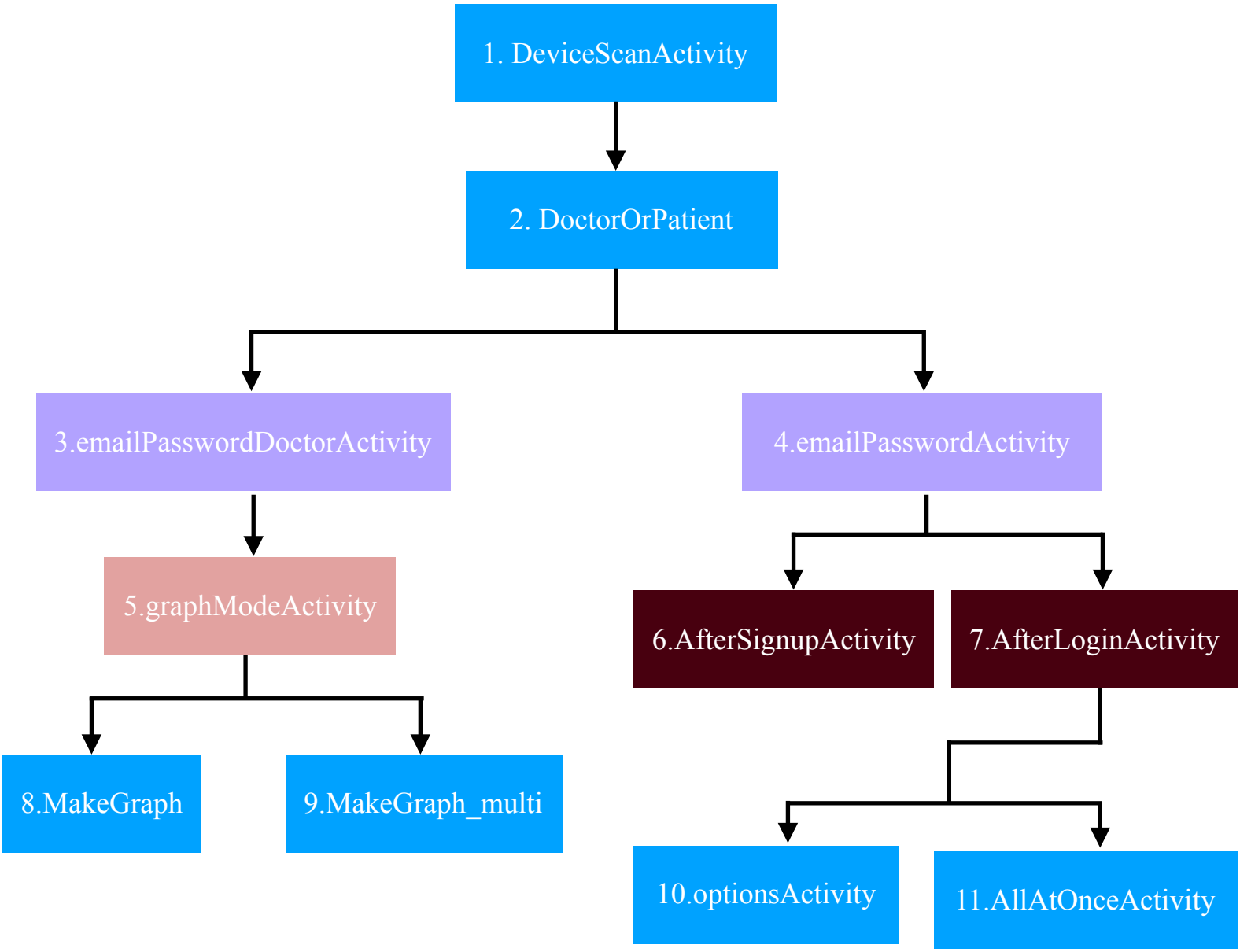
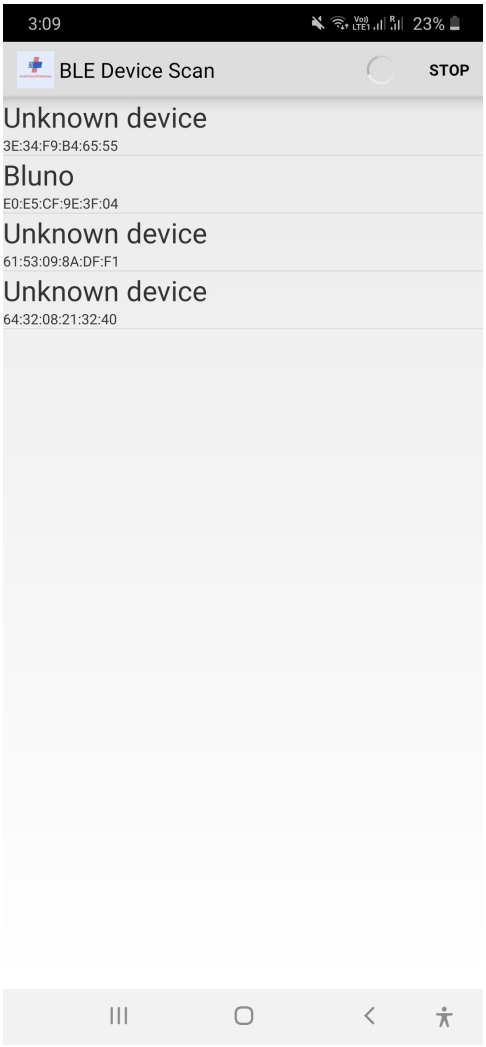


