CAE-II

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PART - B

(7)

	A	B	C	D	E	F
A	0					
B	0.71	0				
C	5.66	4.95	0			
D	3.61	2.92	2.24	0		
E	4.24	3.54	1.41	1.00	0	
F	3.20	2.50	2.50	0.50	1.12	0

Merging two points A and B

	A,B	C	D	E	F
A,B	0				
C	4.95	0			
D	2.92	2.24	0		
E	3.54	1.41	1.00	0	
F	2.50	2.50	0.50	1.12	0

MIN [dist(A,B), C] = 4.95

MIN [dist(A,B), D] = 2.92

MIN [dist(A,B), E] = 3.54

MIN [dist(A,B), F] = 2.50

Merging D and E

	A,B	C	D,E	F
A,B	0			
C	4.95	0		
D,E	2.92	1.41	0	
F	2.50	2.50	0.50	0

MIN [dist(D,E), C] = 1.41

MIN [dist (D,E), F] = 0.50

Merginging D, E and F

	A,B	C	D,E,F
A,B	0		
C	4.95	0	
D,E,F	2.50	1.41	0

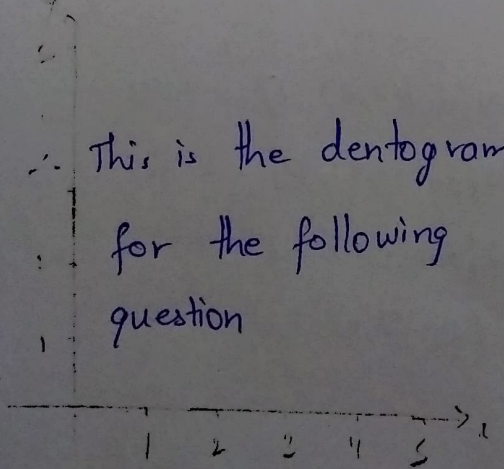
MIN [dist (D,E,F), C] = 1.41

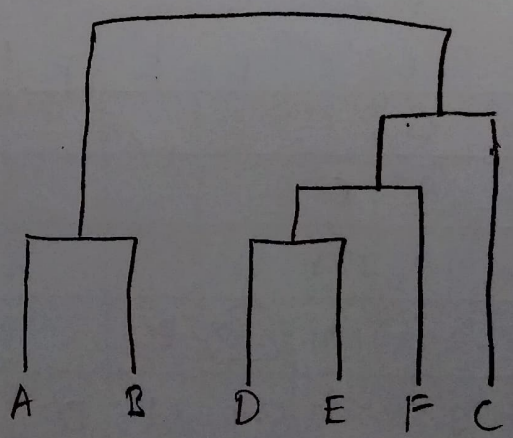
Merging D, E, F and C

	A,B	C,D,E,F
A,B	0	
C,D,E,F	2.50	0

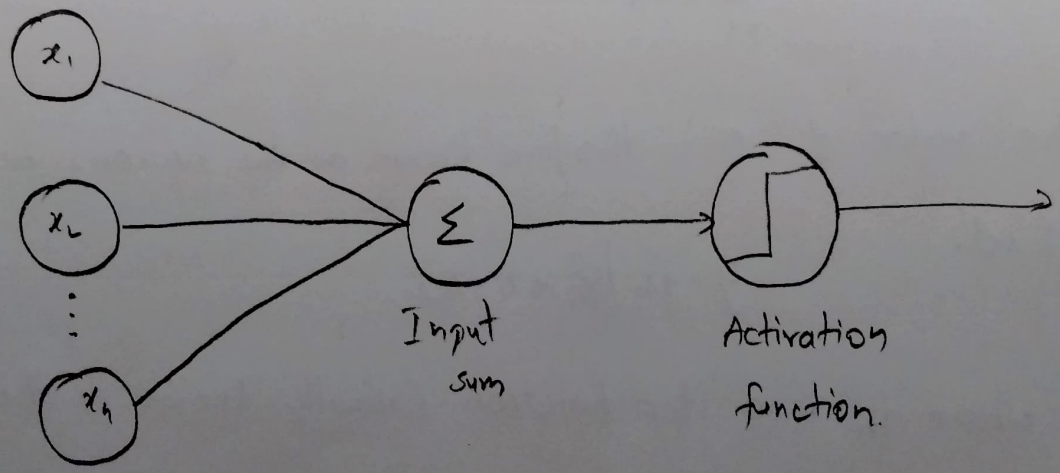
MIN [dist (D, E, F, C), (A, B)] = 2.50

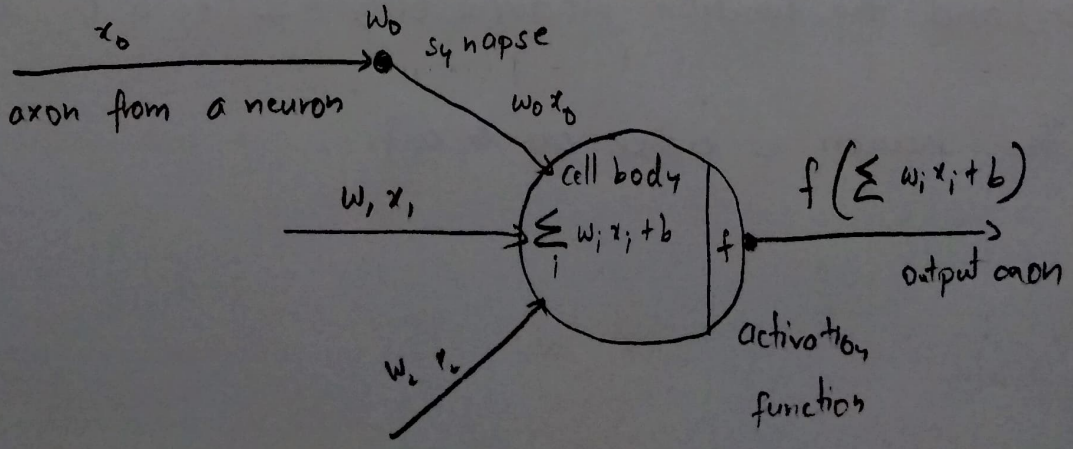
∴ This is the dentogram for the following question





(8) single layer perceptron is the first proposed neural ~~network~~ model created. the content of the local memory of neuron consists of a vector of weights. the computation of a single layer perceptron is performed over the calculation of sum of the input vector each with the value multiplied by correspond-ing element of vector of the weights. the value which is displayed in the output will be the input of an activation function.





It performs a weighted sum of its inputs, compares this to some internal threshold level, and turns on only if this level is exceeded. If not, it stays off, because the inputs are passed through the model neuron to produce the output, the system is known as a feed forward network.

