

Homework 4

Purpose and Scope

Hospitals can take care of many patients from varying rooms and floors. Patients can even be grouped up in one single room depending on their case. As such, it can be hard to keep track and make sure all the patients are doing okay. One solution to this problem is having in-room sensors to gather the status of all the patients in that room. This sensor is connected to the medical devices that are monitoring patients as well as cameras that view the whole room. This allows the sensor to capture medical information as well as what is happening in the room physically. The sensor will then notify the patient care system (PCS) of exceptional health conditions and notify human personnel of exceptions. For example, when a medical device detects an anomaly, it will send a signal to PCS and determine what action should be taken. The camera is a backup and for things that don't get detected by a medical device. With these in-room sensors and PCS, any patient emergency can be handled quickly.

Sensor – PCS Protocol and PCS – Human Protocol

Sensor detects anomaly in medical device monitoring the patient -> PCS looks at the anomaly and checks if it needs manual interaction. If it can be handled automatically, the PCS takes care of it and then monitors the situation until the anomaly is no longer present. If a manual interaction is required or more in-depth analysis of the situation is needed, then the PCS notifies specific personnel accordingly. For example, if a medical device detects a patient going through cardiac arrest, PCS will notify the nearest doctor.

Sensor is malfunctioning -> PCS notifies engineers and staff to determine what's wrong with the sensor and to fix it or replace it. PCS also notifies doctors to keep a lookout in the room as they will be the one monitoring and gathering the status of the room while the sensor in that room is malfunctioning. The nurses or staff will stay in that room to monitor the patients until the in-room sensors are fixed.

Sensor sees an altercation (or a physical situation/emergency) through the camera -> PCS tries to identify the problem going on in the room. For example, it could be an altercation, a patient is having a fight with a guest or a patient is trying to escape. If PCS manages to identify the situation, it then notifies personnel accordingly. If it doesn't identify the situation, it notifies a human to look at the situation while having staff look at what's going on.

Test Cases

Patient is having a seizure -> in-room sensor notices the anomaly in medical device and sends the data to PCS. PCS determines it is a seizure and notifies nurses and doctors of the location and situation. The nurse and doctor are notified and they hurry to the patient and help the patient.

In-room sensor is malfunctioning. This can be a medical device not working correctly, like coming up with a really high number that is unrealistic. When this happens, PCS should notice this anomaly and since it is very unrealistic, it determines that the device is probably malfunctioning. PCS then notifies an engineer as well as a nurse just in case the patient's situation is also a problem. The engineer

and the nurse then hurry to the room and looks at the device or patient respectively. Engineer inspects the device and either fixes it or replaces it. The nurse takes a look at the patient and stays in the room until the device is fully fixed or replaced.

Patient is having a physical altercation with another patient. The medical devices don't detect any anomaly, but the sensor/camera sees the whole room. PCS detects an altercation through the camera and notifies staff/bodyguard as well as a nurse about the situation and have them go to the room. The bodyguard eases up the altercation and the nurse or doctor makes sure no injuries or treats them. They then make sure everything is good, or separates the people (changes their rooms and such) involved in the altercation

Human Awareness Plot

