CAP 6133 - Advanced Topics in Network Security

Assignment 2 – Potential IoT Applications

Group Members:
Rajib Dey, Debashri Roy, Kennedy Vrutaal

Number of Interviews: 4 (In 3 domains)

Name: Rajib Dey
PID: 4166566

Selected Domain: Futuristic
Selected Subdomain: Spectrum Sharing to implement 5G network across U.S.A

Interviewee's Name: Dr. Mainak Chatterjee
Interviewee's Company: University of Central Florida
Interviewee's Position: Associate Professor
Interviewee's Email id: mainak@cs.ucf.edu

Interview Type: Face to face

Interview Summary:

Dr. Chatterjee is an associate professor at UCF. Among many other areas he does research work on spectrum sharing which will play a vital role in implementing 5G networks across U.S.A.

In the U.S.A a major portion of the radio spectrum is reserved for the defense and other security forces (Navy, Airforce, Army etc.) to use. But most of the time these spectrums are not being used for various reasons. For security purposes, civilians cannot use it just because it is not being used. As we are facing an increasing need for faster communication we should not waste a big chunk of the spectrum. We(civilians) can use the spectrum when the defense and security forces are not using it. But when they are actively using it we will stop allocating the spectrum for civilian use. This is the whole idea behind spectrum sharing.

To make the spectrum sharing a reality, Dr. Chatterjee suggested to make an IoT device that could sense the power of a (or a range of) radio frequency at one place. So that we can detect if someone is using the frequency or not. If no one is using it then we can allocate the frequency for civilian use. We should be able to control this IoT device via Internet and this IoT device should be light-weight and mobile. So that it does not use a lot of resources and we can move it around to use the same device in different areas according to our needs.

Dr. Chatterjee seems hopeful about his idea to implement IoT devices to detect if the radio frequency is being used or not. If this is implemented and we use an efficient algorithm to implement spectrum sharing then implementing 5G across United States could be done easily. Which is what we would try to implement in our term project as a group.

Name: Debashri Roy
PID: 3941847

Selected Domain: Transportation and Logistics
Selected Subdomain: Logistics

Interviewee's Name: Mr. Navjot Singh Chhoker
Interviewee's Company: FedEx Services
Interviewee's Position: Programmer Analyst
Interviewee's Email: navjot.chhoker@fedex.com

Interview Type: In person
Interview Location: 1900 Summit Tower Blvd, Orlando, FL 32810
Interview Date and Time: September 22, 2017 and 11:00 am-11:30 am

Interview Summary:

I interviewed Mr. Chhoker, who works as a developer on SenseAware (http://www.senseaware.com) project in FedEx innovation team for FedEx Services. At first, Mr. Chhoker briefed about his project and its utility. SenseAware is a FedEx innovation for monitoring the packages in transit. It consists of a GPS enabled monitoring device and web based collaboration from customer side. FedEx is already offering two kinds of devices SenseAware 2000 and SenseAware PT3000D, using 2G and 3G services respectively. The customers can choose the monitoring service based on the importance and necessity of their package to be monitored. Customers can buy or rent the SenseAware devices before the shipment of their packages. SenseAware is generally bundled up with the package, and customers can monitor different environmental condition of the package in a certain interval. SenseAware devices can monitor current location, accurate temperature, exposure to light, relative humidity, biometric pressure and shock. Customers get an id related to each device and set their preferences of monitoring options prior to the start of the shipment. Customers can get real time visibility and insight of their shipment along with the condition of surroundings of the packages. If the customers find any hazard or alert, they can take necessary steps accordingly.

As Mr. Chhoker told, the customers can only monitor their packages with this device, spending around 150$. They cannot control the package information like changing destination address, delivery time or place, add extra note on the package etc. FedEx received a lot of customers' feedback concerning this issue. The customers need to call or request online to change package delivery details when the package is on transit. Sometime, that is not even possible when shipment truck has started to final delivery destination from the last FedEx center, i.e., the package is out for delivery.

So Mr. Chhoker stated that, they have a requirement for IoT device for controlling the package delivery from customer side. He described to me the requirement of that IoT device. The device could have a screen where the delivery address and required notes (like timing or community entry codes) will be displayed, which will be attached to the package. The sender will be given an id for that device and s/he can log on to that id and see/change the details of delivery/transit of the device (attached to the package). The customer with the id of that particular device can change delivery address or any necessary information anytime, until the package got delivered. Each time the package is scanned on different hubs in transit, the destination address is scanned, and forwarded accordingly. Ultimately when the package is out for delivery, the delivery person will check the final address. and s/he finds any change that time also, s/he will take back the package and put it in transit again. However, the customers will need to pay extra for too many address changes. Mr. Chhoker suggested, this new IoT device can be implemented in two ways. Those can be manufactured as a separate device for controlling only and then attached with existing SenseAware devices at the starting of shipment. Otherwise one standalone IoT device can be visioned to do both monitoring and controlling, using SenseAware technology for monitoring.

