Use Case 1: Starting New Session

Primary Actor: Patient

Scope: Neuroset device and Patient

Level: User Goal

Stakeholders and Interests:

Patient: To run a session of Neurofeedback therapy

Manufacturer: Providing a user-friendly interface and ensuring accurate treatment delivery.

Precondition(s):

Neurofeedback device is charged, powered on and functional. Patient has placed the 21 electrodes from the headset correctly and the EEG headset is connected to the device.

Success guarantee:

The session starts successfully, and the patient receives treatment as intended.

Main success scenario:

1. Patient selects the "New Session" option from the device menu.
2. Device initiates a timer and starts reading EEG signals from the headset.
3. Contact is established with the EEG headset, indicated by the blue light.

Overall baseline average is calculated concurrently for all 21 EEG sites

4. Device calculates baseline frequencies for each EEG site over approximately 5 seconds.
5. Treatment is applied at offset 5hz for one second per EEG site concurrently over course of 1 second, with the green light flashing during treatment.

Overall baseline average is again calculated concurrently for all 21 EEG sites. Step repeated at offset 10 hz, 15hz and 20hz.

6. During a session, the user can monitor session progress on the device's display.
7. The progress bar shows the percentage of the session completed.
8. The timer shows the approximate time remaining
9. The session progresses until completion or until paused voluntarily by the patient.

Session is recorded with its time and date as well as before and after overall baselines

Extensions:

4a: Device fails to establish contact with the EEG headset

4a1. Device displays an error message and prompts the user to check the headset connections

4a2. Patient troubleshoots the connections and retries starting the session

5a. Device encounters an internal error during baseline calculation or treatment delivery

5a1.Device notifies the user and prompts them to restart the session.

5a2. Patient restarts session after resolving issues

6a. Device encounters error updating the session progress

6a1. Device notifies the user and prompts device restart

Use Case 2: Pausing Session

Primary Actor: Patient
Scope: Neurofeedback device
Level: User Goal
Stakeholders and Interests:

Patient: Interested in pausing the session temporarily without losing progress.
Manufacturer: Interested in providing a reliable pause functionality to enhance user experience.

Precondition(s):

Neurofeedback device is charged, powered on and functional. Patient is currently running a Neuroset session.

Success guarantee:

The session pauses successfully, allowing the patient to resume at a later time without losing progress

Main success scenario:

1. Patient presses the "Pause" button on the device interface.
2. Session timer halts, and treatment delivery pauses.
3. Device displays a message indicating the session is paused.
4. Patient can resume the session by pressing the "Pause" button again

Extensions:

2a. If the session is paused due to lost contact with the EEG headset:
2a1. Device emits a beeping sound to alert the patient.
2a2. Patient attempts to reestablish contact with the headset.
2a3. If contact is not reestablished within 5 minutes:
2a3a. Device automatically terminates the session and displays a warning message.
2a3b.Patient acknowledges the warning and can choose to start a new session or troubleshoot the issue.

Use Case 3: Viewing Session Log

Primary Actor: Patient
Scope: Neurofeedback device
Level: User Goal
Stakeholders and Interests:

Patient: Interested in reviewing past session information for personal records or to monitor progress.
Manufacturer:Interested in providing an accessible and intuitive interface for viewing session logs.

Precondition(s):

Neurofeedback device is charged, powered on and functional. Patient has run at least one session so that data is available for viewing

Success guarantee:

The patient can successfully access and view session logs, including dates and times of past sessions.

Main success scenario:

1. Patient selects the "Session Log" option from the device menu.
2. Device displays a list of past sessions with dates and times.
3. Patient scrolls through the session log to find the desired session.
4. Patient selects a specific session entry to view additional details if available.

Extensions:

2a. If there are no past sessions logged:

2a1. Device displays a message indicating there are no past sessions available.

2a2. Patient acknowledges the message and returns to the main menu.

3a. If the session log data is corrupted or inaccessible:

3a1. Device displays an error message indicating the issue.

3a2. Patient acknowledges the error and may attempt to troubleshoot or contact support for assistance.

Use Case 4: Uploading Session Data to PC

Primary Actor: Patient

Scope: Neurofeedback device

Level: User Goal

Stakeholders and Interests:

Patient: Interested in reviewing past session information for personal records or to monitor progress.

Manufacturer:Interested in providing an accessible and intuitive interface for viewing session logs.

Precondition(s):

Neurofeedback device is charged, powered on and functional. Patient has run at least one session so that data is available for viewing. Patient has the necessary connectivity device.

Success guarantee:

The patient can successfully upload session data from the Neureset Device to the PC without data loss or corruption.

