

## **Introduction**

The Epilepsy Monitoring System is intended to make life easier and safer for patients suffering from epilepsy. The system is compound of main components the monitor which is a device that will record the brain activity of the patient and also have the up to day information of the symptoms that the patient is having. This will be done by connecting three electrons in the skull of the patient. They will be connected in specific location where they can detect with a better precision the electric signal of the brain. The electrons are going be wireless connected to the monitor device. The monitor device it will be similar to a cell phone in structure but will be specific for any kind of disease in this project particularly in the sickness of epilepsy. The monitor will be wireless connected to the cell phone of the patient. The cell phone will have an application that will contain brain pattern, information of the different medications and also a schedule or reminder of when does the patient has to take the different medicines.

## **Methods**

The method will be the implementation of an application for cell phones with the Google android. I imagine this application as a very user friendly program, this android will contain different prompts for the user some of them are, yes or no questions like, did you take your medication today?, giving the name of the medication. Also did you change your medication, if you did please update?. I will also ask the user to enter any type symptoms that he or she is having at the moment in a drop down menu. User will have the option to turn on or off the application whenever they want, if is the case that they don't have much battery in their phone. The application will have to record the brain data coming from the monitor device and compare it with brain patterns that will be located in a database accessible by this application. The application will receive this information via internet so every user has to obtain a specific user number. This application will be sending the company that will be making this system so they will have a medical history of the patient including updated brain activity of their customer. The company will maintain the data base of the system and also will be the intermediate between the patient, the emergency room and the specialist which are the three stakeholders.

The first stakeholder which is the patient will have to use the monitor device which is compound of an electronic device similar to a cell smart phone now a day. The monitor will have to be connected to a series of electrons that will have to be located in the skull of the patient. They will detect the electrical signal of the brain and the frequency in which they manifest. These electrons will send these signals to the monitor device and this as well will save it in the memory. The monitor will send brain patterns in form of graphics waves to the cell phone android for it to save it and do what it has to do.

The second stakeholder, the emergency room, will be in charge of attending the calls and the messages via internet that they will receive from the company when the patient is about to a seizure or any other serious condition. They will be inform of the situation by the brain activity patterns that they will receive and the location of the person for them to go and help the patient.

The third stakeholder, the specialist will be in charge of course taking care of the patient but in this project its role will be to receive the information of the patient when something serious has happened to it so he can analyze it and come with a help to the emergency room where the patient will be. The doctor will know where to go because the company will send the location of the person to the specialist.

## **Discussion**

The primary function of the system is to record the brain activity, via a monitor device worn by the user. The device will be capable of analyzing this data, and will alert the emergency services if a seizure is detected. It should be able to do this wherever the user is having a seizure.

The system should be capable of prompting or reminding the patient to take any medication, therapy, or any other treatment he or she needs. The user will also be able to log that information manually. In case the seizure detection fails the user will have an option in this case a button that will call directly to 911 and tell the operator via a voice recording that will say that the patient is having a seizure and the location that she or he is. The location will be given because the cell phone will have a GPS system. The user must also be able to cancel a call, so that for example, redundant occurrences are prevented.

I realized that when I started to do the sequence diagrams there were more functions to add between the user interfaces that I did not include in the class diagrams.

## **Results**

The final product will incorporate two devices--the Monitor that the user wears, and a normal cell phone with internet access. A special application will need to be installed on the phone. The Monitor connects with the cell phone via Bluetooth.

When the symptoms of a seizure are detected, the cell phone is ordered to call the company and send recent brain data to them via internet, which acts as a go-between for the user and 911. The company operator will determine if 911 is needed, because the patient may have family nearby that can help and know what they is happening at the moment. If the operator cannot get in contact with anyone, then he or she will call 911 directly.

If requested, the cell phone can retrieve the log of brain data from the Monitor and display it, so that if paramedics arrive, they can look at it and possibly learn valuable information about how to help the user. This brain data can also be sent via internet to the specialists and doctors the user may have.