Fig: Flow Chart of All the activities of healthCare Android Application

Explanation

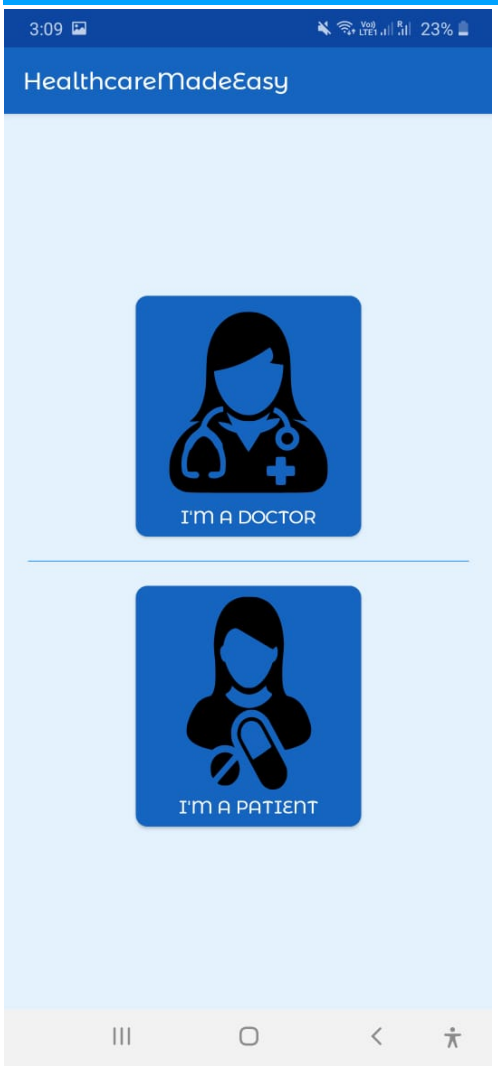
The android application is built using android studio employing Java programming language. It has several activities, each responsible for specific functionalities.

1. DeviceScanActivity



- The first activity is the '**DeviceScanActivity**'
- It scans for all the available bluetooth devices present nearby.
- The name of our healthcare BLE device is '**Bluno**'
- Once we click on the '**Bluno**', it goes to next activity which is '**DoctorOrPatient**'

2. DoctorOrPatient



•The second is the '**DoctorOrPatient**' activity.

•Here, if the user is a doctor, he clicks on **doctor button**. If the user is a patient, he clicks on the **patient button**

•If the user clicks on former, he/she is taken to '**emailPasswordDoctorActivity**' which allows the doctor to authenticate by signing up or logging in.

•If the user clicks on later, it leads him/her to the '**emailPasswordActivity**' which is the authentication page for the patient.

3. emailPasswordDoctorActivity

•Via '**emailPasswordDoctorActivity**' , doctor can choose to either Sign Up or Login.

5. graphModeActivity

•**graphModeActivity**' presents user (i.e. doctor) with 2 buttons.

•Clicking on the first button allows the doctor to choose a single-sensor CSV from the internal storage and plot its graph.

•Clicking on the second button allows the doctor to choose a multi-sensor CSV from the internal storage and plot its graph.

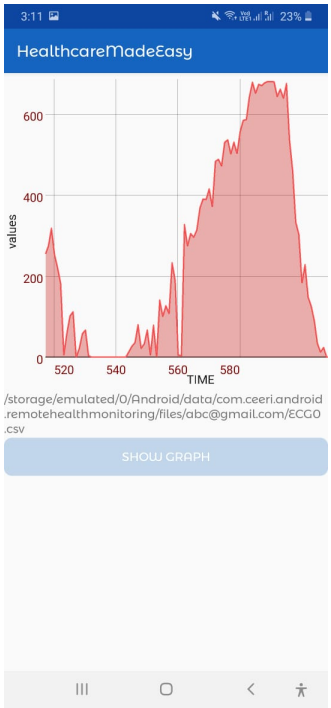
•The format of single-sensor CSV is given in **figure a** below.
•The format of multi-sensor CSV is given in **figure b** below.

