FINAL RESULTS

Our project successfully met the software requirements of producing a four-dimensional visualisation of the EEG signals. The visualization obtained displayed time on the x-axis, frequency/scale on the y-axis, space on the z-axis and power spectral strength encoded by colour. The prominent features of the visualization are as follows:

1. The visualization displayed the spatial distribution of the EEG signals through the stacking of data from different electrodes

2. The visualization successfully captured the high frequencies in the data. This was a necessity since most of the information for epileptic seizures is stored in the higher frequency range.

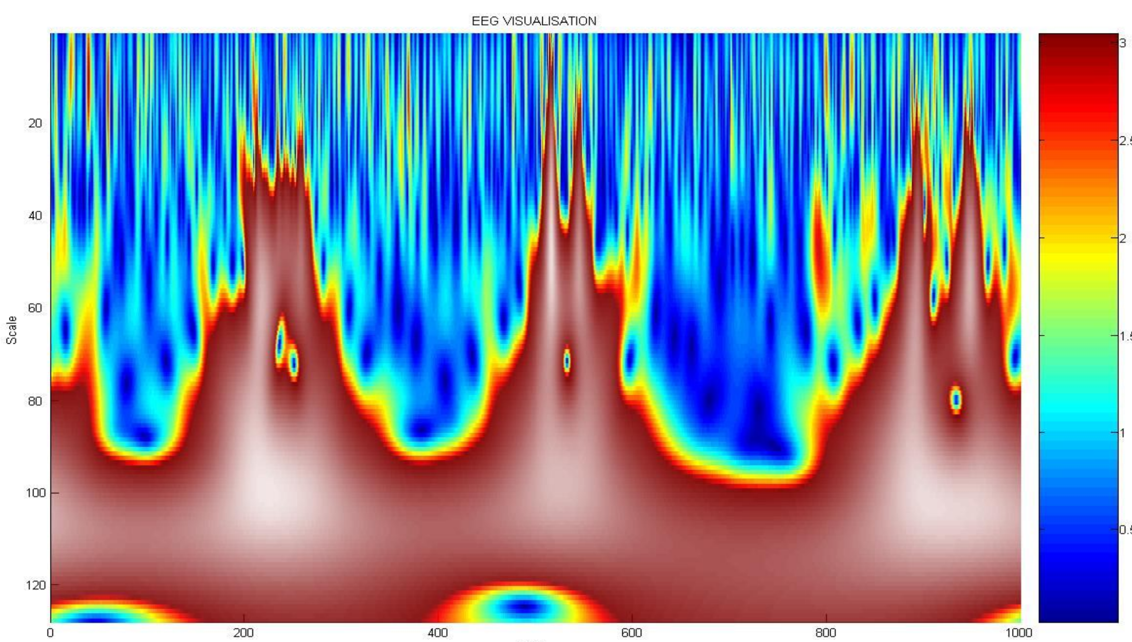
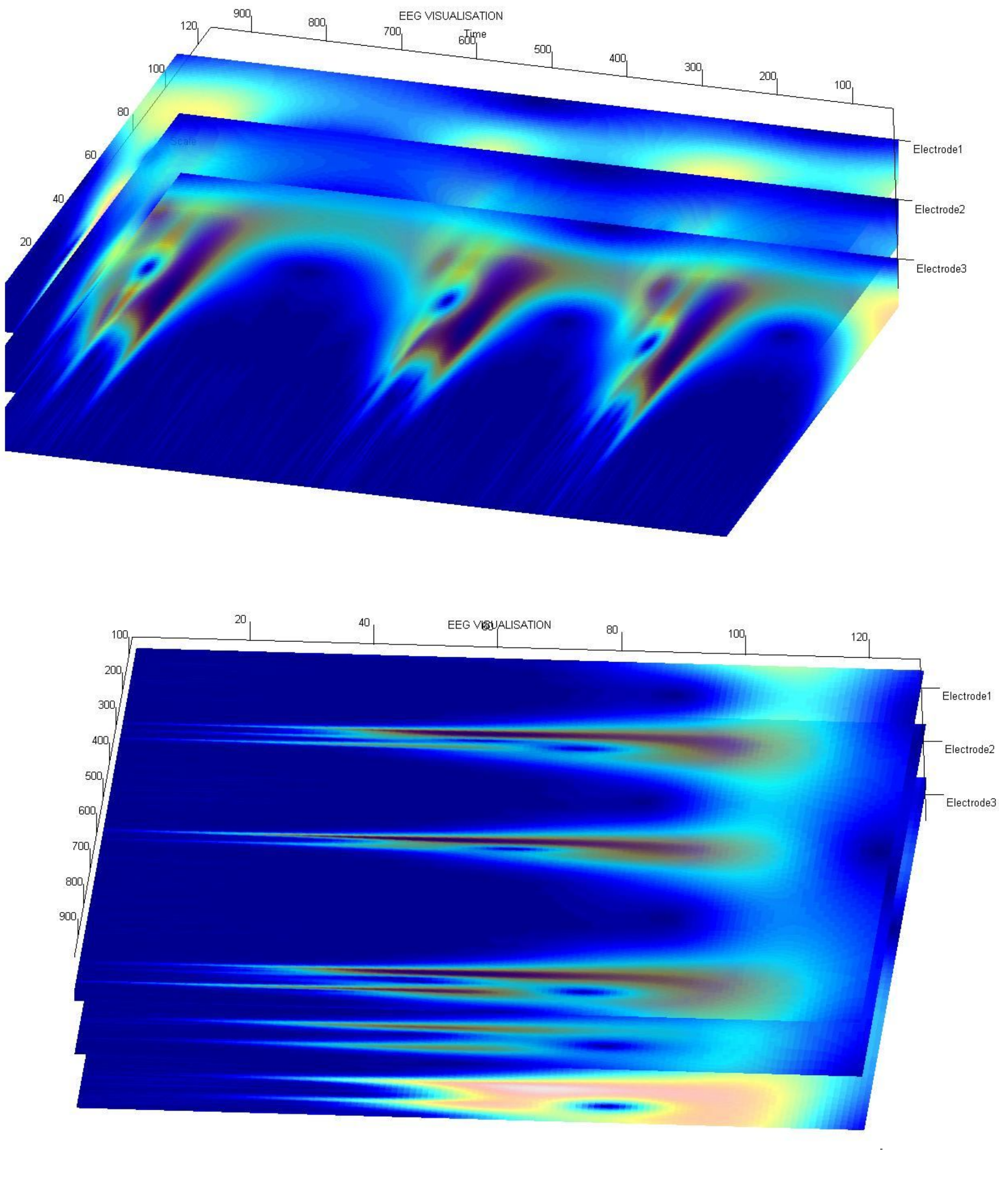


