Excitatory

Spikes at GbarE = 0.3

A graph of a graph

Description automatically generated with medium confidence

GBarE = 0.4

A graph of a test cycle

Description automatically generated

GBarE=0.2

A diagram of a test cycle

Description automatically generated

GBarE = 0.1

A graph of a test cycle

Description automatically generated

2.1

Increasing GbarE 0.3 to 0.4: Spike rate increases

Decreasing 0.3 to 0.2: spike rate decreases

2.2

Setting GBarE to 0.1 theres no spikes occurring

2.3

Setting GbarE=0.13 starts the neural spikes

A screenshot of a computer

Description automatically generated

2.4

GbarE = 0.12

2.5

GbarL=0.8

2.6

GbarL=0.75

2.7

Spike = True

GBarE= 0.2

A diagram of a test cycle plot

Description automatically generated

GBarE=0.3

A diagram of a test cycle

Description automatically generated

GBarE=0.4

A diagram of a test cycle

Description automatically generated

Spike=false

GBarE=0.2

A diagram of a test cycle

Description automatically generated

GBarE = 0.3

A diagram of a test cycle

Description automatically generated

GBarE = 0.4

A graph of a test

Description automatically generated with medium confidence

2.8

No of active input units in each digit and Ge

0 – 12 0.335

1 – 13 0.335

2 – 15 0.67

3- 15 0.726

4- 14 0.279

5- 16 0.782

6- 15 0.67

7- 11 0.335

8- 17 0.949

9 – 15 0.670

* Do Init and Test Trial to see the 0 input again. If you hover over the RecvUnit with your mouse, you should see it has a value of Ge = .3352... To apply the above equation, you should have observed that 0 has 6 units in common with 8, and N = 35 (7\*5), so that is about .1714. Next, we need to apply the Alpha correction factor, which we set to be the activity level of the 8, which is 17 of the 35 units active. Thus, we should get:

Ge = (1 / (17 / 35)) \* (6 / 35) = .3529...

for 0

Calculated Ge = 0.3529(show the steps to calculate)

Multiplying this value with 0.95(clipping max value) we get

Ge = 0.335

2.9

GBar = 2

A graph with blue lines

Description automatically generated

GBarL = 1.8

A graph with lines and numbers

Description automatically generated with medium confidence

GBar = 1.5

A graph with blue and green lines

Description automatically generated

GBar = 2.3

A graph with blue lines

Description automatically generated

2.10

3.1

It is observed from the face cluster plot that the faces with female gender are closer to each other and same for faces with male gender. Going deeper into the cluster tree among the male faces, we can see that the faces with identities mark and zane are more closer to each other than that of Alberto, hence their faces are more similar to each other than alberto. As for the faces with female gender, we can see that lisa and betty are closer to each other hence their faces more similar than that of wendy. However it is also observed that betty’s face, whether happy or sad, is closer to lisa s sad face than lisa s happy face. Lisa s sad face is closer hence more similar to betty’s happy face.

As for each identity their faces with both emotions are most close to each other.

So we can see that emotions do not affect the similarities of faces that much. Identities make a more significant difference. The most significant difference is gender

3.2

In case of the emotion cluster plot, we can see that the sad faces are closer and similar to each other than the happy faces regardless of gedner/identity. On checking the sad emotion cluster we see that lisa and mark are closer, zane and billy are also closer, etc. As for the happy emotion cluster we can see the same for lisa and alberto, zane and mark, etc. We also observe form the plot that wendys sad face is similar to lisa s happy face. Hence emotions categorise the facial features more than gender or identity

3.3

Mark\_sad: first 16 seconds: Gender and identity output start to get detected

17 s: more sure it’s a male and identity mark but identity zane is also detecting a little. Both happy and sad emotion is getting detected

19s: sad is more detected than happy

21s : Mark and male is more detected and zane detection is going down

Finally emotion is detected after gender/identity

Wendy\_happy: all 3 detect at same rate

Same for wendy\_sad

3.4

10s: cat species

20s: identity the first 5 get activated

30s : identity all goes down, activates: size small, toy string, food grass, 1st 5 names

34s: identities and names 1st and 3rd, colour orange

The cats subset of morris and Sylvester were activated because they have all the features that are most common in the cats dataset such as string for toy, grass for food and small in size. So this subset portrays the most common cats. Another feature that launces similar activations is the input pattern set to size small, saying that cats are typically smaller than dogs.

3.5

Levels of noise

0 – Both interpretations are slighty activated(mention why)

* 1. – The activations fluctuate in a mix of cubes from both interpretations until it settles with activating the left cube interpretation
  2. –the units on the left cube only activate very weakly and go down. the right cube gets more active immediately
  3. the units on the right cube only activate weakly and go down. the left cube gets more active after a short while(mention why for the noises)

We can observe that without any noise, it’s not possible to determine which interpretation should be active. However keeping the noise as minimal as possible(near to but not zero) quickens the process of determining which cube interpretation is fired

3.6

3.7

3.8

Question 1

Question 2