	A	B	C
1	Date	Time	ECG
2	20 Aug 2020	06:30:23:123	327
3	20 Aug 2020	06:30:23:123	319
4	20 Aug 2020	06:30:23:123	324
5	20 Aug 2020	06:30:23:223	320
6	20 Aug 2020	06:30:23:223	309
7	20 Aug 2020	06:30:23:323	475
8	20 Aug 2020	06:30:23:323	319
9	20 Aug 2020	06:30:23:423	318
10	20 Aug 2020	06:30:23:423	327
11	20 Aug 2020	06:30:23:423	334
12	20 Aug 2020	06:30:23:523	367

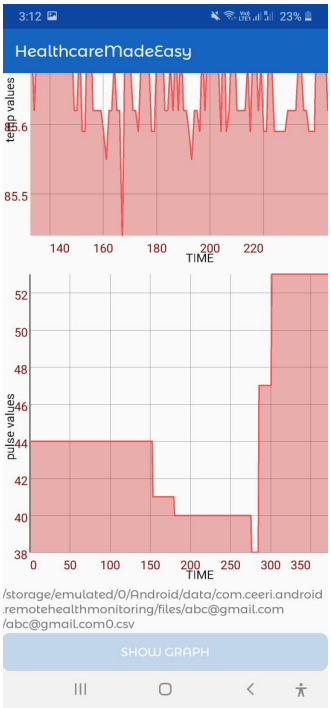
figure a - Single-sensor CSV

	A	B	C	D	E	F
1	Date	Time	ECG	EMG	Pulse	GSR
2	7 Feb 2020	17:35:53	277	974	693	699
3	7 Feb 2020	17:35:53	242	974	691	698
4	7 Feb 2020	17:35:53	268	974	730	692
5	7 Feb 2020	17:35:53	315	974	730	698
6	7 Feb 2020	17:35:53	366	974	730	699
7	7 Feb 2020	17:35:53	281	973	730	699
8	7 Feb 2020	17:35:53	265	973	730	699
9	7 Feb 2020	17:35:53	267	973	729	699
10	7 Feb 2020	17:35:53	290	973	557	699
11	7 Feb 2020	17:35:53	327	972	672	699
12	7 Feb 2020	17:35:53	341	972	699	699

figure b - Multi-sensor CSV



Single-sensor graph plot

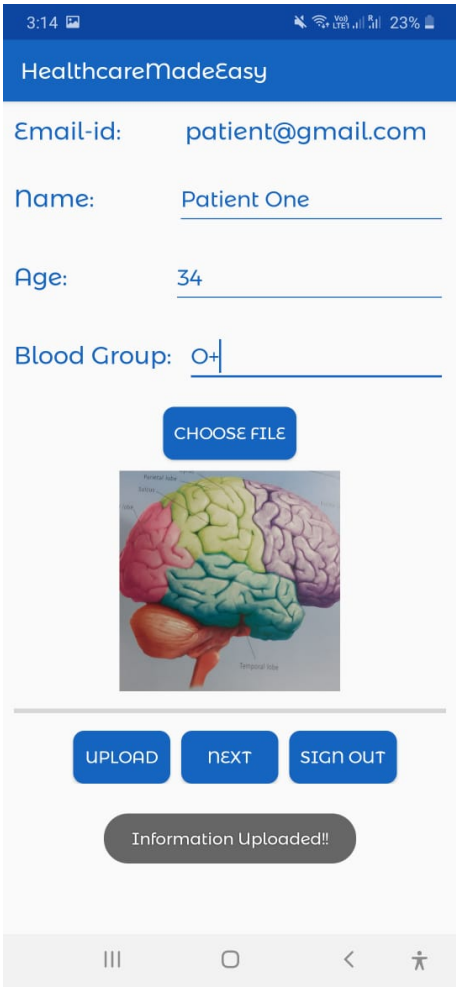


Multi-sensor graph plot

4. emailPasswordActivity

•Via '**emailPasswordActivity**' , patient can choose to either Sign Up or Login.

6. AfterSignupActivity



•'**AfterSignUpActivity**' prompts the patient to enter his/her basic details like <u>name, age, blood group and profile pic</u> and uploads this information on the firebase database.