Fig. 1 – Scalogram displaying the presence of high frequency components (displayed at low scale levels in red)

As can be seen in Figure 1 above, the low scales (high frequencies) are present captured in the wavelet analysis of this segment of the signal (displayed in low scale components as red).

3. The visualization can be rotated as a whole by 360 degrees in any direction thus allowing the user to gain a clearer picture of the EEG components at each point in the time-space plane.

Fig. 2 – Display the rotational abilities of the visualization



4. The distance between the stacked plots can be expanded or contracted. This functionality is enabled by typing “stretch” on request into the terminal window.

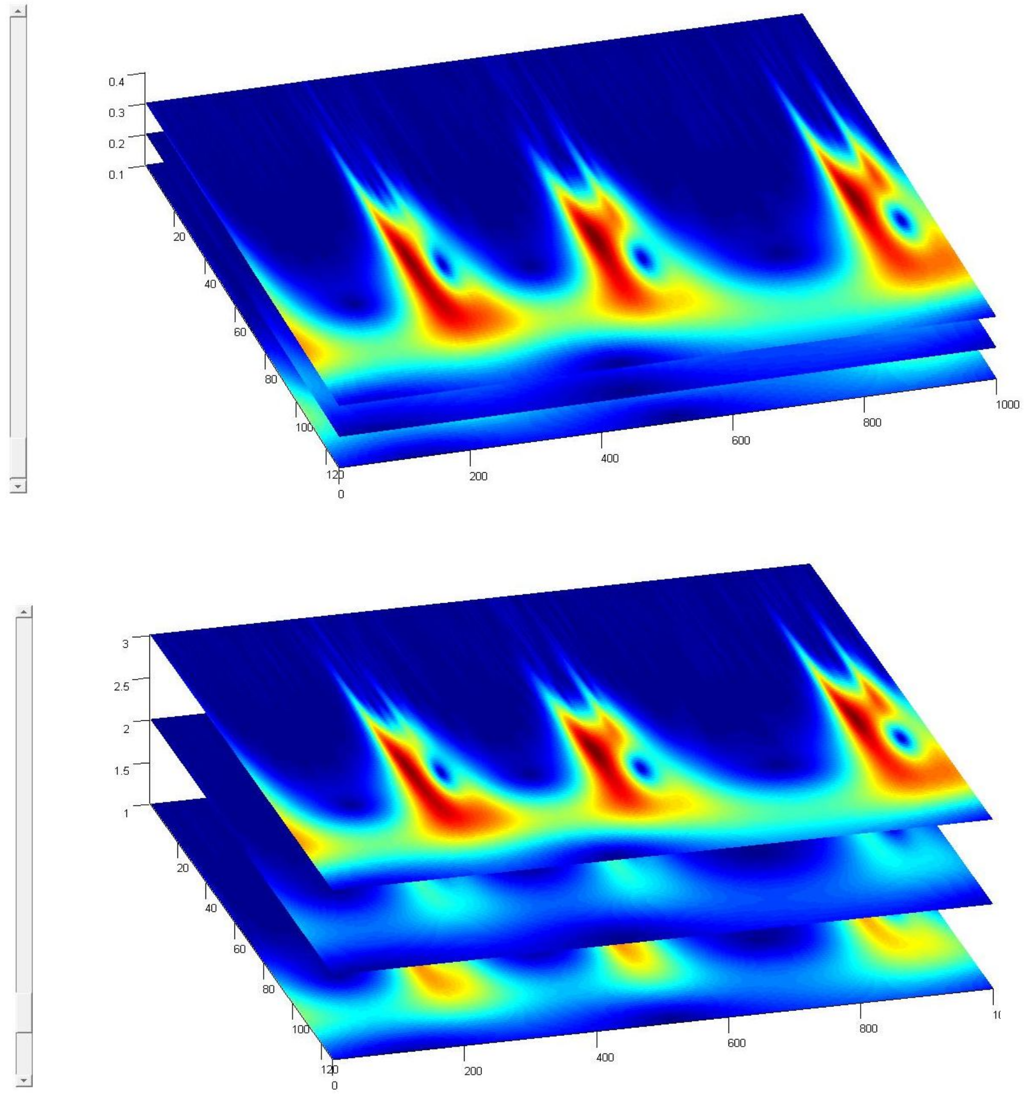


Fig. 3- Display of the ‘stretch’ feature of the visualization with (i)slider at position 1 and (ii) slider at position 2.

The plots can be stretched/compressed upto a factor a 9. The slider bar is create via a built-in GUI and configured for use in this design.

5. The visualization has a feature allowing for the separate viewing of data from each electrode. This was implemented using a GUI and can be enabled by typing “singleelec” into the terminal window.

