Automated External Defibrillator - Use Cases

Turn Device On (UC1)

Primary Actor:
- Emergency Responder

Precondition:
- User has the AED.

Main Success Scenario:
1. User presses the power button.
2. The AED turns on and initializes.

Postcondition:
- The AED is turned on and is displaying the main menu.

Extensions:
- 2a. The AED does not turn on:
    - 2a1. User checks if the AED's batteries are properly installed.
    - 2a2. Checks for any visible signs of damage or malfunction.
    - 2a3. If the AED remains non-functional, the user contacts customer service or technical support for further assistance.

Perform Self-Test (UC2)

Primary Actor:
- AED

Precondition:
- AED is turned on.

Main Success Scenario:
1. User initiates a self-test via the AED interface.
2. The AED performs a diagnostic check of its components and battery.
3. AED confirms that it is ready for use.

Postcondition:
- AED is confirmed operational and ready for emergency use.

Extensions:
- 2a. Self-test fails:
    - 2a1. User refers to the user manual for troubleshooting based on the error code.
    - 2a2. If the issue is not resolved, the user contacts technical support.

Attach Electrodes (UC3)

Primary Actor:
- Emergency Responder

Precondition:
   AED is turned on and ready.

Main Success Scenario:
1. Responder attaches the electrode pads to the patient's chest as instructed by the AED.
2. AED detects successful attachment of electrodes.

Postcondition:

- Electrodes are properly attached and AED is ready to analyze the patient's heart rhythm.

Extensions:
- 2a. Electrodes are not detected:
    - 2a1. AED prompts the responder to check the electrode connections.
    - 2a2. If electrodes are still not detected, the responder ensures they are not expired, damaged, and are correctly placed on the patient's skin.
    - 2a3. If the problem persists, the responder tries a new set of electrodes.

Analyze Heart Rhythm (UC4)
Primary Actor:
- Emergency Responder

Precondition:
- Electrodes are attached to the patient.

Main Success Scenario:
1. Responder initiates heart rhythm analysis.
2. AED analyzes the rhythm and determines if a shockable rhythm is present.

Postcondition:
- AED provides a clear recommendation based on the analysis.

Extensions:
- 2a. AED cannot determine heart rhythm:
    - 2a1. Responder adjusts electrodes and reinitiates the analysis.

Deliver Shock (UC5)
Primary Actor:
- Emergency Responder

Precondition:
- AED identifies a shockable heart rhythm.

Main Success Scenario:
1. Responder confirms that no one is touching the patient.
2. AED charges and delivers a shock.

Postcondition:
- Shock is delivered, and AED advises on subsequent actions.

Extensions:
- 2a. AED fails to deliver shock:
    - 2a1. Responder rechecks electrode connections and tries again.
    - 2a2. If the AED still fails, manual emergency procedures are initiated and technical support is contacted.

Guide CPR (UC6)
Primary Actor:
- AED

Precondition:
- AED advises CPR is necessary.

Main Success Scenario:
1. Responder begins CPR following AED's audio-visual prompts.
2. AED provides feedback on compression quality.

Postcondition:

- Effective CPR is delivered with guidance from AED.

Extensions:
- 2a. Responder is unable to follow AED prompts:
    - 2a1. AED repeats the prompts and offers corrective advice.
    - 2a2. If the responder continues to struggle, AED suggests seeking additional help.

Regular Maintenance Alerts (UC7)

Primary Actor:
- AED

Preconditions:
- AED is not currently in use.

Main Success Scenario:
1. AED software tracks maintenance schedule.
2. When due for maintenance, AED issues an alert to maintenance personnel.

Postconditions:
- Maintenance personnel are notified to perform maintenance.

Extensions:
- 2a. Maintenance is overdue:
    - 2a1. AED sends repeated alerts at set intervals.
    - 2a2. If maintenance continues to be ignored, AED logs the information for review by medical authorities.

Emergency Override During Shock Delivery (UC8)

Primary Actor:
- Emergency Responder

Precondition:
- AED is in the process of delivering a shock.

Main Success Scenario:
1. Responder observes a change in patient condition indicating shock should not be delivered.
2. Responder activates the emergency override function.
3. AED aborts the shock delivery process.

Postconditions:
- Shock delivery is halted, and AED reevaluates patient condition.

Extensions:
- 2a. Override function fails:
    - 2a1. AED provides immediate feedback and alternative actions to the responder.
    - 2a2. If the device still attempts to deliver a shock, manual disconnection of electrodes is advised.

Use Case Diagram