•The cloud uses a JSON structure (as shown in **figure c**) to store all the important patient details.

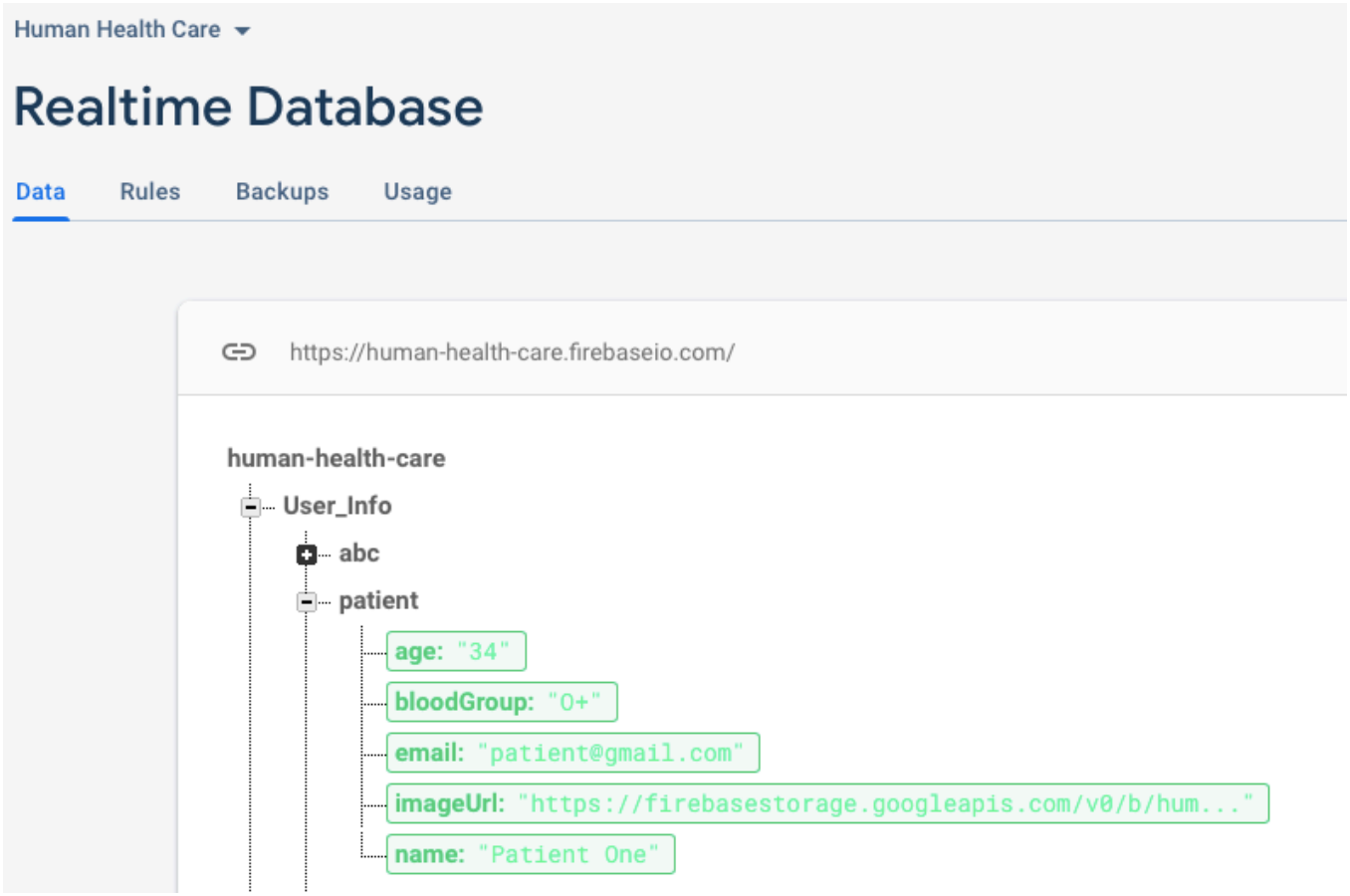
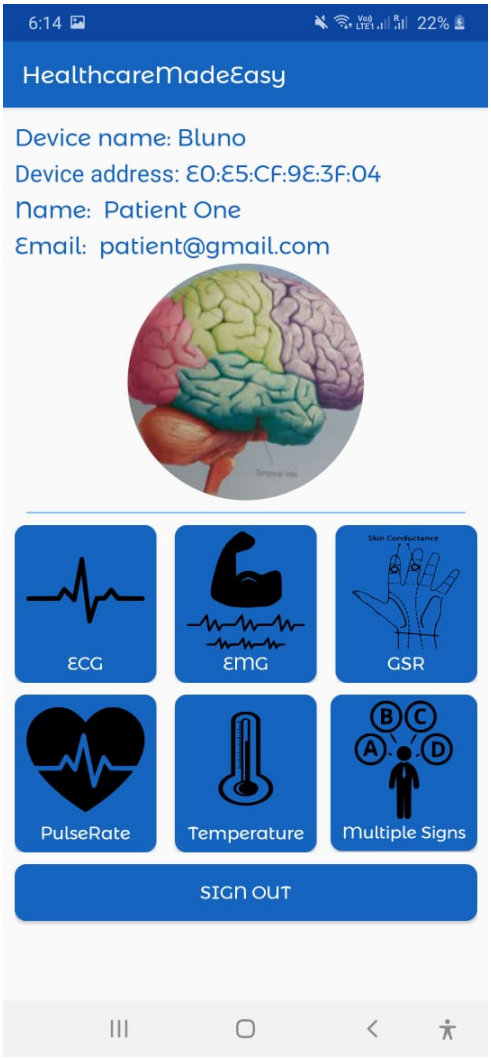


