# Proof of completion:



Code Snapshot : Code for updateRandomNode



Code Snapshot : Code for suppress diagonal terms

# How many and which memories can you encode and recover perfectly from flawed cues?

BY observation, only clubspade and winhelp can perfectly recover from flawed cues. The process of operation is attached below:

# Show some of the intermediate states of results of your program, illustrating the process of convergence to a perfect recall

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Original | Errored | 100 Runs | 250 Runs | 500 Runs | 1k Runs | 5k Runs |
| clubspade |  | C:\Users\frank\Desktop\EECS484-PS5-master\Source Code\err_clubspade.bmp |  |  |  |  |  |
| handheart |  |  |  |  |  |  |  |
| happyworld |  |  |  |  |  |  |  |
| printtrash |  |  |  |  |  |  |  |
| winhelp |  |  |  |  |  |  |  |

# Think about and report on properties of memories that can be recalled and memories that interfere with each other (e.g. look at orthogonality)

When two pictures are orthogonal, there will be no correlation between these two generated vectors. Lets take a look at their correlation with others:

We use the function of: (vector1 **dot** vector2)/(|vector1|\*|vector2|) to evaluate the correlation between to:



Code Snapshot : Finding the correlation between two images

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Clubspade** | **printtrash** | **handheart** | **computersum** | **winhelp** | **notespell** | **happyworld** |
| Clubspade | 1.0000 | 0.1914 | 0.2305 | 0.1680 | 0.0937 | 0.1055 | 0.0937 |
| Printtrash | 0.1914 | 1.0000 | 0.2812 | 0.3281 | 0.1055 | 0.2422 | 0.2070 |
| Handheart | 0.2305 | 0.2812 | 1.0000 | 0.2656 | 0.1758 | 0.2734 | 0.1602 |
| Computersum | 0.1680 | 0.3281 | 0.2656 | 1.0000 | 0.1289 | 0.4062 | 0.2539 |
| Winhelp | 0.0937 | 0.1055 | 0.1758 | 0.1289 | 1.0000 | 0.2617 | 0.1328 |
| Notespell | 0.1055 | 0.2422 | 0.2734 | 0.4062 | 0.2617 | 1.0000 | 0.3320 |
| happyworld | 0.0937 | 0.2070 | 0.1602 | 0.2539 | 0.1328 | 0.3320 | 1.0000 |

Table : Correlation between two images

After calculating the correlation, we used color to illustrate the size of the correlation. 1 to be the largest, and green representing the smallest. As we can observe, winhelp and clubspade have most green in their row/column, indicating their correlation to every image else is very small. I would guess that a correlation less than 0.2 will be acceptable for perfectly reconstruct.

As a proof, if we want to perfectly reconstruct happyworld, let’s try take out computersum, printtrash and notespell from memory:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Original | Errored | 100 Runs | 250 Runs | 500 Runs | 1k Runs | 5k Runs |
| happyworld |  |  |  |  |  |  |  |

What if we only take out notespell?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Original | Errored | 100 Runs | 250 Runs | 500 Runs | 1k Runs | 5k Runs |
| happyworld |  |  |  |  |  |  |  |

Therefore I can clearly say that 0.2 will be the cut off of recoverable vs non recoverable.