The cell phone application will have schedules for medication, therapy, etc., and reminders for them. It can also have a log for this so that the user can record his or her treatment every time it is taken. The monitor will created a special medical history with symptoms, treatments, medication, numbers of seizure, doctors, that have already help the patient and know his or her case, etc.

The completion of the different diagrams like class, use cases and sequence help me to realize what was needed to implemented in the future.

## **Conclusion**

The Monitoring System incorporates five main "devices"--the user/patient, the company, 911 emergency services, the Monitor, and the cell phone. Most of the work starts with the Monitor-cell phone system, so that is where we must be careful that nothing overrides the user; it is the user who must be able to override the automatic operations. The communication between these whole systems has to be tested much time for it to function as it should.

The purpose of this project if implemented will be very helpful for people that have epilepsy in these

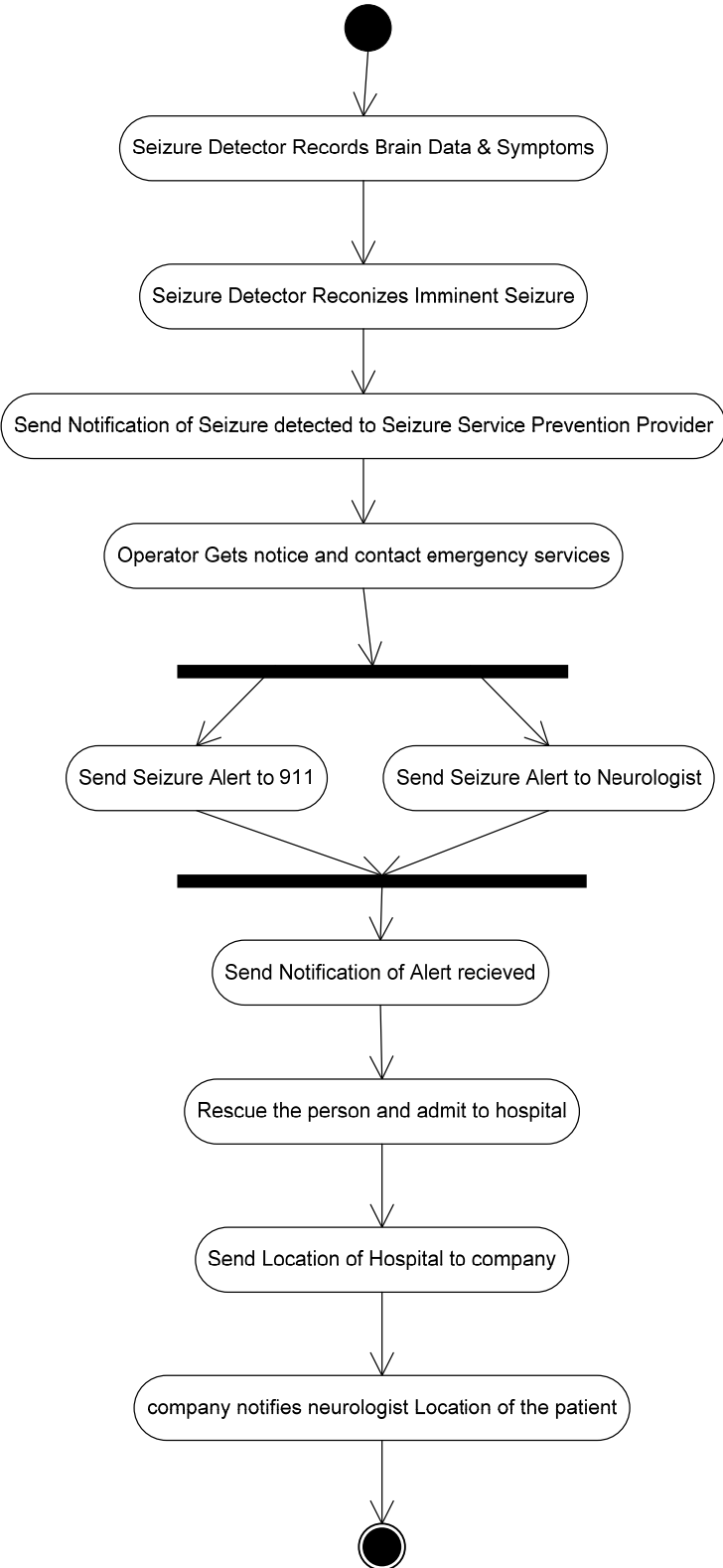
days many people that suffer from this disease have died from strong seizures; I believe this is a concern for health. This may bring huge relieve to for these people in their daily lives, and will help doctors and specialist to develop new ways of treatment or medication that they can use by tracking the symptoms that the system continuously records. Thinking on any other disease like heart problems, diabetes, cancer, and many others sickness can be helped with this systems just by implementing it with their determine specifications for each disease.