figure c - Patient Information Stored in Database

7. AfterLoginActivity



•'**AfterLoginActivity**' presents us with 6 buttons/options, that allows the patient to retrieve the vital health signals from the hardware device and show it in the form of a user-friendly graphical representation.

•This activity offers the patient to see graph of single-sensor readings i.e. either of the ECG, EMG, GSR, Pulse, Temperature signals. (**first 5 buttons**)

•It also allows the patient to simultaneously record the data of 4 signals i.e., ecg, emg, pulse and gsr. (**last button**)

10. optionsActivity

- This activity allows us to view graphical representations of single-sensor readings (**figure d**).
- It also allows us to process this data in various ways (**figure e**):
  - Send the data to cloud (via **Activate button**). (**figure f**)
  - Stop sending the data to cloud (via **Deactivate button**).
  - Store the data in CSV file in the internal storage (via **CSV button**).
  - Store the captured bitmap of the graph in the internal storage (via **Capture button**).
  - Share the information with the doctor (via **Send button**).

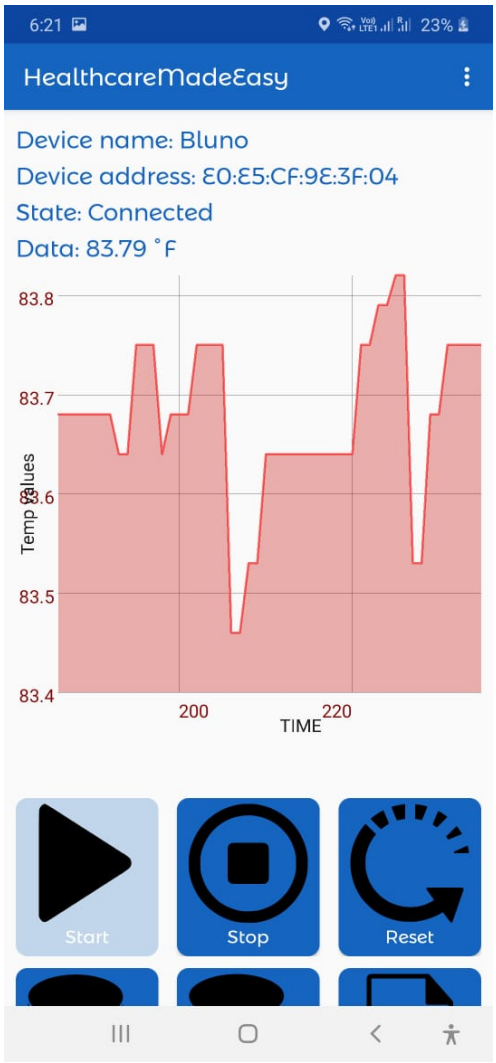


figure d - Single-sensor graphical representation (temperature)

