FLORIDA ATLANTIC UNIVERSITY

Jancarlos Gomez

EGN4952C

Design Experience Reflection

22 November 2021

Dr. Kalva

We are developing a robotic collar for Florida Power & Light (FPL) that can test wooden utility poles to see if they are suffering from rot. Rotting in wooden utility poles is dangerous for linemen because it can cause the pole to weaken and snap under the weight of the lineman during climbing, leaving them injured or dead. Our solution was to replicate the hammer test, a hammer strikes the pole, creating a sound for a microphone to pick up, and the microcontroller processes it. The user can control the collar and receive reports about the quality of the pole via a mobile application.

As far as local and global impact, our project has no real use, it is purely academic. When we met with linemen at the FPL site in Boca Raton, they told us that our project is useless. They showed us their process for inspecting poles. They only inspect the pole about the first six feet and half a foot underground. Most of the rot a pole could have would be in this underground region, meaning that the whole climbing and tensioning aspect of the collar is pointless. The robot is not capable of digging half a foot below the ground nor was it ever stated in the scope documents provided to us that it must. The majority of the wooden utility poles are covered with risers and obstacles around the pole such as fences, which make it impractical to attach a collar. I would have done instead of this robotic collar a handheld device for linemen that detects the manual hammer strikes conducted by the linemen and gives them feedback about the rot that way.

Regarding ethics and professional considerations, the team has worked honestly and has communicated extensively with the sponsor. We are serious about working on this project even if it's just purely academic; however, the amount of negligence, miscommunication, and selfishness we have faced with the teacher assistants (TAs) and the lab coordinator, Perry, is absurd. We did get quite frustrated multiple times throughout the semester but we always maintained respect towards these individuals. We also made sure to appropriately confront these individuals when necessary.

Our senior design project has been a headache. It has been a hassle to work with the TAs and Perry because there is barely any communication and a lot of self-interest. Most of our project depends on the convenience of other people outside of our group. We experienced constant delays with 3D printing and laser cutting. Perry forced us to switch the whole collar design to laser cutting and caused a lot of new problems to arise. The collar is flimsy and no longer weatherproof. We had to waste a lot of time assembling the collar and spent our own money on screws, nuts, fasteners, and brackets since the school has no equipment at all. We should have followed through with what our sponsor, Troy, suggested about outsourcing 3D printing during an earlier meeting. It would have saved us a lot of time and money. Troy says he experienced the same issues with the previous team at FAU regarding the TAs and Perry. Most of this project has been more mechanical engineering than anything. We are a team of CS/CE/EE. If this kind of project is being offered, we should be able to work with the mechanical engineering people as the amount of guesswork we have done in the project is ridiculous. Overall, this project has been a poor experience for me and the rest of the team I believe due to the constant delays and required dependence of other people outside of the group.