## **Reference**

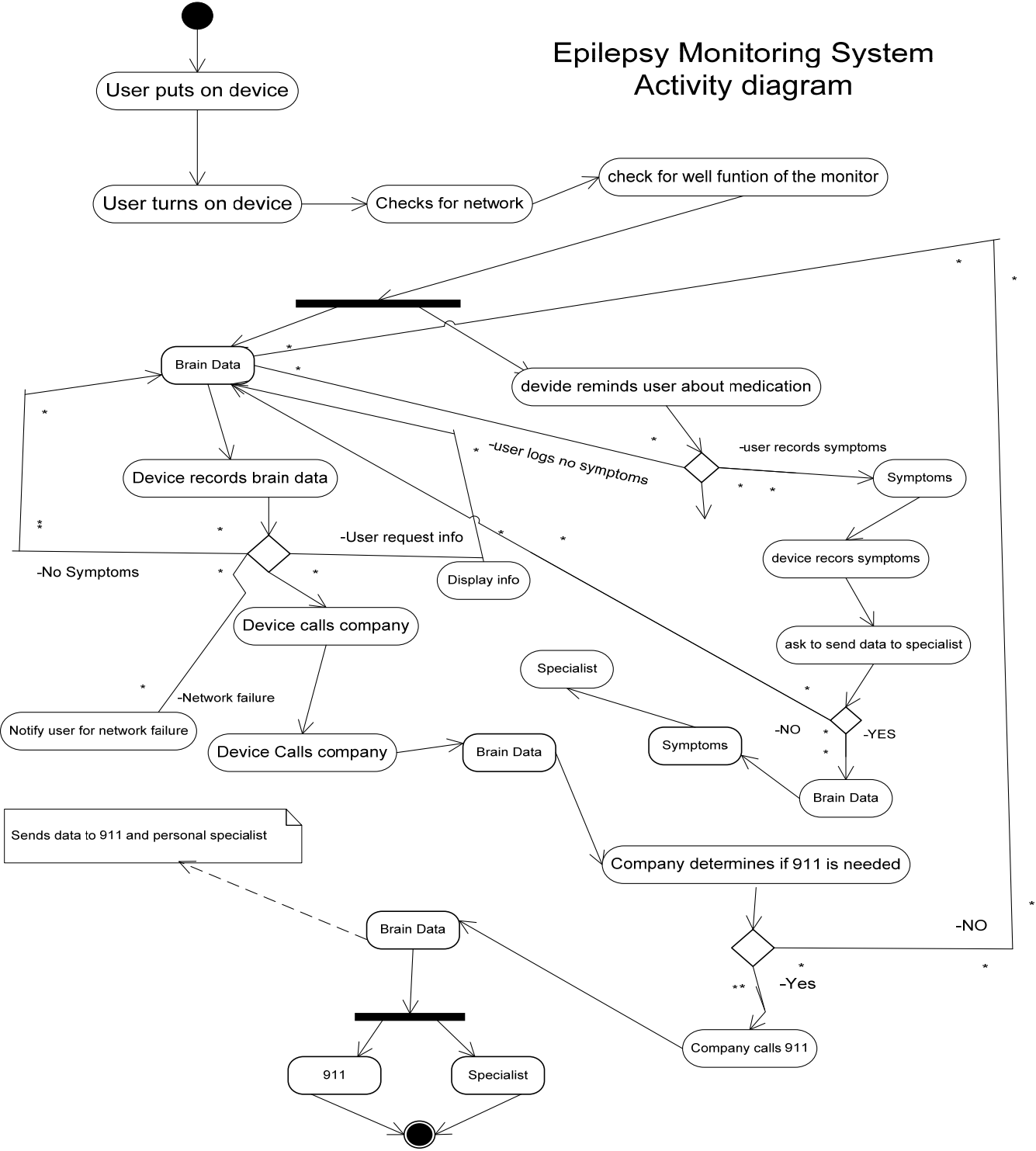