figure e - Multiple options for data processing

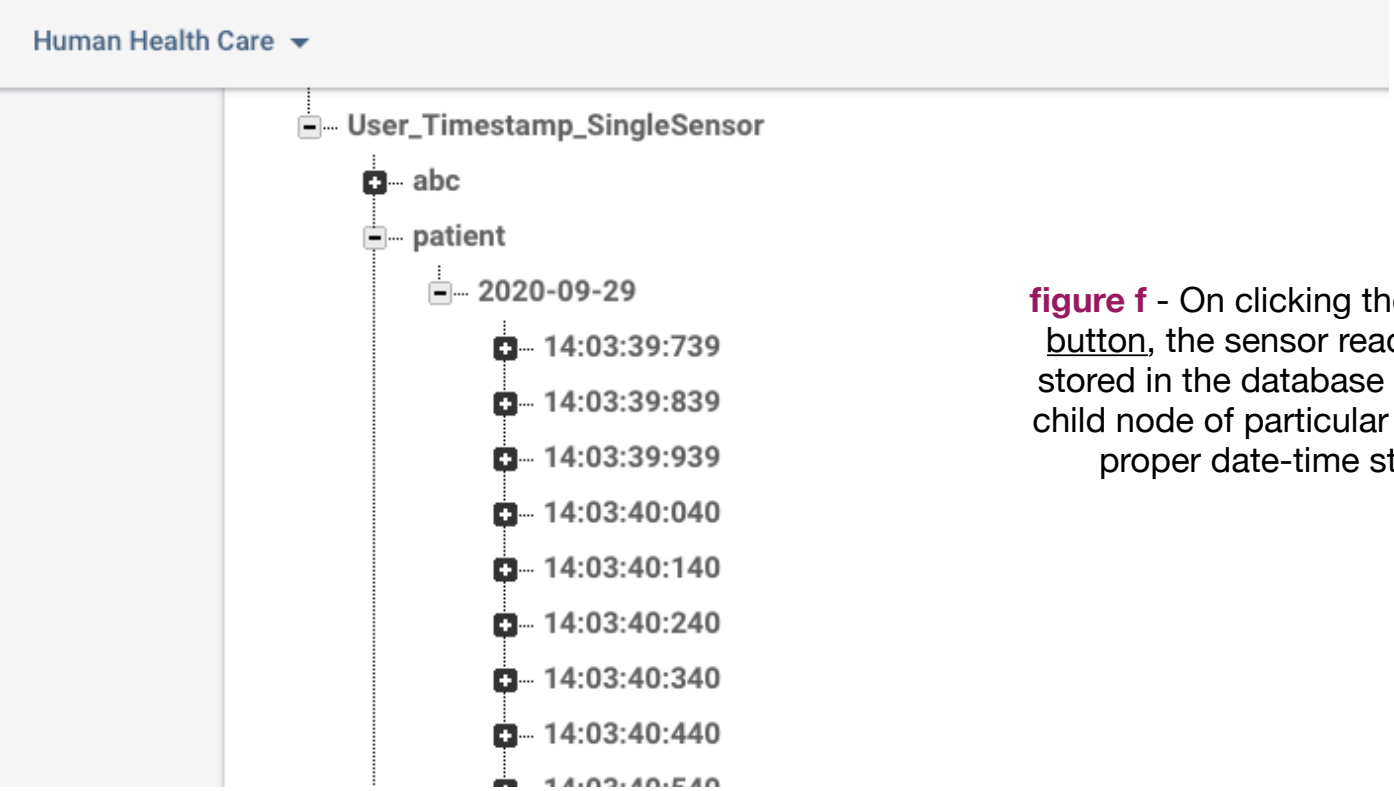
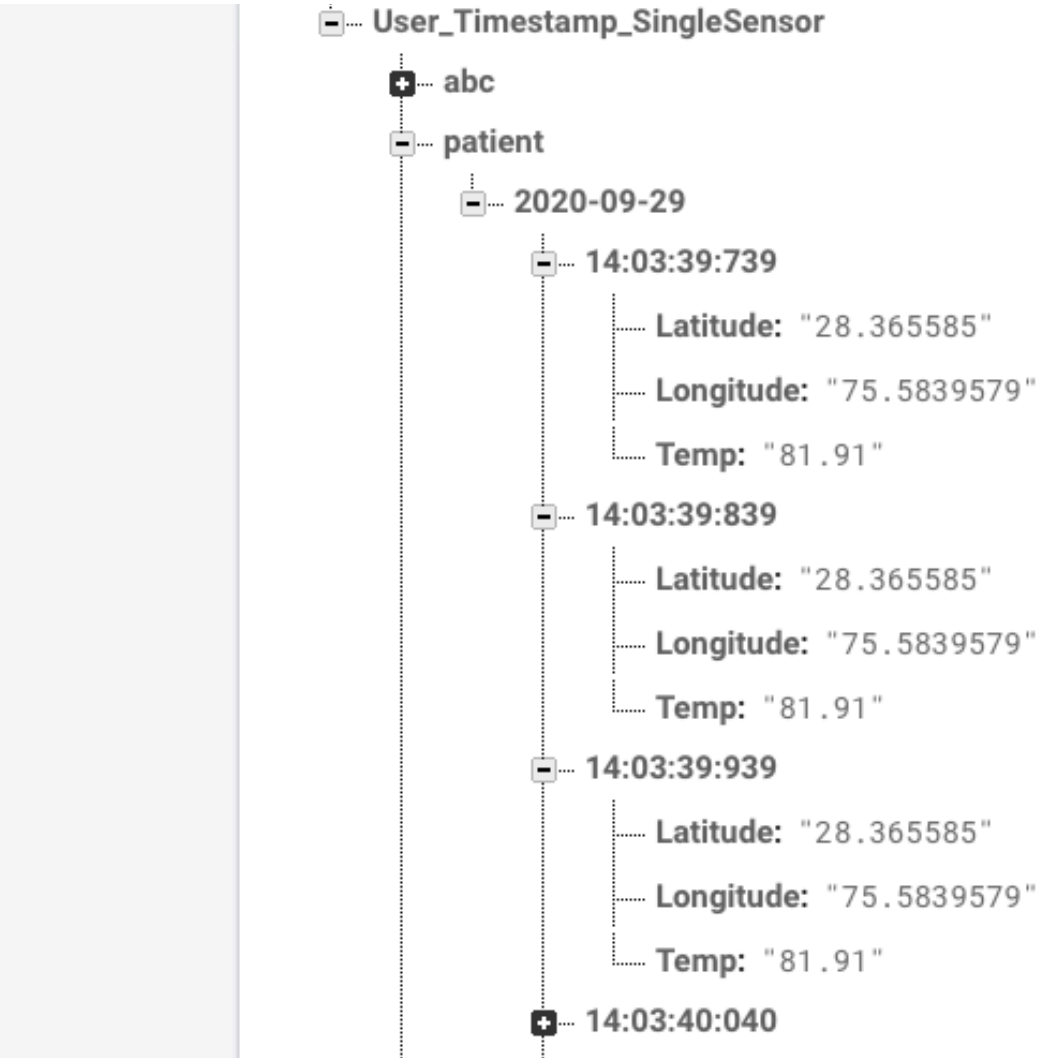