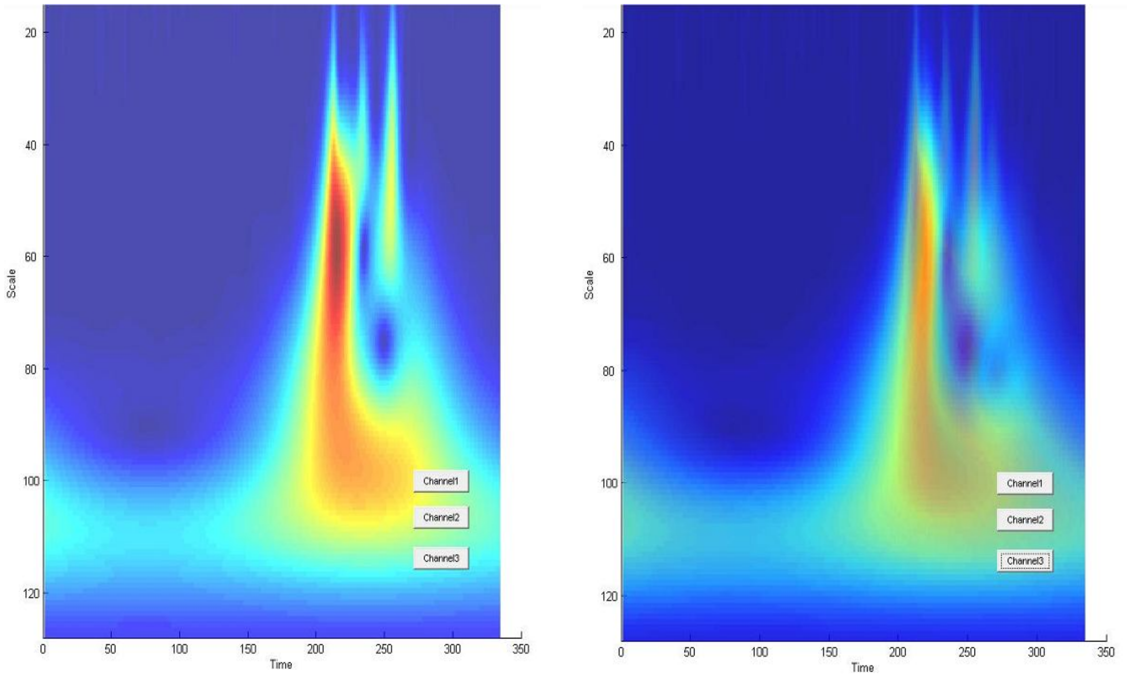


Fig. 4- A GUI allowing the user to choose a single electrode for further analysis. (i)scalogram produced for Channel 1 and (ii) scalogram produced for Channel2.

The scalogram produced from each electrode can be further analyzed. As seen in Figure 4, the buttons on the bottom right corner specify each electrode available for analysis. By pressing the appropriate button the user can view the scalogram for that electrode individually.

6. Transparencies were used for the different layers of staked scalograms so as to allow for the easy interpretation of data from the different electrodes.