total input = weight on line 1 x input on 1 + weight on line 2 x input on 2 + ... + weight on line n * input on n

$$= w_1 x_1 + w_2 x_2 + \dots + w_n x_n$$

$$= \sum_{i=1}^{n} w_i x_i$$

The value of $-\theta$ is therfore known as the neuron's bias or offset.

$$y = f_h \left[\sum_{i=1}^{n} w_i x_i - \theta \right]$$

where f_h is a step function (actually known as the Heaviside function) and the function produces only a 1 or a 0, so that the neuron is either on or off.

PART-A

(1) The distance among clusters can be compute using single linkage or Complete linkage methods. Single linkage is a method that focused on minimum distances or nearest neighbor between clusters mean while complete linkage concentrates on maximum or farthest neighbor between cluster.

(2) A(10, 5, 32, 28) and B(12, 0, 16, 4)

Euclidean distance:

$$d(i,j) = \sqrt{(|x_{i1} - x_{j1}|)^2 + (|x_{i2} - x_{j2}|)^2 + (|x_{i3} - x_{j3}|)^2 + (|x_{i4} - x_{j4}|)^2}$$

$$= \sqrt{(|10-12|)^2 + (|5-0|)^2 + (|32-16|)^2 + (|28-4|)^2}$$

$$= \sqrt{(2)^2 + (5)^2 + (16)^2 + (24)^2}$$

$$= \sqrt{4+25+256+576} = \sqrt{861} = 29.3428$$

(3) Information gain is the decrease / increase in Entropy value when node is split.

Entropy (Dataset) - (Count (Group 1) / Count (Dataset) * Entropy (Group1) + Count (Group2) / Count (Dataset) * Entropy (Group2))

④ Multilayer perceptron are able to approximate any continous function, rather than only linear function. They do so by combining several neurons, which are organized in at least three layers : One input layer, which simply distributes the input features to the first hidden layer.

⑤