figure f - On clicking the Activate button, the sensor readings are stored in the database under the child node of particular child with proper date-time stamp.



Temperature value being stored in the date-time nodes, along with the realtime latitude-longitude values.

10. AllAtOnceActivity

- This activity allows us to view graphical representations of multiple-sensor readings (**figure g**).
- It also allows us to process this data in various ways (**figure h**):
  - Send the data to cloud (via **Activate button**). (**figure i**)
  - Stop sending the data to cloud (via **Deactivate button**).
  - Store the data in CSV file in the internal storage (via **CSV button**).
  - Store the captured bitmap of the graph in the internal storage (via **Capture button**).
  - Share the information with the doctor (via **Send button**).

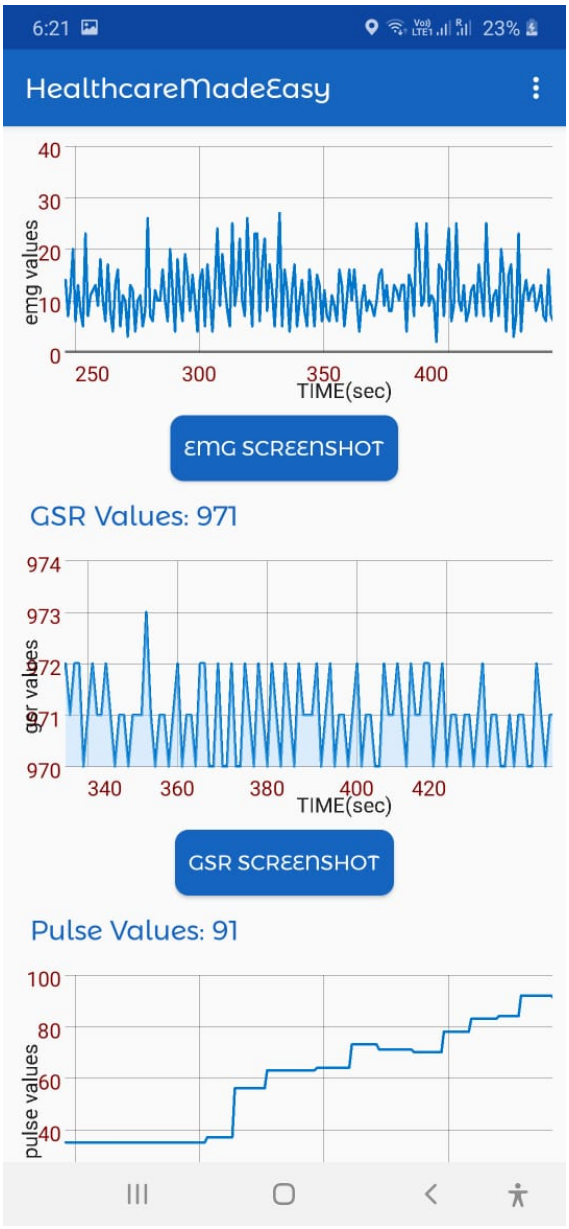


figure g - Multiple-sensor graphical representation (temperature)

