

IoT Database for Air Quality Monitoring and Pollution Source Detection in Denver

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Company Background:

Lunar Outpost Inc. is an advanced technology company with a focus on developing technologies that have both terrestrial and space applications. Comprised of engineers with experience working on NASA, defense, and commercial programs, Lunar Outpost is engaged in contracts with the U.S. Air Force, local and state government organizations, and leading research institutions. Other current projects include a prototype life support system for Lockheed Martin's Lunar Habitat module; the Lunar Prospector, a rover designed to map resources on the Lunar surface; the Bloomberg Mayor's Challenge; Denver's Smart Cities Initiative and more...

Description of Work to Be Done:

The work to be done is towards an IoT Database that supports sensor network integration while performing data intake, aggregation, and analytics to use air quality sensors for pollution source identification. The effort will start with a network around the City and County of Denver and the first iteration of the data platform will be focused on integration of Lunar Outpost's Canary Air Quality Monitors. The Canary is a proven sensor system used by the City and County of Denver to win the Bloomberg Mayor's Challenge in the Fall of 2018.



A Canary Air Quality Monitor painted by a local artist as part of an art exhibit for CCD

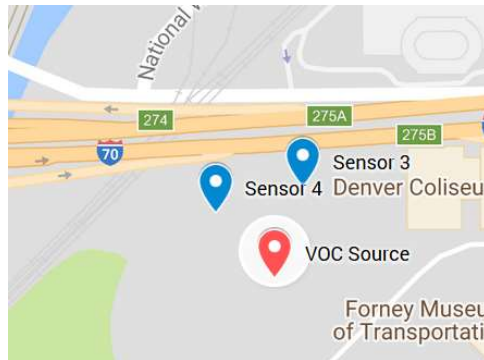
The students will be involved in every phase of the project 'from design through implementation'. During the design phase the students will interact with customers locally at the City and County of Denver, University of Denver, and the State of Colorado to get feedback on what the customer would want to see in the database. From there the database overview will be created and the work divided into tasks.

As a final product, the database will intake data from Canary sensors either from a cloud architecture or directly from the sensors themselves. This database should provide a GUI that is easy to understand and



provides access to the feature set the aforementioned customers are looking for. Once these features are established, pollution source detection and more advanced data analytics can be applied.

Justin Cyrus, the CEO of Lunar Outpost, will be managing this project on the Lunar Outpost side. Mr. Cyrus has extensive software development and project management experience and can help mentor the student team throughout this 6-week course.



Screenshot of Pollution Source Detection to be implemented on database

Desired Skill Set for Students:

We understand that all the students in the group might not have the desired hard technical skill. As long as they have the ability to problem solve and the willingness to learn then our engineers can help teach some of these hard-technical skills.

- Database Management
- C++
- Python
- IOT Device Experience
- Data Analytics

Preferred Team Size: 3-5 Students

Given the scope of this project a group of 5 students is preferred but 3 students could also excel given they are willing to problem solve and learn.

Internships at the End of The Course:

We are happy to consider offering internships at the end of the course. A couple of the students in the class are already going to be involved with our company later this Summer and if there are other valuable members of the team that can contribute to this project post-course, we would consider them for internships as well.

Location Where Work Should Be Performed:

We have offices in Golden and in Boulder, CO. The office in Golden, CO is located at 17700 S Golden Rd Unit 102 and has space for a student team. This office is less than a 5-minute drive from CSM campus and should provide a convenient location for the students to meet. We also provide free beverages and snacks to keep the team fueled throughout the day.