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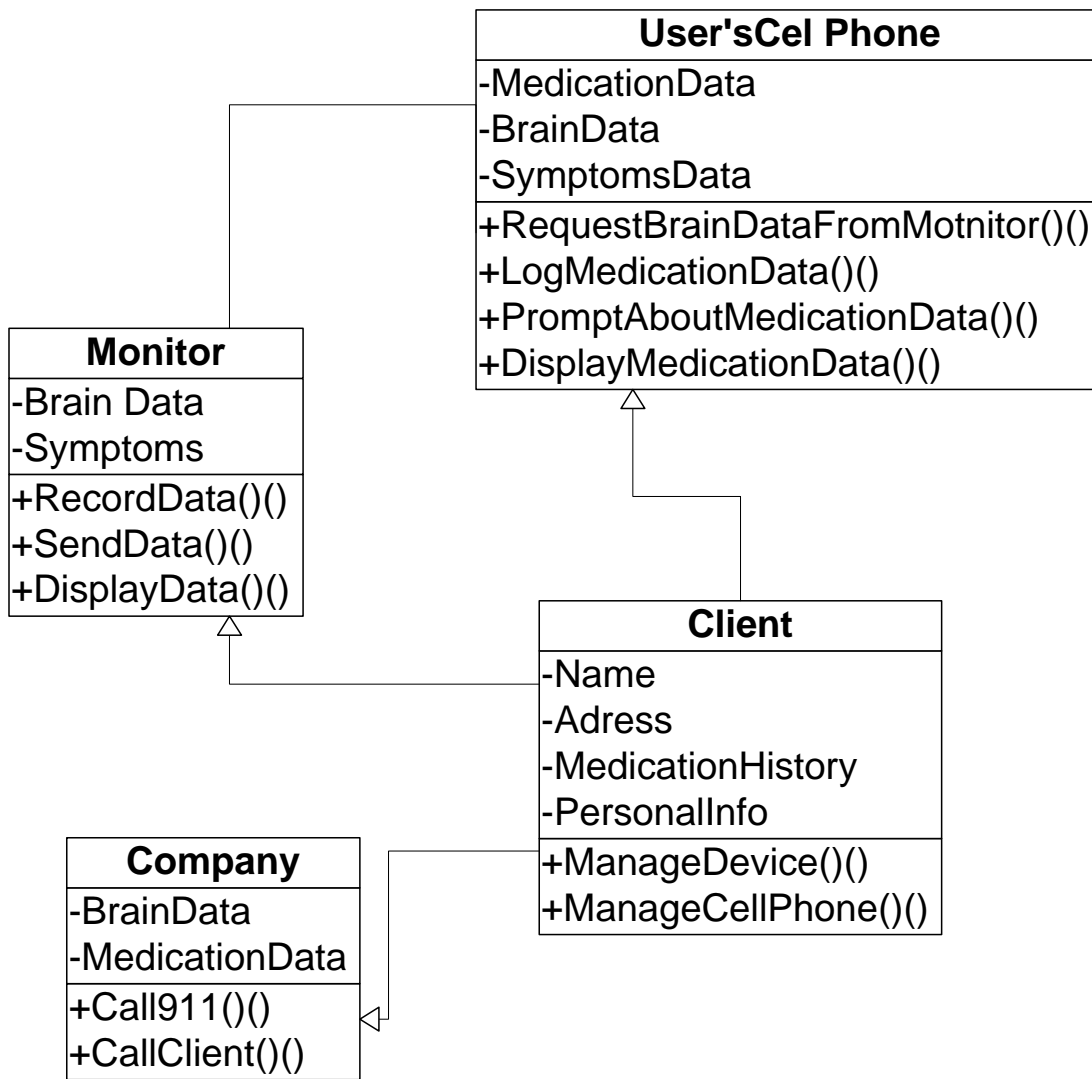
Appendix