figure h- Multiple options for data processing

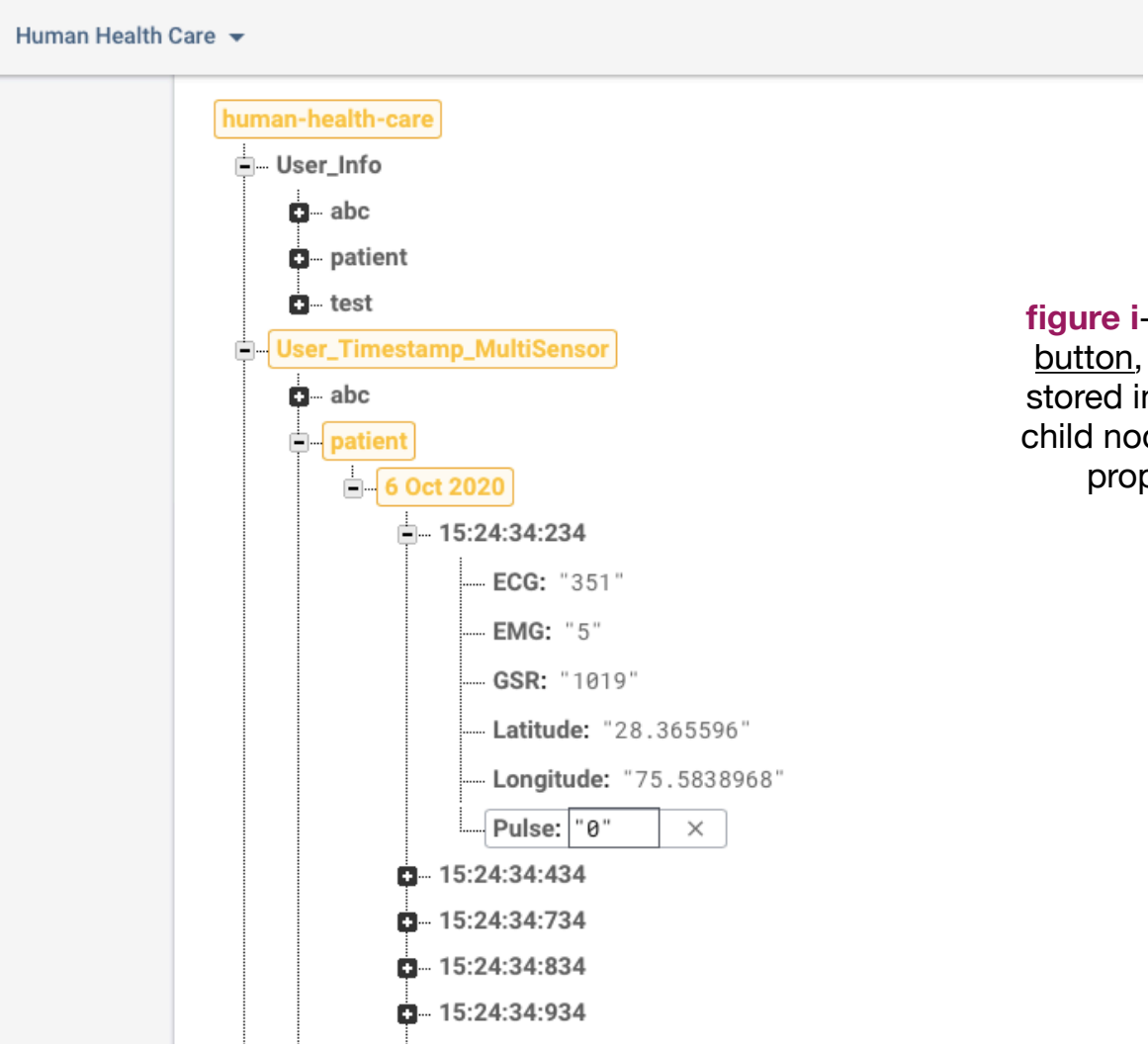


figure i- On clicking the Activate button, the sensor readings are stored in the database under the child node of particular child with proper date-time stamp.