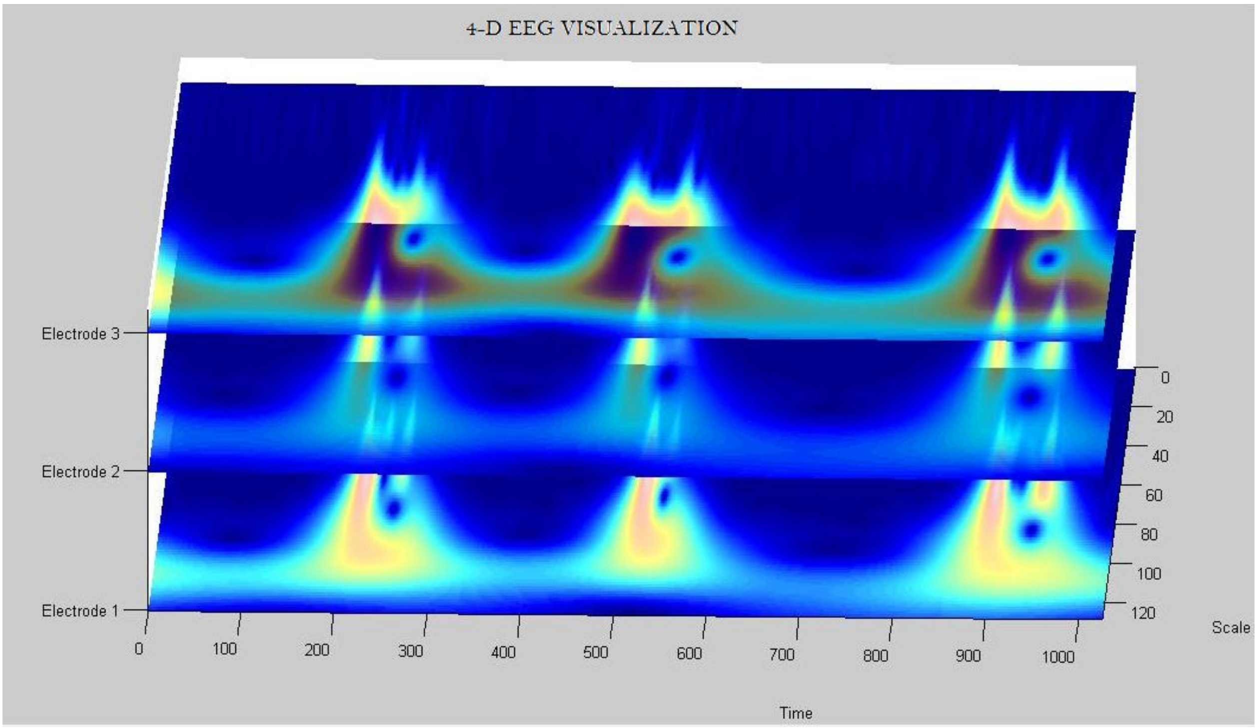


Fig. 5 – Alpha mapping(as explained earlier) used to define transparencies of each layer of the plot.

7. The colour code of the visualization can be changed according to the user's preference.

   As shown in Figure 6, the user can change the colour mapping used by typing

   colormap('*name*');

   in the terminal where name refers to the name of the desired colour scheme.

   The default setting is 'Jet'.

   The available options are:

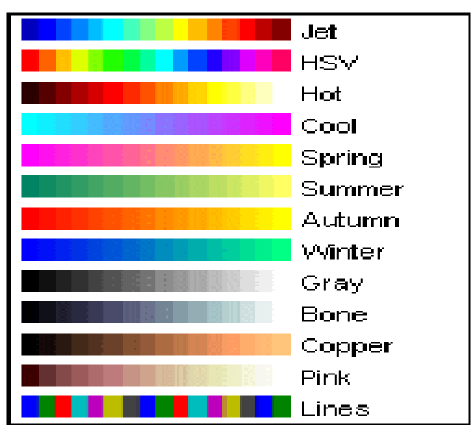
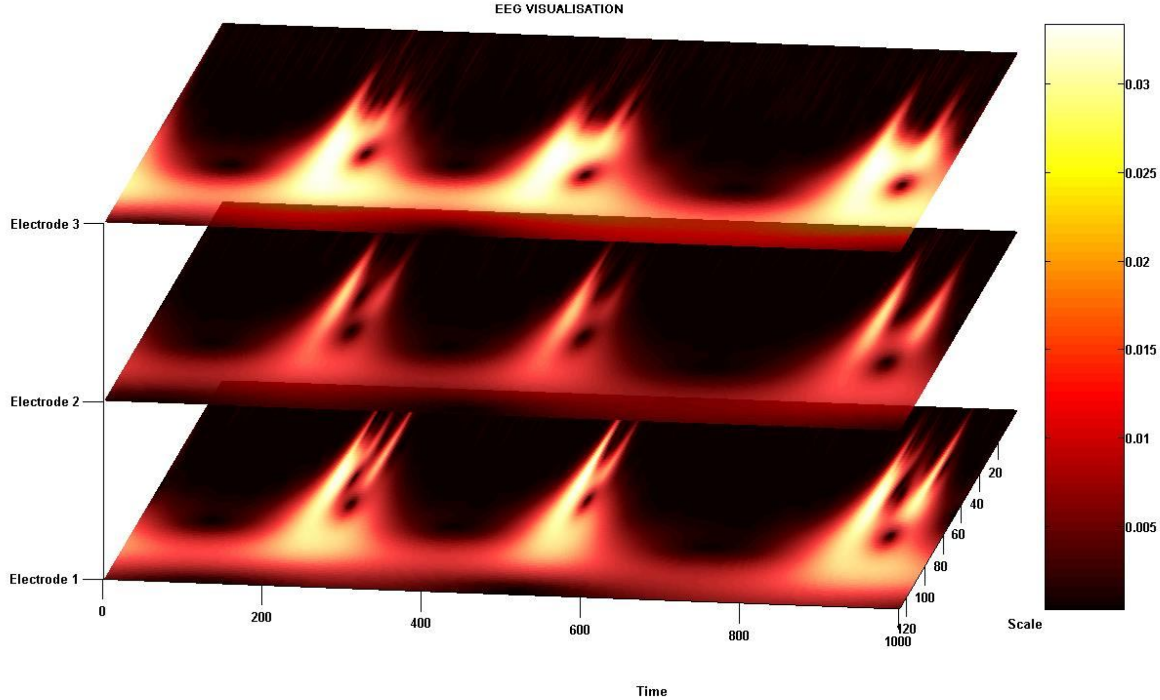


