-neural-networks/>
7. Collect all loss values during training and plot it to show the graph.
8. Collect the final value of the weights and biases and use it to classify at least two example property that is not found in the dataset.
9. Write a documentation report of this exercise with necessary illustrations, tables, charts, screenshots, etc., and source code (if using python program) and convert into PDF .

*Submit on or before October 6, 2024.*