Introduction

In today’s competitive IT world where information is the key and the king to process vital statistics particularly in the field of healthcare and affecting lives of healthcare professionals and also the people taking care of these services. There are multiple devices that offer monitoring of these services but an IoT powered smart hospital that can alert doctors when a patient needs attention will be very helpful.

The lead doctor’s of a big hospital with sometimes 300-350 beds cannot obviously go through each patient and need to segregate as to which patient is critical and needs more attention which in turn leads to multiple meetings and followups with other doctors, nurses often taking upto 40% of their time during their work day.

When I interviewed a few doctors, they feared that sometimes a particular patient may have been overlooked due to manual error and often some supplies might have been missed that have been required in emergency thus they would want a solution which would help them overcome this manual error. In this project, I designed a prototype based on the Internet of things to overcome this shortcoming using sensors which would report data on a real time basis.

Story

As the lead cardiac surgeon and head of doctors in ABC hospitals, Dr. XYZ has a long and tiring day at her job. She starts her day by performing a round up of the patients to check their vital body measurements like BP, glucose, O2 levels etc., takes follow ups with the resident doctors, nurses and then also consults her procurement department to check if there was any supplies that need to be ordered for the hospital.
**Job Responsibilities:**

- Look into day-to-day operations of the hospital
- Ensure hospital is in good condition and ready for patients
- Analyze sales numbers and review business metrics
- Manage hospital’s medical supplies and staff's salaries
- Monitor and maintain the hospital’s equipment, facilities, and utility costs
- Train, mentor, and develop other resident doctors

**Needs:**

- I need to know the current levels of medical supplies in the hospital in real time
- I need to record and analyze patient’s data to accurately determine where more attention will be needed in the coming days
- I need to know if hospital’s facility and equipment are in good condition and when they require maintenance
- I need a way to monitor the quality and age of perishable items
- I need to maximize energy savings and minimize utility costs without compromising customer service and the quality of staff’s work environment.

**Goals:**

- Ensure the hospital is ready for patients and their needs are served properly
- Make sure that the supplies are adequately stocked
- Implement an effective inventory replenishment process and make sure supplies have been ordered
- Make sure that the insurance companies are regularly updated with the patients’ information and vice versa
- Create effective workflows and healthy work environment for staff

**Paint Points:**

- Low levels of supplies causing issues for availability sometimes as critical as blood supplies
- No way to effectively monitor the quality and age of perishable items in real time
- Manual way of checking the supplies and ordering thus causing problems for ordering and storing of supplies
- Overdue facility and equipment maintenance that leads to customer and staff disappointment
- No way to monitor and analyze the health of a patient from a single dashboard to effectively deploy doctors before an issue occurs

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**Age** 32  
**Occupation** Lead Doctor  
**Experience** 8 years in Cardiology  
**Location** Orlando, FL

I spend about 50% of my time talking and walking around the hospital to make sure patients and supplies are up to date. If I could have a centralized way to check and monitor it, it would make my job much easier.
## ACTIONS
- Piyu wants to check the hospital’s operations as part of her daily check.
- She is checking the staff availability and patients health for the day.
- She wants through the hospital supplies and finds some critical items maybe required soon.
- She talks to the nurses about what can be done to avoid this shortage.
- She walks into an ICU room and find that a patient has a high pulse and doctor has not reached yet.
- She checks the monitoring system.
- She also needs to check if the equipments are functioning properly.
- She needs to ask maintenance department to do a regular checkup of equipments.

## MINDSET
- I hope everyone shows up for their shifts today.
- I wish there was an easier way to look into things faster.
- Are there any issues that I missed?
- Do we have enough medical supplies in stock?
- How can there be an automatic paging for the doctor?
- It seems that someone else should also have a bird’s eye view of the hospital.
- Some of the equipments have missed their maintenance.
- I can’t check this daily and need to be dependent on other staff to check this.

## FEELING
- ✍️
- 😞
- Medical supplies
- Patient health
- Monitoring patients
- Staff
- Manual intervention
- Staff dependent
- Supervisors

## TOUCH POINTS

### Point of View (POV)

As a lead doctor in my hospital, I want to have detailed analysis and a centralized view of the health of my patients on my laptop or on my phone so that I can check from anywhere and accordingly guide resident doctors and nurses to assist the patients. Also, I need a detailed view of the supplies so as to not fall short of medical supplies. I want to setup an automated system to lead into the era of future sophisticated healthcare.
After interviewing and multiple prototype sessions with doctors, I have created a prototype using SAP's BUILD website and the link is provided below. Since this is IoT enabled, the hardware part involves using sensors and beacons. This prototype is created for hospitals to make them smart enough and self-sufficient but can be extended to other solutions. A live prototype can be found here:


This is the start page which lists what actions you can perform with the smart hospital app. More tiles can be added like "Staff on duty", "Call-A-Doctor" etc. and this solution can be extended to multiple more domains.
"Patient Overview" page shows Dr. Piyu all the information that she needs about all the patients in her hospital. Now she can monitor the health of her patients at one central location and do not need to walk around the hospital and take regular notes from the doctors and nurses.
The Supplies page lists all the items along with its stock numbers so that if the items goes below 20 then it gets listed in warning and if it gets below 10 then it gets listed under "Order now".
Thank you for going through my project!