ECE445 Senior design Proposal

--Air Quality Monitoring system based on sensor networks

I. Project Description

Even though we have lived about 4 years in Haining campus, we are still not used to some strange smell that we can sometimes smell out in campus, especially when it is in spring. So, we hope that we can build a real-time air quality monitoring system based on wireless sensors. We hope this system would cover the whole campus and show us the real-time air quality and pollutant data, by which we can inform students that they should not go to those areas with bad air quality. In the long run, we can make use of these continuous data to analyze the overall pattern of air quality in our campus.

II. Submodule

1. Self-designed air quality monitoring device:

This device is based on Arduino and integrated with WIFI module, GPS module and a lot other sensors. The sensors part have been integrated by some junior students, so we need to help to add the extra communication abilities to this device.

1. Data processing system based on machine learning:

It is too expensive to set up the monitoring device in every corner of our campus. So, we plan to set up a few devices in some major places in our campus and then use some signal processing and machine learning technique to develop a high resolution air quality map for the campus.

1. Server and Front-end interface:

We need to get a server to store data and a webpage interface for us to view the real-time air quality in different places of our campus.

III. What we will achieve:

We will develop an air quality monitoring as described above. Students can access our website to view the real-time air quality and the researchers can get the air data from our server.