CarePro: A Complete Arduino and Android-based Elderly Care Health and Security Monitoring System: Supplementary Document

Rohan Sarkar [a], Rohan Roy [a], Bipasha Pal [b], Rijit Chakraborti [b], Antara Mukherjee [b], Shankhadeep Ghosh [a], Sovan Saha [c, *, 1]

[a] *Department of Electronics and Communication Engineering, Dr. Sudhir Chandra Sur Degree Engineering College, 540, Dum Dum Road, Near Dum Dum Jn. Station, Surermath, Kolkata, 700074, India.*

[b] *Department of Computer Science & Engineering, Dr. Sudhir Chandra Sur Degree Engineering College, 540, Dum Dum Road, Near Dum Dum Jn. Station, Surermath, Kolkata, 700074, India.*

[c] *Department of Computer Science & Engineering, Institute of Engineering & Management, Salt Lake Electronics Complex, Kolkata – 700091, India.*

**Corresponding Author, Email address: sovansaha12@gmail.com, sovan.saha@iemcal.com*

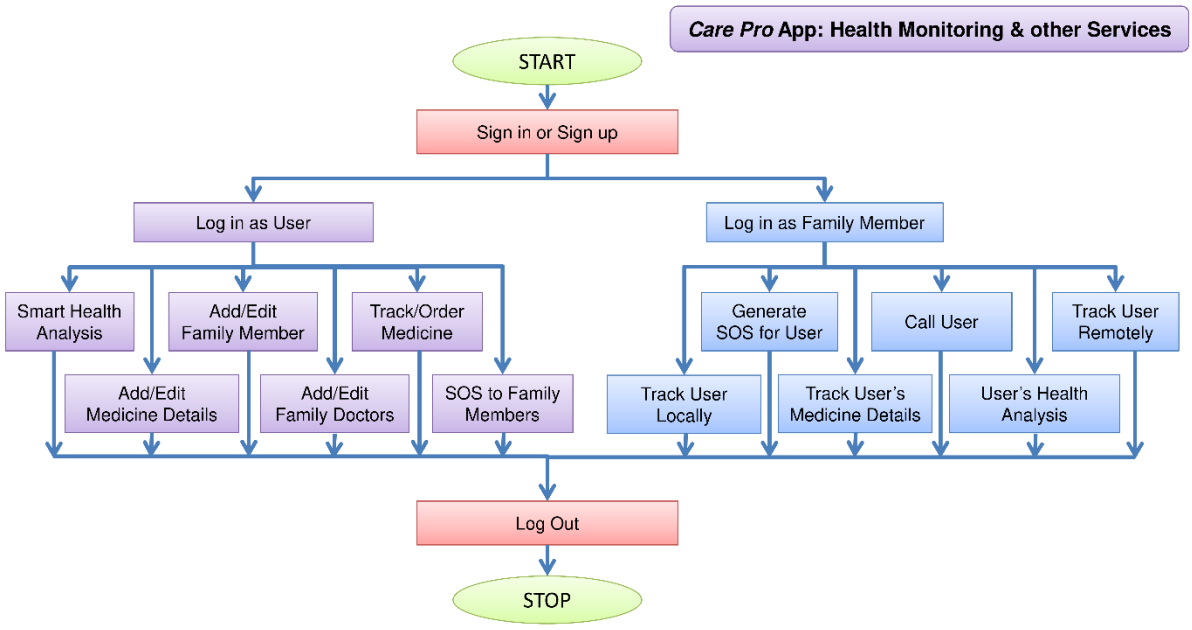

Fig. S1. ***CarePro* app features.** All the features of users and family members in the ***CarePro*** app are highlighted. All these features have been developed considering the emergencies from the user's perspective and their registered family members.