User Suffers from Seizure event



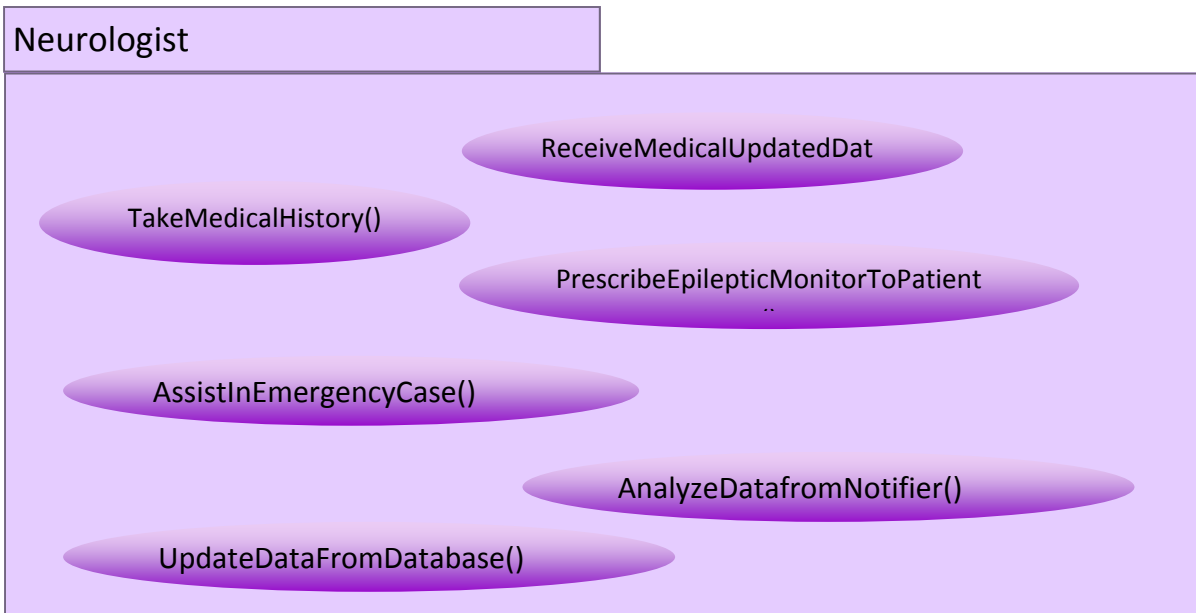
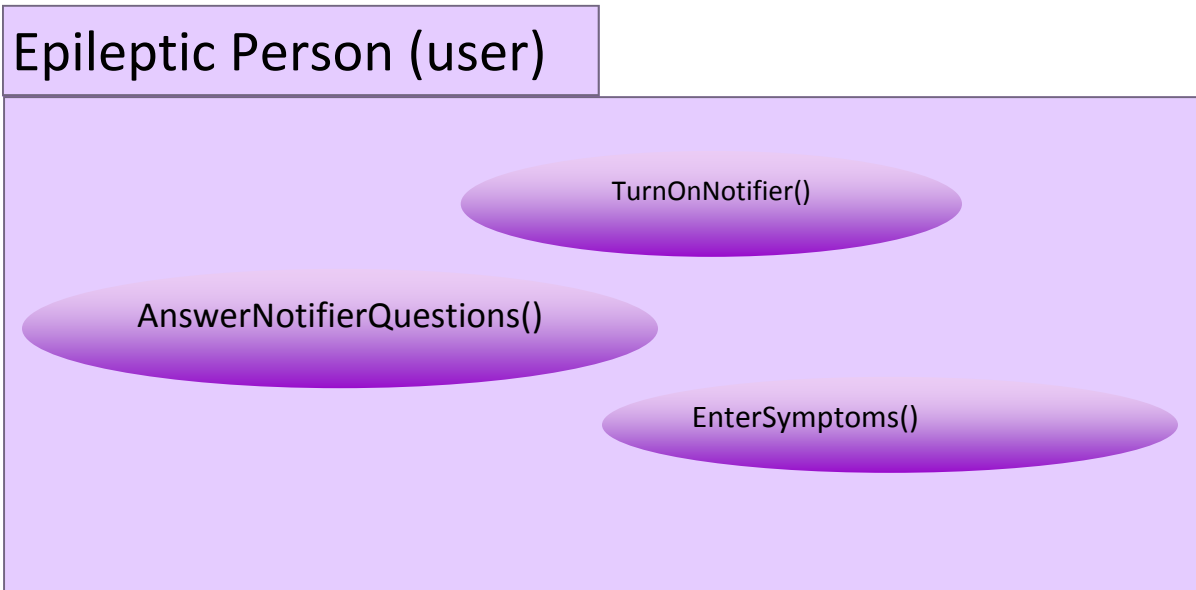
# Epilepsy Monitoring System Activity diagram



