

The observer pattern was used when designing the device. When the user presses the power button, the Neureset device turns on, which notifies the battery by having it start depleting and notifies the screen by having the menu displayed. Whenever the play button is clicked when the menu is being displayed, the menu responds by hiding itself, and different widgets will show up depending on the option selected. For example, if NEW SESSION is selected, a QProgressBar and QLabel representing the timer will show up, and a blue light will appear in the corner of the device. If TIME AND DATE is selected, a QDateTimeEdit will show up. During the session, as the session timer progresses, the QProgressBar and QLabels on screen will be updated.

Additionally, the state pattern was also used when designing the device. The device can change to different states which affect what the device displays, and how the buttons interact with the device. In theory, there are 6 states: Off, Menu, Session Log, Time and Date, New Session, and Finished Session. However, during implementation, the buttons behave the same during Session Log, Time and Date, and Finished Session, and so they share a deviceState in the code. That is because the variable deviceState only affects how the buttons act, and not what shows up on screen.

The user can change the device from the Off state to the Menu state by clicking the power button, and from the Menu state to the New Session, Session Log, or Time and Date states by selecting a menu option and clicking the play button. Letting a session complete, or cancelling it by pressing the stop button will transition the device to the Finished state. The device can transition to the Off state from any state by having the battery deplete, or by having the user press the power button.

In the Menu state, a menu is displayed, and the play, up, and down buttons are used to navigate the menu. In the New Session state, the screen displays a progress bar and timer, and the play, pause, and stop buttons can be used to control the progress of the session. In the Finished state, none of the device buttons except for the menu and power buttons work.

The “measuring” of the users EEG brain wave pattern was simulated using a sine wave generator. The program generates a sine wave with coefficients and parameters that create a wave that is within realistic margins. Buttons have been placed within the external factors section of the device. These allow for the testing of different EEG wavelengths. Each will generate a wave within the real life parameters for that type of wave. For example, if Alpha wave is selected, then the generated wave will have a frequency from 8-12 Hertz. Within the PC ui, there is a QCustomPlot widget that graphs the baseline EEG frequency when a session is selected.