Fig. 6 – Visualization using the 'Hot' colour mapping scheme



8. The scale of the colour map can also be varied thus giving the user control over the gradient of the colour scheme.

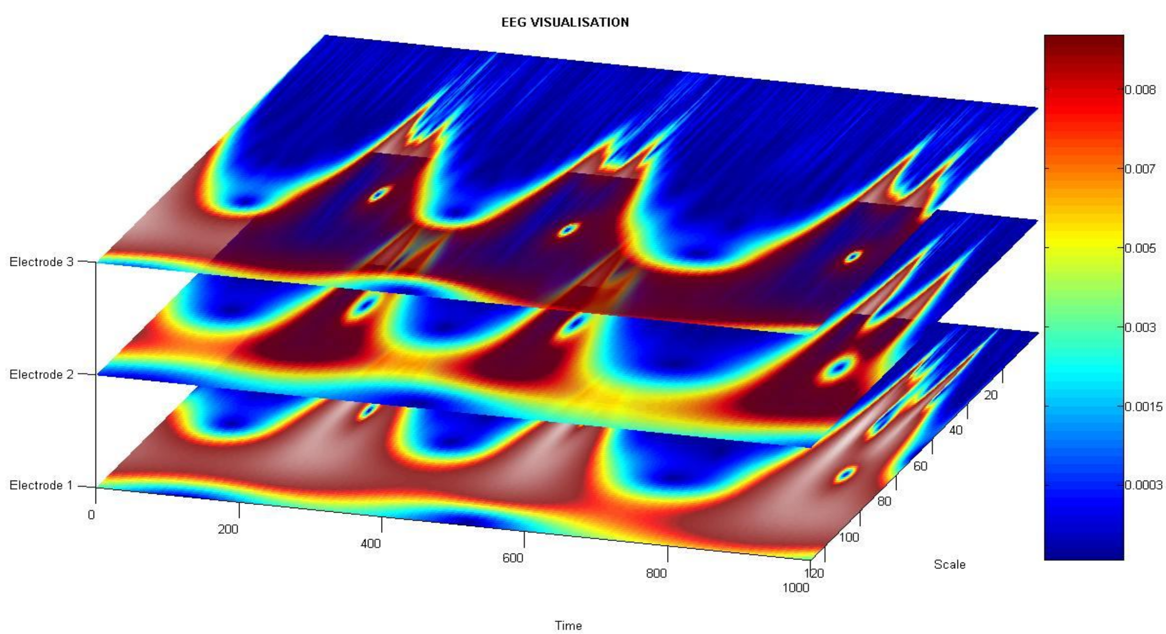


Fig. 7 – The colour bar scale has been set to 0 – 0.01 using 'Jet' colour mapping; as opposed to that in figure 5 which is 0 – 0.33

As seen in Figure 7, the user can define the scaling of the colour mapping by typing

colorbar('YTick', '*user defined range*');

in the terminal window.