Proposal: Monitoring of Toxic Fumes (CYNSORS)

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**Toxic Fumes Background**

In the past we have seen tragedies when it comes to toxic fumes being in the air and people not noticing what’s going on. Little do they know they are inhaling toxic gas causing internal problems and in some instances death. The problem my group and I will be addressing is the monitoring of toxic fumes. These are some toxic fumes found in houses and apartment buildings; carbon monoxide, mold, radon, lead, and asbestos. Undetectable by the human noses we wouldn’t even know that we are silently killing ourselves by inhaling those deadly chemicals. They be found in the walls, in the vents, and even in the basement. Toxic fumes can also cause things like explosions and chemical reactions that are not meant to happen.

**Proposal**

The problem that our team is addressing is a cybersecurity issue from a company called ByBlocks which does Replast. Replast uses steam along with compression to create ByBlocks out of plastic waste.(ByFusion, 2023) This company uses smart sensors to monitor toxic fumes in the environment and will alert the system if it surpasses the set amount. With use of recycled plastic high amounts of heat is used so that is can be repurposed. During that process because of the high amount of heat it releases compounds that can form toxic fumes which causes problems to the workers that have to deal with the material on a day to day bases. This is why it is critical for our product Cynsors to be successful in monitoring the air and alerting the system if there are any toxic fumes in the vicinity. If the system is compromised in anyway then there is a huge problem. Depending on how big the building is there could 10s or 100s of people effected. With increases in cyberattacks because of the progression of technology a threat could always be lurking at the door.

**Context**

I know toxic fumes is a problem because there are 187 pollutants labeled as hazardous. With that being said the individuals who work at a place like ByBlock would rely on these sensors everyday they are at work. With ByBlocks being made with compression and steam there is less heat being used but the air would still need to be monitored but it is definitely better than the other way the plastic is reworked. Toxic fumes being inhaled by the employees can cause a magnitude of problems such as respiratory problems, cancer, birth defects, reduced fertility, and in worse case scenarios even death. If someone were to get into the system and potentially cut off the sensors without anyone noticing and there were toxic fumes in the air then everyone would continue to work like nothing is happening. At least 420 people die each year from carbon monoxide poisoning, a type of toxic fume and that could just be a sample of size of what could come.

**Solution**

To fix the problem we are developing a system that implements resilience, encryption, access control, and authentication. With these protocols put into place it will give us a better chance at protection on the network that the sensors would be on.

Resilience plays a huge factor in these sensors because if the system goes down we have a back- up in place that would be effective immediately. Every second matters in an instance where there is an attack on the network so that’s why we have to put the proper protocols in place to be effective when they are called upon. A lot of the times we see a cyberattack and the system has no back up so the system automatically fails and then that adds another major issue. Since we are taking the time to make sure the system is resilient we are more confident with our product and the safety of our consumers who will be using the sensors and the system that controls the sensors.

Encryption is also pivotal in how commutation travels through the network. If I’m giving the sensors a command I need the message to be encrypted so if it were to be intercepted by someone who isn’t supposed to be on the network they have no idea what the message says. Encryption on our product will add another form of protection because trying to decrypt a message that how nothing to do with a person trying to intercept will make their attempt harder. Preferably using the AES(Advanced Encryption Standard) which uses symmetric encryption and is the most used method around the world.

Authentication will also be key from entering the building, to having access to the sensors, to the sensors themselves having to get authentication to follow commands. With a two-factor or multi factor authentication in place it makes it harder and harder for a threat to get into somewhere they shouldn’t be going anyways. This mediates potential risk and hackers that can corrupt the system. Encryption will make the commands a lot more complex than plain text and with authentication meaning you need the key to decrypt a message they go hand in hand, which adds more security to our system.

Role based access control will also alleviate some of the problems that can rise from outside risk and even internal risk by allowing certain individuals with certain privileges. This prevents some employees from trying to get carried away and trying to access something they shouldn’t have access to in the first place. It keeps procedures easier for when a company wants to use our product all they would have to do is assign each employees or entity a role in the same whether it’s the administrator or a regular user. With using logic controllers we and the consumers would have to be very specific of the roles being assigned because if a regular user is assigned an administrative role they could potentially have access to sensitive information and could potentially mess with all of the sensors in the building.

With all of the protocols we are taking Cynsor will have more than enough protection and will be super effective in what it is meant to do and that is to monitor the toxic fumes.

**Barriers**

Funding/Budget will be a major barrier because technology is expensive to develop and produce. Getting sponsors would of course help but aren’t always guaranteed but with what we came up with I think we would be in a good place to be successful in. Of course our goal is to make profit so we can keep our budget in the positive. Staying in the positive means our venture is a success and business is booming. If there was ever a point where we had to exert all of our financial resources then trouble would be brewing for us. Many companies have faced failure due to their lack of capital management. As long as Cynsor can maintain loyal customers then we are in good hands and can have one less thing to worry about.

Patents and regulations is another barrier we could potentially face because we don’t want everyone trying to make the exact same thing as us and as well all know the process can be long and not always go as planned. With the market being competitive it could be liable for a patent to get denied which is worst case scenario but definitely a possibility.

Research and development, before even selling the product we have to put time in to research how we want to create the product. To achieve what you want could take months or even years and this also ties into budget and money because this all cost. With something like this though you have to take your time so you can make sure your product is in a position to be great. Every detail was thought out and it was made and executed just like it was supposed to be and now you have happy, grateful customers and business.

**Assessment**

We can see that our product can have success with the right protocols implemented and also with the quality of our product. I think our product is a success if our feedback from the customers and companies using Cynsors is positive because word of mouth travels. If our products executes all of the implementations we put in place such as authentication, encryption, resiliency, and access control then we are successful. This is definitely important because if our products survive cyberattacks more people will be confident in trying our product out. Lastly, if a company see’s a decrease in attempts to try to get in the system then that is also a success for our product.

References

Reshape the future of plastic waste. ByFusion Global. (2023, April 12)

<https://www.byfusion.com/>