**BRAIN CONNECTIVITY MEASURING SOFTWARE MANUAL**

In this software, there will be a total of 6 modes with each and every one of them either visualizing the connectivity or giving information about how visual cortical areas contact with one another with calculations such as betweenness centrality, z-score and modularity.

The first two modes of this software are called “Microscale Directed Graph” and “Macroscale Directed Graph”. They do take text file inputs and our software lets you to browse for one. The input files of “Microscale Directed Graph” should include 4 coordinates, one integer weight and one “1” or “0” that will indicate whether the communication is directed or not. Other communications are to be written under this line. After every information, it is necessary to put a space as this is how this software retrieves the input data. This mode lets a user to place a node anywhere they want in a brain image as a custom visualize. “Macroscale Directed Graph” is extremely similar as to how it receives input data but the one difference it has is that it lets the user create a custom visualization of the nodes representing the 11 visual cortical area that are respectively “V1-V2-V3-V3A-V3B-V4-V5-V7-LO1-IPS1-IPS2”. In the input text file for the second mode coordinates are hardcoded inside the program so what the user will have to do is to add 2 numbers instead of 4 coordinates. “1” will indicate “V1” and “11” will indicate “IPS2”. Then an integer is to be put to indicate the weight of the edge and a binary value to indicate whether the connection is directed or not. The user should be careful to leave a whitespace between all input values but also should be careful about not leaving unnecessary amount of whitespaces between values or at the end of the input text file.

The rest of the three modes that calculate betweenness centrality, z-score, and modularity is to take excel sheet input files. The input data is to be like a matrix. Columns should represent the cortical areas with rows representing their datapoints in terms of electrical activity or frequency. At least 15 datapoints is to be written in the input file for better results. There should be no headers in the input file and for accurate results, the columns should respectively be representing with first column representing “V1” and the last column representing ”V2”.

The last mode, meaning the betweenness centrality video mode, is to take a text file as an input. Again, each node is to represent he cortical areas from 1-11 with “1” representing “V1”, ”2” representing “V2” and “11” representing “IPS2”. After the betweenness centrality scores of each node is represented in our previous modes, the user can record them with a text file. The text file should have the number representing the area, and a rounded integer betweenness centrality score rate. There should be whitespaces between values but unnecessary whitespaces are to be avoided.

Lastly, if the program is to be executed with python, the user should put the brain images found in this folder to where they have located the “.py” file.