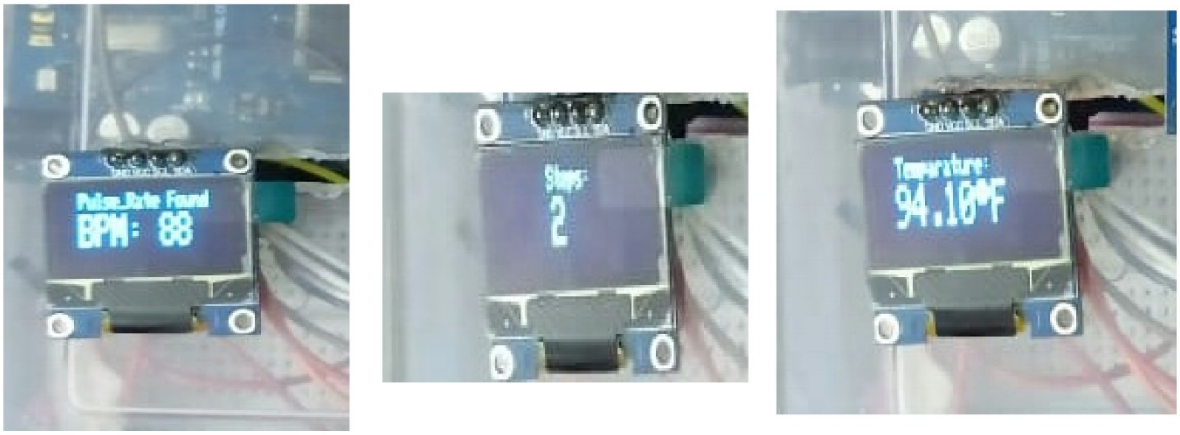

Fig. S2. ***CarePro* band health monitoring system.** BPM, Footsteps, and Temperature of the user are highlighted in the ***CarePro*** band OLED display. These sensors automatically start detecting the pulse, body temperature, and steps when the user wears the ***CarePro*** band on their wrist.

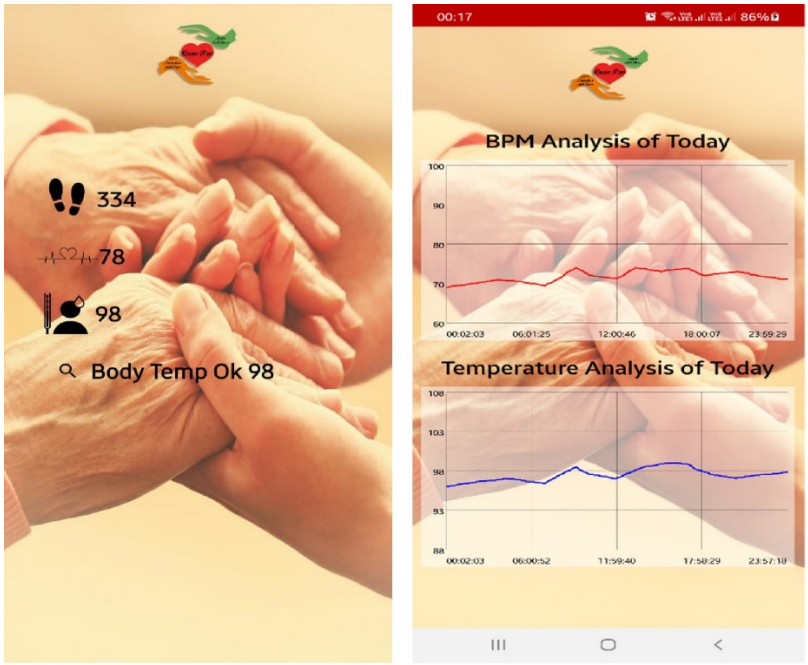

Fig. S3. **Smart analysis in the *CarePro* app.** Graphical health data analysis in the ***CarePro*** app is highlighted. ***CarePro*** app is an indispensable software component of the ***CarePro*** band. It stores and analyses the data in Google Firebase. All these data are related to the health parameters of the user.

Fig. S4. **Family member services in the *CarePro* app.** Two of the essential features in family login in the ***CarePro*** app: 1) Generate SOS for the user and 2) Track user remotely have been highlighted. These features will help the family members to get user-related data in emergencies.

