HEALTH MONITORING THROUGH SMART WHEELCHAIRS

Amr Salahia Khalid Akaila Islam Ramadan Sankar Sathyanaryanan

Situation

Technology can help doctors provide a more efficient medical care to their patients which can often mean the difference between life and death, and give modern medicine control over factors that were previously hard or impossible to control, but significantly affected patients' survival rates.

Technology can help perform continuous analysis of a patient's data and significantly increase the chance of the patient's survival particularly in a case where the patient is suffering from a disease that could produce sudden or unexpected complications. Decreasing rescue vehicle response times could practically double the survival rate for people who suffer from cardiac arrests [1].

Problems

- We need to monitor the patients' vitals continuously.
- Patients might sometimes be unable to seek medical help/assistance.
- If patients are not in the hospital, it is very hard to predict any upcoming issues concerning the patients' health.
- It is hard for patients to access their medical information whenever they need it.
- Patients occasionally forget to take their medicine on time.

Solutions

Our solution to the problems mentioned earlier is to design a smart wheelchair and implement technology in it. This process will consist of the following:

- Incorporating medical equipment for the basic routine checkups like devices that monitor the health and vital signs of the patients like the pulse, blood pressure, heart rate, and glucose levels.
- Implementing a monitoring system that notifies the nearest hospital or contacts the necessary personnel to provide some first aid to keep the patients stable as soon as possible if an accident happens.
- Installing a medicine dispenser in the wheelchair.
- Pairing the patients' smartphone with the smart wheelchair to make it easier and more efficient to send the patients' health status to their doctors. The system will function as shown in Figure 1.

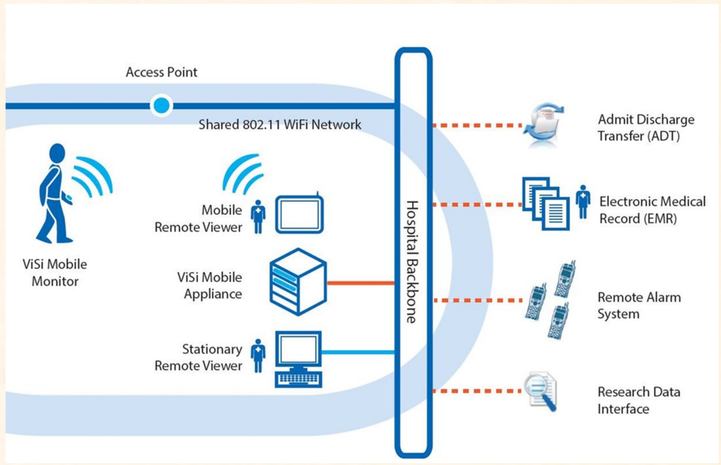

Figure 1: Patients' Data Management [2]

Evaluation

Advantages:

- Remotely monitors patients, which decreases the need for the patient to remain in the hospital.
- Patients will not forget to take their medicine on time.
- Fasten up the response time by knowing immediately if any warning signs are detected which increases the chances of the patients' survival as proven in Figure 2.

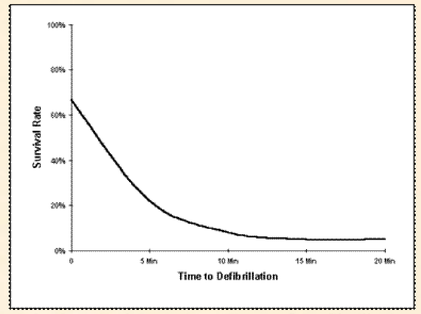

Figure 2: Survival Rate Vs. Time of Defibrillation [3]

Disadvantages:

- Cost: The high costs of the power wheelchair and the medical devices makes it available for a less number of people.
- Battery Life: It should fit the constraints of the wheelchair (i.e. size, weight).
- Size: It should be chosen so that the chair can be moved freely allowing better portability for the patient.

References

[1] L. Holt. Fast ambulance response time reduces cardiac deaths. Emergency Nurse 9(4), pp. 5. 2001. Available: http://ezproxy.aus.edu/login?url=http://search.proquest.com/docview/218316360?accountid=16946.

[2] Technical Product Information, ViSi Mobile, n.d., http://www.visimobile.com/visi-product-info/technical/ (Accessed: 17 November 2014).

[3] B. Elliott & T. Foley, "Pantops – Fire Rescue Station Analysis," (Albemarle County, Virginia), [online] 1 May 2007, https://www.albemarle.org/upload/images/Forms_Center/Departments/Board_of_Supervisors/Forms/Agenda/2007Files/20070509/PantopsAttachment.htm (Accessed: 14 December 2014).