**Monitoring Air Pollution using JKL**
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**Introduction:** Report Carbon Monoxide Levels over Los Angeles

Research Overview
- Carbon Monoxide Levels across Los Angeles
  - 5000 death certificate codes address carbon monoxide (CO) poisoning every year in the U.S.
  - Los Angeles is one of the most polluted cities in the United States
  - People can avoid areas where carbon monoxide levels may pose potential health risks
  - Create a map of the local carbon monoxide levels

Problem Description: Need an effective, reliable, and mobile way to collect the data

Proposed Solution: Compact sensor module that takes advantage of smart phone capabilities

We combine our JKL sensor with a GPS and WiFi enabled smart phone

- **Carbon Monoxide Sensor Module**
  - Electrochemical carbon monoxide sensor outputs current relative to CO level
  - Output of the sensor connects to BlueSentry’s analog to digital converter; readouts are sent via Bluetooth upon request

- **Windows Mobile Application**
  - Automatically connects to BlueSentry on launch
  - Collects CO levels from the sensor module location data from smart phone’s built in GPS.
  - Stores packets in SQLite database until data connection is available to backend server
  - Application runs in background and with zero user input required

Future Development
- Lower cost and power consumption
- Use more reliable CO sensor with heated circuit
- Spatial and temporal visualization of data

- **Backend Server**
  - Accepts TCP connections from multiple smart phones
  - Incoming packets stored in a permanent MySQL database on the backend server

- **Web Application**
  - Location based carbon monoxide data are displayed using the Google Maps API
  - Once additional data is available, processing will be done to enable display based on both spatial and temporal filters

**The Need for Effective Sampling**
- Reliable and Available Data
  - Precise and repeated values of carbon monoxide (CO) in parts per million (ppm)
  - Accurately reported on a map
  - Data available to the public without restrictions (both as a physical database and graphically via the map) in real time
  - Maintain high quality of sampling, transmission and storage process

**Mobile Data Collection**
- User Friendly Design
  - Must be easy to carry and easily deployable
  - Module and application should be user friendly interface and require minimal user interaction
  - Wireless communication between phone and sensor rather than a physical connection to the device
  - Data collection and storage should happen without user intervention

**Carbon Monoxide**
- CO is particularly important to monitor because it is odorless, colorless, and tasteless.
- Safe outdoor levels of CO are below 20 parts per million (ppm)
- JKL (Jones, Kouassi, Li)
  - JKL is a module consisting of a carbon monoxide sensor, and a BlueSentry (ADC and Bluetooth). It is designed to collect carbon monoxide levels and send them over Bluetooth to the phone.

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