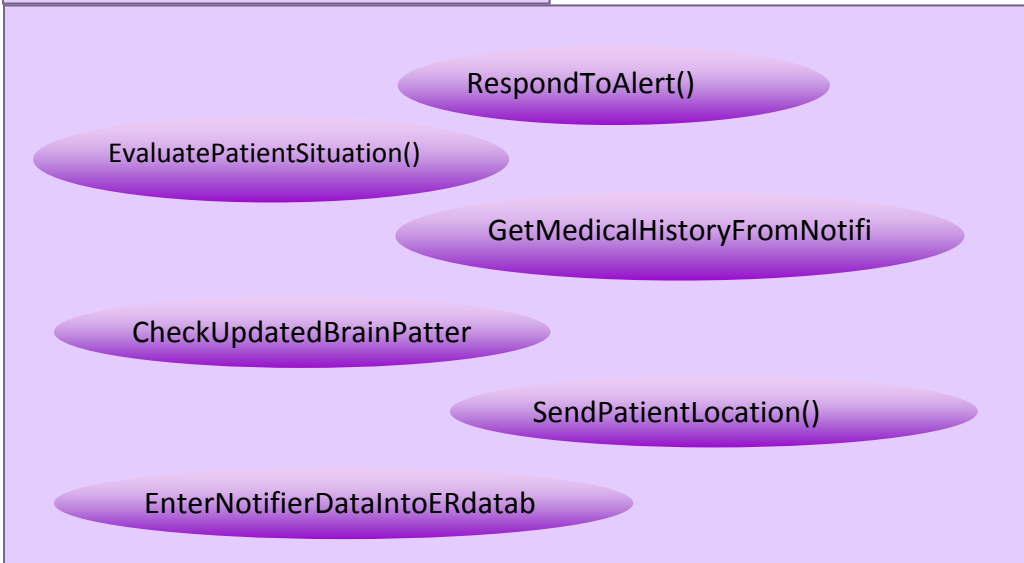


**Class Diagram**

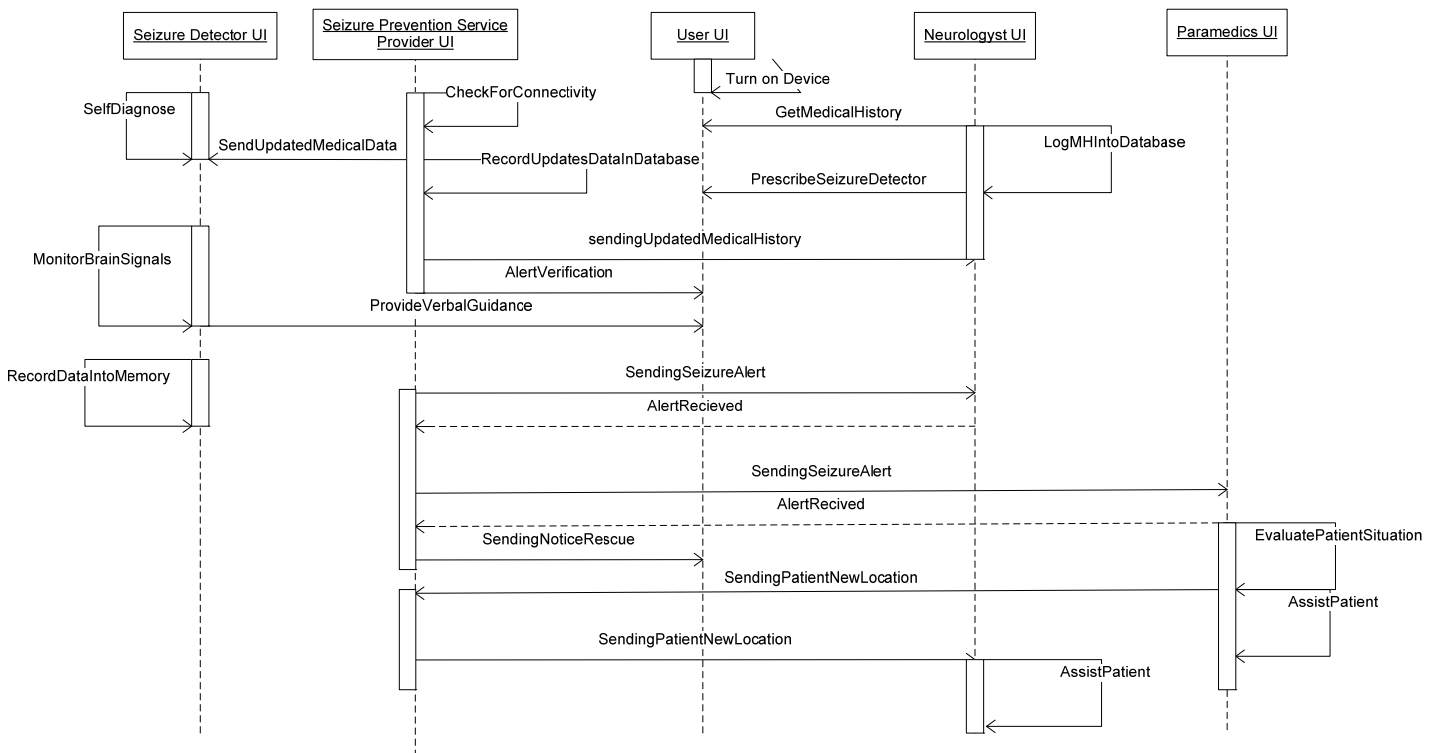
## Use Cases



# Emergency Room



## Sequence Diagrams





## User interface

### Neurologist Interface/UI

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- UpdateMedicalHistory()
- Diagnose()
- Prescribe()
- AlertNeurologist()

### Seizure Detector UI

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- RunDiagnosis()
- Symptoms()
- UpdateModifications()
- + VerbalGuidance(Msg)
- MonitorEEG()

