

Intended User (Target User)

- Age: 16+ (or old enough to legally drive a vehicle)
- Tech Experience: Any
- Anyone who has a vehicle and smartphone
- Simple application interface and set and forget hardware



3

Interviewee

1. Interviewee A is a 28 years old, PhD student at TTU, experienced driver
2. Interviewee B is a someone (early 60s) on street who ran car and shut garage doors
3. Interviewee C is 25 years old a high school instructor in Dallas, experienced driver

4



Interview Questions

- Do you know anyone or have you ever had an experience with dangerous levels of carbon monoxide?
- Are you familiar with the circumstances that can lead to dangerous levels of carbon monoxide building up in the vicinity?
- If you were going to receive a life saving notification over your phone while driving, do you think that an audio and visual notification would be too distracting, and if so which do you believe would be more important?

5



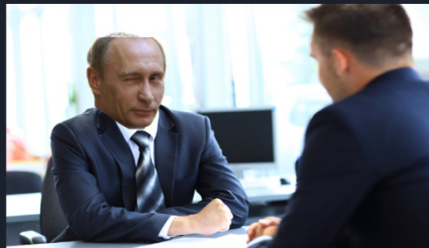
Interview Questions Cont.

- If you were in danger of carbon monoxide poisoning, keeping in mind that carbon monoxide poisoning is nearly undetectable and can severely limit your mental capacity, would you like a system that can notify emergency contacts and take steps to roll down windows/perform potentially life-saving maneuvers?
- If so, would you put effort into looking for a vehicle during your next purchase that has such a feature?
- Would you be interested in a feature whereby you could actively monitor the concentration of carbon monoxide in the air, or would you rather set and forget the system which would only notify you when the levels become dangerous?

6

Interview Response

- $\frac{2}{3}$ of interviewees knew someone who had experienced high levels of CO
- Visual warning preferred
- Agreed that it would be an important safety feature
- Would not be a deal breaker if the vehicle did not have the device
- Should be a set it and forget it device



7

Requirements

- The system must be able to detect carbon monoxide concentrations of at least 70 ppm
- The system must be able to trigger the electronic relays in the vehicle to roll down the windows
- The system must be able to transmit a signal to the user's phone informing the application via Bluetooth that the carbon monoxide concentration has crossed the predefined threshold
- The system must be able to audibly or visually alert the user that the carbon monoxide concentration has reached dangerous levels via the application on their smartphone

8

Requirements

- The user must be able to enter in at least one emergency contact number into the application on their smartphone
- The system must be able to acquire the user's current GPS from their smartphone
- The system must be able send a message indicating the user may be in need of assistance and containing the user's current GPS location plotted on a map to the user's emergency contact(s)
- The user must be able to cancel the automatic sending of a message to their emergency contact(s)

9

Changes to Hardware

1. Arduino Pro instead of Raspberry Pi.
2. Considering switching to RF Receiver/Transmitter Pair instead of Bluetooth.



10

Acquiring Hardware

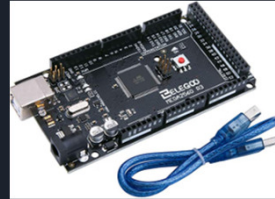
1. MQ-7

- Amazon: 2 Day Shipping, \$5.49 USD
- Sparkfun: 7-14 Day Shipping, \$7.25 USD



2. Arduino

- Arduino Pro 328, Sparkfun: 7-14 Day Shipping, \$15.95 USD
- Elegoo Mega 2560, Amazon: 2 Day Shipping, \$14.99 USD
- Elegoo Uno R3, Amazon: 2 Day Shipping, \$11.86 USD



3. Wireless Transmitter

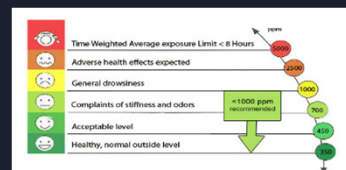
- HiLetGo RF Transmitter and Receiver, Amazon: 2 Day Shipping, \$4.69 USD
- UCEC XY-MK RF Transmitter and Receiver, Amazon: 2 Day Shipping, \$10.55 USD (5-Pack)



11

Existing Functions & New Functions

- Active monitoring of carbon monoxide levels in the vicinity, alerting if there are dangerous concentrations.
- Sending a push notification to either the user's phone or through the car systems in order to notify the user of the car.
- Rolling down the windows to prevent poisonings.
- Send location data from user's phone to emergency contacts / authorities



12



Existing Functions & New Functions

- Timeout requesting User Input before Sending Location / Alert Message to Authorities / Emergency Contacts
- Allow user to enter emergency contact information
- Allow user to view carbon monoxide poisoning information
- Allow user to view Poison Control Hotline contact information



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13



Questions?

14