I [Jeremiah] chose to pursue this project in hopes to learn more about a field within my major, robotics. Programming a robot to perform specific tasks and learning how to problem solve, real and physical problems, have always been an interest of mine that I wish to turn into a skill. This project, I believe, was a great choice for me in the sense that I am going to be able to apply my skills in programming and code to make something move in the physical world, which I find very exciting. I have also decided to take this opportunity to treat my learning environment as a work environment, so that by the end of this project I will have an idea of what it’s like to work with others in the same field, as well as other disciplinaries i.e., mechanical engineers.

**Goals/Objectives**

The purpose of this project is to assist in the inspection of University of Central Florida’s storm drains. To iterate, the goal is to build a functioning robot which can accomplish a set of objectives, such as inspection, evaluation, and integrity check of the storm drains. Being that the conditions of the storm drains are wet, made of concrete and metal, and are 20 feet below the ground, there are restrictions that need to be worked around and solved. As for must haves, the robot will be tethered, most likely by a steel cable for recovery if needed. Also, since the robot will be operating underground, a wireless connection is not possible and will instead be connected via ethernet cable. Due to the conditions that the robot will be operating in, good lighting is needed which in return will allow for good visibility for the cameras.

**Equipment**

The robot will require several types of hardware such as, cameras, controls, circuit boards, lights, motors, tether, power supply and a cooling system. These will be designed and provided by the mechanical engineers who are working alongside us during the manufacturing of the robot. As for the computer scientists, several pieces of hardware will be needed in order to successfully program the robot to perform its set tasks. One of these required pieces of hardware will be the NVIDIA Jetson Nano Developer Kit, which is already equipped with computing power to run AI workloads, which can be useful in developing the final version of the robot. With the NVIDIA Jetson Nano alongside with other sensors, the robot may be able to perform its tasks more efficiently, such as detecting cracks, cave-ins, and hazard conditions, allowing users to effectively complete their tasks within the storm drain. For the mentioned sensors, laser mapping, ultrasound sensors, and light sensors may be used in order to create a more efficient robot that can detect issues that the user may not see or realize.

**Broader Impact**

With the completion of this project, its applications can help not only the university, but also cities who are prone to being rained on or flooded. The robot can be used as a replacement for a person, as conditions in storm drains can get risky and dangerous from gas leaks, cave-ins and wildlife. This robot can increase the efficiency of many inspections done by cities or construction companies, saving them time and money as well as lowering the risk of injury for laborers. The application of this project doesn’t stop with the inspection of storm drains though, the idea of completing a risky task using a controlled robot can help in other fields in the workforce i.e., construction.

The success of this project can bring to light the significance that computer scientists and engineers can be beneficial to society in a way that makes life easier and safer for everyone. People will see how the innovation of science and engineering can make a brighter future for the world, and advance society to a new level of efficiency and safety. As this innovation ripples into the future, inspired people will want to partake in the pursuit of this brighter future, creating more and intuitive engineers and scientists.

**Legal, Ethical, and Privacy Issues**

The misuse of this robot can lead to legal issues, as it is probable that this robot will be equipped with a weapon in order to fend off any wildlife it encounters, and it will be equipped with cameras, lights and sensors. The misuse of the weapon can lead to serious injury or fatality. Also, if this robot were to be inserted into a storm drain in which it is not allowed to be in, trespassing will occur, and as the robot is equipped with cameras and sensors, a breach of privacy will occur as well. The issues listed from misuse can lead to legal action and should be avoided.