### Seizure Prevention Service Provider UI

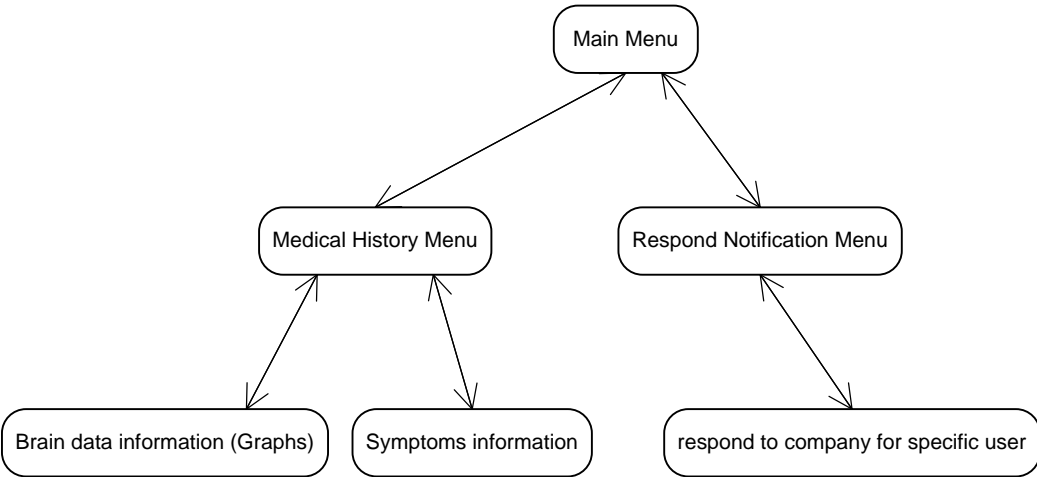
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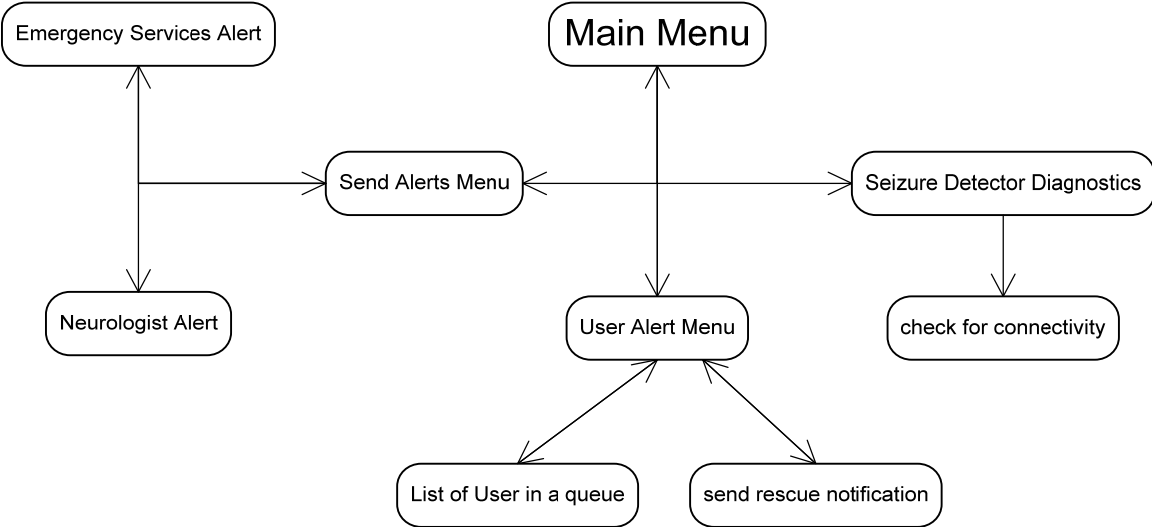
- SendNoticeToNeurologist()
- SendNoticeToEr()
- VerifyAlert()
- SendNoticeofRescue()
- CheckForConnectivity()

# State Diagrams

## Neurologist State Diagram



## Seizure Prevention Service Provider State Diagram



Seizure Detector state diagram