Main success scenario:

1. Patient connects the Neureset Device to the PC using a compatible cable (e.g., USB).
2. Patient selects the "Upload to PC" option from the device menu.
3. The PC displays a confirmation window to verify data, and the patient confirms transfer.
3. Neureset Device establishes a connection with the PC and begins transferring session data.
4. Device displays completion message once the data transfer is successful.
5. Patient confirms successful data transfer on the PC and proceeds with further analysis

or storage as needed.

Extensions:

1a. If the PC does not recognize the Neureset Device:

1a1. Patient checks the cable connection and ensures the device is properly connected.

1a2. Patient attempts to reconnect the device and retry the upload process.

3a. If the data transfer encounters errors or interruptions:

3a1. Device displays an error message indicating the issue.

3a2.Patient acknowledges the error and may attempt to troubleshoot or retry the upload process.

5a. If the uploaded session data appears incomplete or corrupted on the PC: 5a1. Patient verifies the integrity of the uploaded data and contacts support if necessary for assistance or data recovery.

Use Case 5: Changing Time and Date

Primary Actor: Patient

Scope: Neurofeedback device

Level: User Goal

Stakeholders and Interests:

Patient: Interested in setting the correct date and time on the Neureset Device to ensure accurate session tracking.

Manufacturer: Interested in providing a user-friendly interface for changing the device's date and time settings.

Precondition(s):

Neurofeedback device is charged, powered on and functional.

Success guarantee:

The patient successfully updates the date and time settings on the Neureset Device, and the device accurately tracks session start and end times.

Main success scenario:

1. Patient selects the "Time and Date" option from the device menu.
2. Device prompts the patient to input the current date and time.
3. Patient enters the correct date and time using the device interface.
4. Device updates its internal clock with the new date and time settings.
5. Patient confirms the changes, and the device displays the updated date and time.

Extensions:

2a. If the device interface is not responsive or displays errors:

2a1. Patient attempts to restart the device and retry accessing the date and time settings.

2a2. If the issue persists, patient contacts support for assistance in resolving the interface issue.

3a. If the patient enters an invalid date or time format:

3a1. Device prompts the patient to re-enter the date and time in the

correct format.

3a2. Patient corrects the input according to the device's instructions. If the issue persists, the patient seeks assistance or refers to the device manual for guidance.

4a. If the device encounters errors while updating the internal clock:

4a1. Device displays an error message indicating the issue.

4a2. Patient acknowledges the error and may attempt to troubleshoot or contact support for further assistance.

Use Case 6: Handling Lost Connection

Primary Actor: Patient

Scope: Neurofeedback device

Level: Sub Function

Stakeholders and Interests:

Patient: Interested in minimizing disruptions and ensuring the session progresses smoothly even in the event of a lost connection.

Manufacturer: Interested in providing a reliable and user-friendly mechanism for handling lost connection with the EEG headset to ensure the safety and effectiveness of the session.

Precondition(s):

Neurofeedback device is charged, powered on and functional. The EEG headset is properly connected to Neureset Device

Success guarantee:

The Neureset Device successfully detects and responds to a lost connection with the EEG headset, ensuring patient safety and session integrity.

Main success scenario:

1. During an active session, the Neureset Device continuously monitors the connection status with the EEG headset.
2. If the connection is lost, the Neureset Device promptly detects the interruption.
3. The device activates a visual and/or audible alert to notify the patient of the lost connection.
4. Patient acknowledges the alert and takes necessary actions to resolve the issue, such as adjusting the headset or repositioning themselves.
5. Once the connection is restored, the Neureset Device resumes the session seamlessly without data loss or interruption.

Extensions:

2a. If the Neureset Device fails to detect the lost connection:

2a1. The session may continue without interruption, potentially leading to ineffective treatment delivery.

2a2. In such cases, the patient may experience discomfort or adverse effects due to the lack of proper monitoring and adjustment.

2a3. Patient or caregiver may need to intervene manually to pause the session and address the connection issue.

3a. If the lost connection persists for an extended period (e.g., more than 5 minutes):

3a1. The Neureset Device initiates an automatic session pause to ensure patient safety.

3a2. The device emits a continuous alert signal to draw attention to the issue and prompt action from the patient or caregiver.

3a3. If the connection is not restored within a specified time frame, the device may initiate a safe shutdown procedure to prevent any potential risks or hazards.

3a4. Patient or caregiver may need to troubleshoot the connection or seek technical support to resolve the issue before resuming the session.

Use Case 7: Viewing Waveform

Primary actor: Patient

Scope: Neurofeedback Device

Level: User Goal

Stakeholders and Interests:

Patient: Interested in reviewing brain wave data received from individual electrodes.
Manufacturer: interested in creating accessible and intuitive interfaces for viewing waveforms, as well as accurately graphing brainwave data.

Preconditions:

Neurofeedback device is charged, powered on and functional. Patient must have run at least one session so that data is available for viewing.

Success Guarantee:

The patient can successfully view the before and after brain waves recorded by each electrode after interacting with the 'show waveform' button.