Mr. Chhoker seems hopeful about his idea of package controlling IoT devices. According to him, implementation of this device will serve customer satisfaction, by making their life easier. The interview was fruitful, and I understood Mr. Chhoker's vision of implementation of IoT devices to meet modern-generation's customers' need.

Name: Kennedy Vrutaal

Selected Domain: Smart Environment
Selected Subdomain: Smart Museum and Gym

Interviewee's Name: Alisal
Interviewee's Company: Planet Fitness
Interviewee's Position: Front Desk/Receptionist

Interview Type: On Site
Interview Date and Time: September 23, 2017 and 8:00am-9:00am

Interview Summary:

I interviewed Alisal, who is one of the staff at Planet Fitness. She is one of the staff who works at the front desk, but also goes around replenishing the sanitizing equipment, cleaning paper towels, and makes sure that the equipment is clean and that everything is where they are supposed to be. After explaining the subject to her, she has informed me that they already have this technology in place.

Their equipment allows their clients to track their workout and monitor their heartrate, and can keep this information via their mobile app. This allows the client to share the information with other clients, and or their trainer.

She believes that if they would have an IoT device that allows them to track equipment that are not in place, such as dumb bells, and weights. The only solution in place right now are signs asking the clients to rerack their equipment. Another issue is when the paper towel dispensers and sanitizing equipment run out. Right now, they must walk around and manually inspect everything, which sometimes leaves the front desk unattended. This would make their use of time more efficient, and would provide a better service to their customers.

Another way this could improve their service, is by allowing them to see which machines, or weights are being used the most. This could allow them to get more of those machines, and or weights in order to prevent wait time for their clients.

When asked about security and privacy concerns, she said that they are not looking to collect the data, but looking more to improve their service. And as far as the equipment goes, the clients decide to use the app and it is entirely up to them. The only information it collects is heartbeat and your training.

Name: Debashri Roy
PID: 3941847

Selected Domain: Smart Environment
Selected Subdomain: Comfortable Offices

Interviewee's Name: Mr. Souvik Das
Interviewee's Company: Performics
Interviewee's Position: Senior Business-Intelligence Developer
Interviewee's Email id: souvik.das@performics.com
Interviewee's Contact No: 412-519-6281

Interview Type: Telephonic
Interview Date and Time: September 22, 2017 and 1:00pm-1:30pm

Interview Summary:

I interviewed Mr. Das, who works as a business-intelligence (BI) developer in digital marketing company Performics (http://www.performics.com). Performics mostly works on providing customer satisfaction regarding prediction or utilization of different products. As a BI developer, Mr. Das needs to attend a lot of meetings with customers. He sometime needs to pitch the idea of how they are going to implement digital marketing to help customers. So, huge amount of time in his work week, Mr. Das spends in conference room. Mr. Das described me his need of a IoT device, related to implementing the idea of smart conference room. Though, now a day there is the idea of web meeting, but most of the time Performics prefer to have face to face meetings to instantly predict customers' reaction.

According to Mr. Das, he has to meet a number of people from client side and they get introduced to each other at the starting of each meeting. With advancement of meeting, people start to talk and, sometimes it gets hard for them to remember each individual's name from other side. To maintain a fully professional environment in conference room, Mr. Das suggested a smart conference room device. His idea of that IoT device is quite interesting. The device would be installed in the conference room, and there will be small screens and sensors placed on the table, associated with each chair. Now whenever one person will enter to the conference room, the main IoT device would fetch information about the person from his phone or tablet through the Internet. The person could have an app installed in his or her phone, from where s/he can control the information to be fetched by main IoT device. Then, whenever the person moves forward to a particular chair, the screen related to the chair will sense the person's information via the sensor (attached to it), and display the name and affiliation of that person (fetched from main IoT device), on the screen. During the meeting, each person could get to know the other person's name, affiliation or other important stuffs. Participants of the meeting can utilize a app for controlling different things. First, a person can control what s/he wants to display on the screen. S/he can change name, add email id, add extra notes (within limited area of the screen). Second, the participant can get sitting organization structure beforehand, once s/he is registered with a particular meeting. Then s/he can book favorable spot to sit prior to meeting and start displaying his/her name as soon as the meeting time starts, even if s/he might be on his/her way to the meeting. Third, the host, or manager of the meeting can already make a predefined sitting scenario and get the participant's name displayed before the start of the meeting. Displayed name can easily direct the participants where to sit. As Mr. Das told, they sometime have meetings with nameplates displayed. But more dynamic and controllable approach is desired to make employees' life easier.

Mr. Das seems hopeful about his idea to implement IoT devices to build a smart conference room environment. The interview was engaging, and I understood Mr. Das's idea and need to implement IoT devices in various aspect of modern generation's office environment.