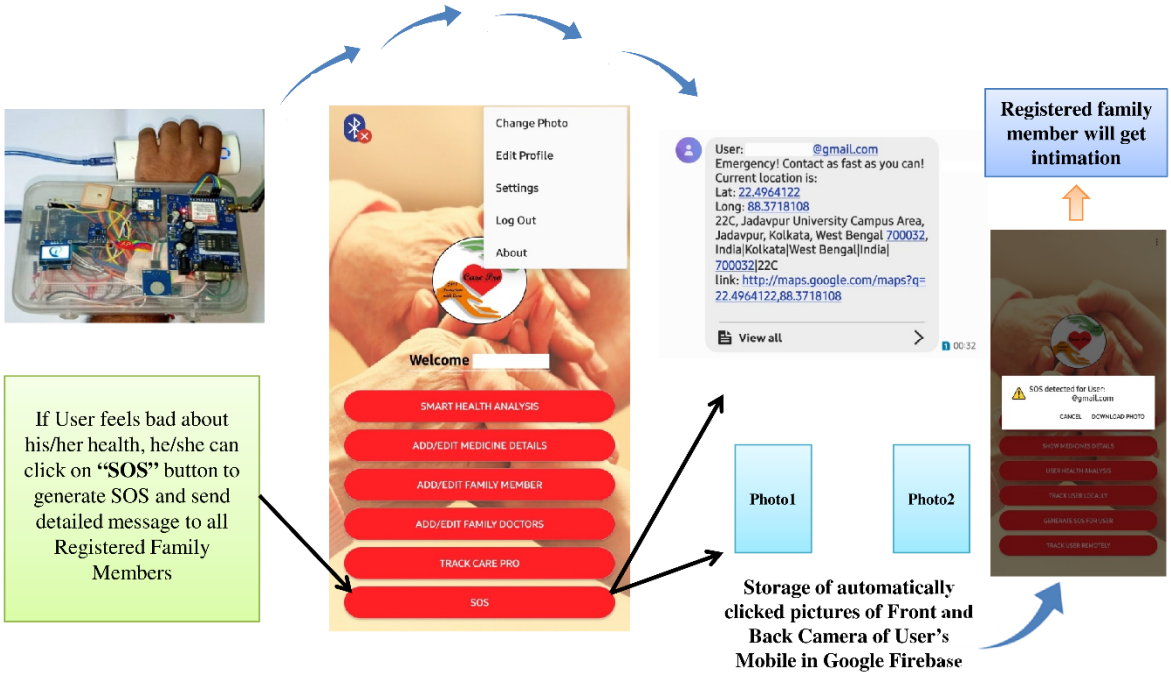

Fig. S5. **Security features in *CarePro* band and app.** SOS in the ***CarePro*** band will send messages to a family member with location and clickable Google Map link. At the same time, the SOS feature in ***CarePro*** app will do the same along with auto clickable photos to be auto stored in Google Firebase (for access of family members).

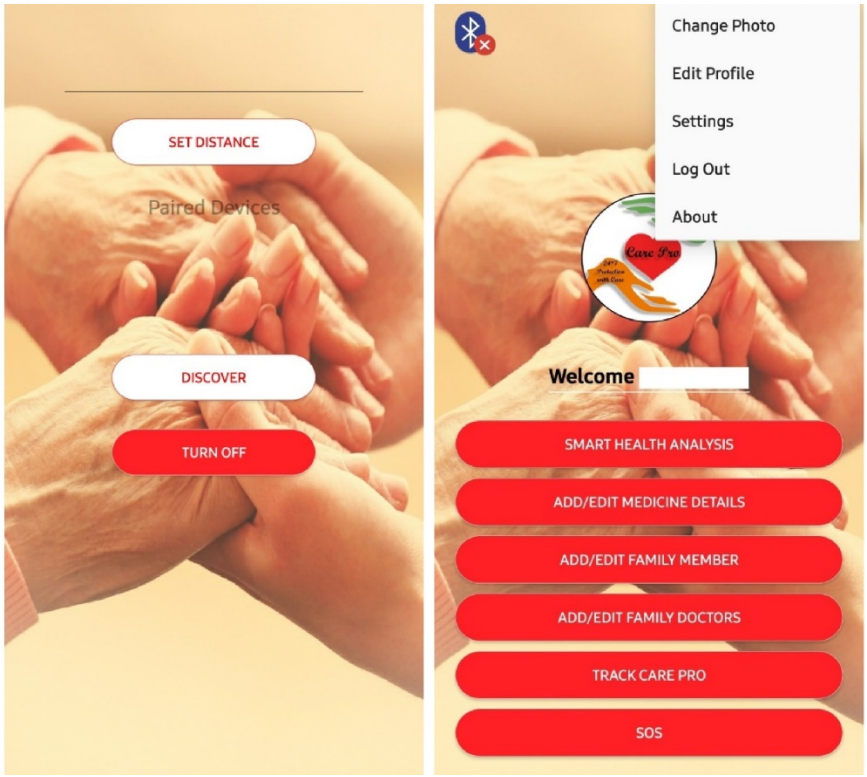

Fig. S6. **RSSI short distance tracking and *CarePro* band finder feature in the *CarePro* app.** Short distance tracking is an essential feature in ***the CarePro app for tracking users inside a room with*** medical issues. ***CarePro*** app also has the facility of tracking the band by itself.