Main Success Scenario:

1. Patient completes a session as described in Use Case 1.
2. Patient then may interact with the 'show waveform' button
3. Neureset device displays before and after waveform data that may be circled through using the 'next' and 'last' buttons
4. Patient confirms data and exits the window

Extensions:

2a. If there are no past sessions logged:

2a1. Device displays a blank waveform graph to indicate the lack of recent activity

2a1. Patient confirms data and returns to the main GUI

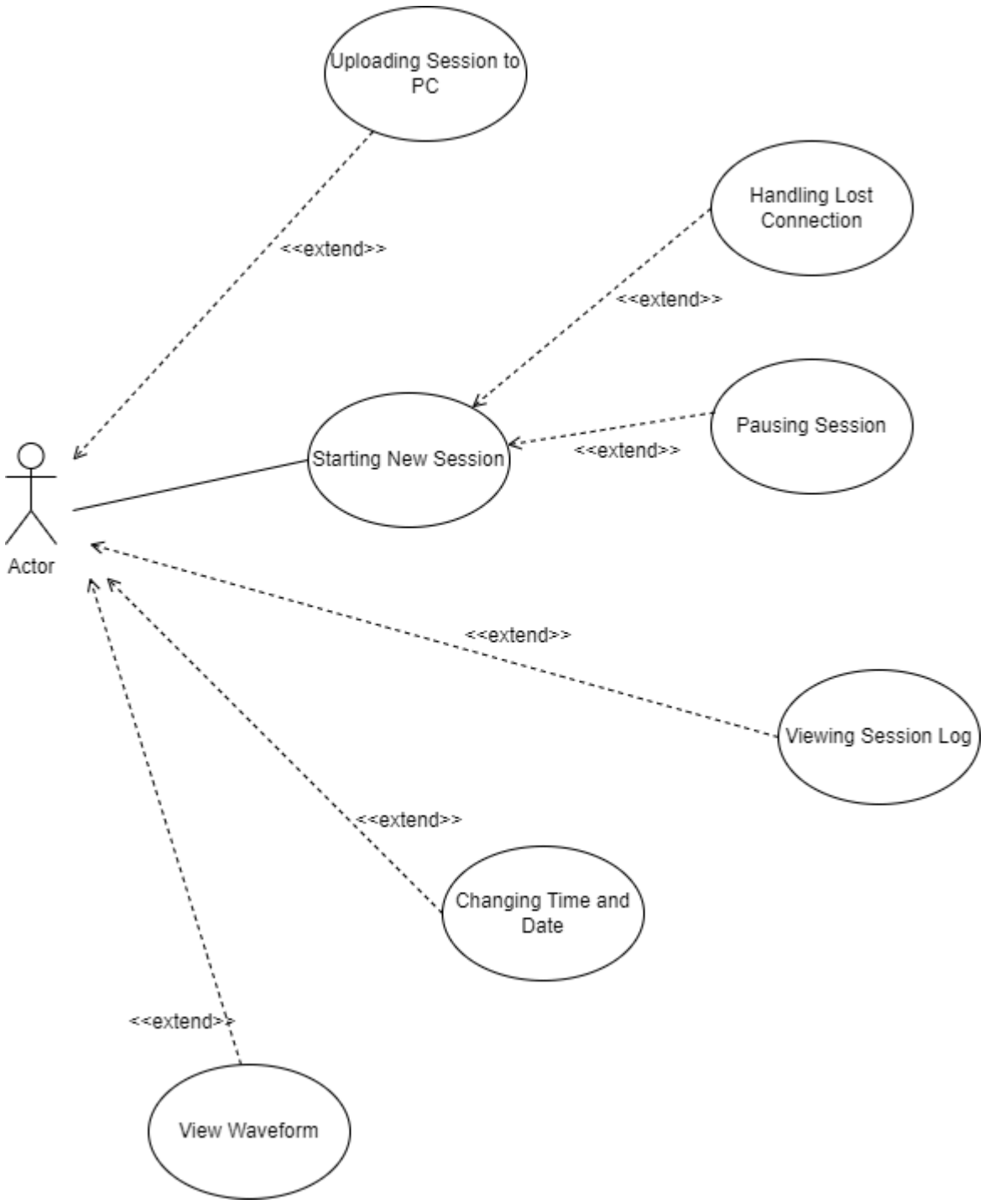
3a. If a session has been interrupted:

3a1. Patient may go to view the waveform via the 'show waveform' button

3a2. All before waveforms are present but after waveforms are blank

3a3. Patient returns to the main GUI

Use Case Diagram:


Uploading Session to PC
<<extend>>
Handling Lost Connection
<<extend>>
Pausing Session
<<extend>>
Starting New Session
Actor
<<extend>>
Viewing Session Log
<<extend>>
Changing Time and Date
<<extend>>
View Waveform