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| **Course Name:** | **ANNFS** | **Semester:** | **VI** |
| **Date of Performance:** | **18/01/2022** | **Batch No:** | **2** |
| **Faculty Name:** | **Dr. Jagannath Nirmal** | **Roll No:** | **1912052** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** | **25** |

**Experiment No: 1**

**Title:**

**1. a -Write a Program to Generate various activation functions.**

**1. b-Implement AND gate by M-P neuron model using threshold as an activation**

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| **Aim and Objective of the Experiment:** |
| * Write a Program to generate activation functionsand implement AND gate by M-P neuron model using threshold as an activation function |

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| **COs to be achieved:** |
| **CO1:** Understand the role of neural networks in engineering, artificial intelligence, and cognitive modelling. |

**Apparatus / Software tools used: MATLAB**

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| **Theory:** |
| TYPES OF ACTIVATION FUNCTIONS:ACTIVATION FUNCTION: f(x) defined as output of neuron in terms of local term .   1. Compact transfer function :   A=softmax(n)   1. Hard limit transfer function:   A=hardlimi(n) A=1 n>=0  A=0 n<0   1. Symmetrical Hard limit transfer function:   A =hardlim(n) A=1 n>=0  A = -1 n<0   1. A=puraline(a)   A=n for all n   1. Satin transfer function :   A=satlin(n) n>=1  A=0 n<1   1. Satlins transfer function:   A=satlins(n) A=1 n>=1  A=n -1<n<1   1. Tan-Sigmoid Transfer function:   A=tansig(n) a=2/(1+exp(-n) |

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| **Algorithm:** |
| M-P neuron model for AND gate: |

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| **Observation:** |
| Attach program and its results after execution |
| MATLAB Code:  clear all;  close all;  clc;  n = [0; 1; -0.5; 0.5]  a = softmax(n);  subplot(2,3,1);  bar(n,a);  title("Softmax");  n = -5:0.1:5;  b = hardlim(n);  subplot(2,3,2)  plot(n,b);  title("Hardlimit")  n = -5:0.1:5;  n = 0:0.1:5  c = purelin(n);  subplot(2,3,3);  plot(n,c);  title("Linear Transfer Function");  n = -10:0.1:10;  d = satlin(n);  subplot(2,3,4);  plot(n,d)  title("Saturating linear transfer function");  n = -5:0.1:5;  e = tansig(n);  subplot(2,3,6);  plot(n,e);  title("Hyperbolic tangent sigmoid transfer function") |
| AND Gate using M-P neuron model |

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| **Post Lab Subjective/Objective type Questions:** |
| 1. What is the significance of activation function? List the different types of activation functions? 2. If the input to a single input neuron is 2.0, its weight is 1.3 and its bias is 3.0, what will be output of the neuron if it has the following transfer function  * Hard limit activation function * Linear activation function  1. What are the limitations of M-P Neuron model? |

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| **Conclusion:** |
| Thus, in this experiment we have understood the concept and application of activation functions using Python and MATLAB to generate various activation functions such as hyperbolic tangent, saturating linear, linear, Relu etc. Finally, we implemented AND gate using M-P neuron model by using the threshold as an activation. |

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| **Signature of faculty in-charge with Date:** |