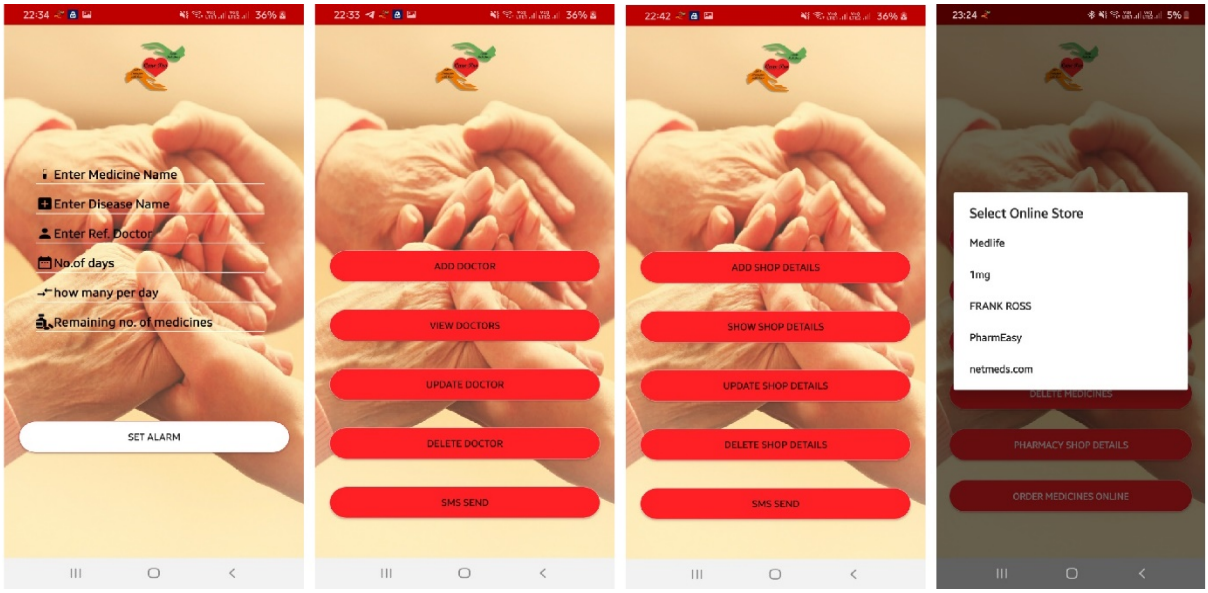

Fig. S7. **Medical services in the *CarePro* app.** Adding doctor details, a timely reminder for taking medicines, depletion of medicines through alarm and message services, and online medicine orders are the extra vital features available in the ***CarePro*** app.

Table S1

Features-based comparison of *CarePro* with others. Device 1 and device 2 are the commercial bands available in the market, while the rest (i.e., device 3-device 9) are the existing non-commercial state-of-arts. It depicts that *CarePro* covers all the significant aspects of elderly care.

Features	**Device 1**	**Device 2**	**Device 3**	**Device 4**	**Device 5**	**Device 6**	**Device 7**	**Device 8**	**Device 9**	***CarePro***
Color AMOLED Display	✓	X	X	X	X	X	X	X	X	X
Monochrome OLED display	X	✓	X	X	X	X	X	X	X	✓
Heart-rate tracker (24/7)	✓	✓	ECG: ✓	ECG: ✓	ECG: ✓	ECG: ✓	ECG: ✓	ECG: ✓	ECG: ✓	✓
Call and SMS notification	✓	✓	X	X	X	X	X	X	X	X
Android app	✓	✓	X	X	X	X	--	✓	✓	✓
Sleep tracking	✓	✓	X	X	X	X	X	X	X	X
Water resistance	✓	✓	X	X	X	X	X	X	X	X
iOS	✓	✓	X	X	X	X	--	X	X	X
GPS	X	X	X	X	X	X	X	X	X	✓
Automatic Heart rate monitoring and alert	✓	Heart rate: ✓ Alert: X	Heart rate: ✓ Alert: X	✓	--	Heart rate: ✓ Alert: X	--	Heart rate: ✓ Alert: X	Heart rate: ✓ Alert: X	✓
Alarm notification	✓	✓	--	--	X	X	--	X	--	✓
Remote tracking	X	X	X	X	X	X	X	X	X	✓
SOS	X	X	X	X	X	X	X	X	X	✓
Disconnection alert	X	X	X	X	X	X	X	X	X	✓
Mobile Finder	X	X	X	X	X	X	X	X	X	✓
EDA Sensor	X	X	X	✓	X	X	X	X	X	X
Electromyogram (EMG Sensor)	X	X	✓	✓	✓	✓	✓	✓	✓	X
Body Temperature Sensor	X	X	X	✓	X	X	X	✓	X	✓
Electrooculogram (EOG Sensor)	X	X	X	X	X	X	X	X	✓	X
Electroencephalogram (EEG Sensor)	X	X	X	X	X	X	X	X	✓	X
Wireless Connectivity	✓	✓	--	X	✓	✓	✓	✓	✓	✓
Market Price	₹ 2,299	₹ 6,527	--	--	--	--	--	--	--	₹ 2,500