STAYSAFE

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**Problem and Solution Overview**

Drivers are facing vandalism, robbery, physical assault, and other criminal threats everyday. It is unsafe for taxi and delivery drivers to drive around and do their job. Regular drivers can avoid the bad situation, but the delivery and taxi drivers are most of the time, bound to drive to the these bad places because of their job. Our original idea was to stay away from the crimes and criminal problems, but after researching and performing contextual inquiry, we are proposing our solutions to keep these drivers aware of the situation and help them out if they find themselves in dangerous situations. Our proposed solution help them find the criminal history of their destination, the numbers of people(suspects) that are around or near the exact destination, and the help they need when they are caught in bad situations. This will help them to be aware of the place and the situation they are going to be in, and find help in a most convenient way when they really are in trouble.

**Related Work**

Since taxi and delivery drivers sometimes are faced with going to dangerous areas, we decided to have a focus on a Panic feature, infrared vision of the area to see if there are people nearby, as well as crime rates of the area so that users can be aware of the dangers in that area.

There are many phone applications and electronic devices that can be activated to alert family or police that the user is in danger. Some devices take this a step forward and have include GPS which can show where a person is going. For example, the “Spark Nano 3.0” has “real time gps enabled tracking” and lets others track where the user is [1]. If a taxi driver is out on the road and is robbed or shot, emergency crews could have a hard time finding them. With real time gps tracking, it would be much easier to find a wounded taxi driver.

![Map of San Francisco](image)

The company Skyhook is developing a device that has a heat map telling how densely populated a certain area is at any hour of any day [2]. This technology would be useful to taxi drivers and delivery drivers because it could show if an area is full of people, and could prepare the user to be cautious or avoid the area if it seems questionable.

Virginia Tech is presenting a device which has “a novel convergence of Internet crowd sourcing and portable smart devices to enable real time, location based crime incident searching and reporting” [4]. This device, named CROWDSAFE, includes features such as a safety router and crime analytics. The safety router would be able to show the safest route to the destination and the crime analytics would show the statistics of the crime in the area. Figure [5] shows a graphic of what the CROWDSAFE safety router looks like. The user can select a safer route by pressing SAFE until its very safe, or a faster route by pressing FAST until its the fastest.

![Image of CROWDSAFE safety router]

Microsoft has also recently patented a technology to help keep pedestrians safe which will be incorporated into Bing Maps [6]. It is a location based service that calculates the “pedestrian route production” which allows the user to take paths that take them to their destination in a quick amount of time. It also keeps the user relatively safe. The algorithm uses crime statistics to make the directions where crime indices are below a certain threshold.

![Image of pedestrian route production]

[5]
**Contextual Inquiry Participants**

**Berihun (Taxi Driver)**
The rationale behind doing a contextual inquiry on a taxi driver was to get a different point of view about safety concerns while driving. By doing this sort of inquiry we could also acquire ideas about features that could potentially be implemented in our initial interface designs. The first taxi driver we interviewed was Berihun, an Ethiopian immigrant who works for Regency Taxi. The environment where we observed his practice was at the Glenmont metro taxi stand where he goes to find customers. Our role as an apprentice was to tap into his everyday reality by asking as many questions we could to try to obtain such insight.

**Ali (Taxi Driver)**
The purpose of doing this contextual inquiry on a taxi driver was to know actual problems about crimes while they are on job. Another person we interviewed was from Pakistan who mostly works in Bethesda and Silver Spring. This person works only on daytime so he never faced any trouble other than passengers getting away without paying, but he mentioned that he would reject customer if the area was not safe. He suggested to have a panic button on a key chain and someone should track his taxi to save him from dangerous situations. Barwood and Orange Cab have this feature. This solution about safety recommended us to have a panic feature on our device so it will call public safety officers directly whenever needed.

**Bob (Delivery Driver)**
I chose to interview Bob, a friend who has been a pizza delivery driver in New York for about a year. I thought he would be good to interview because he’s had experience having to deliver in bad areas as well as contacts with other people who have experiences in the same area.

**Anit (Delivery/Taxi Driver)**
The participant I choose to interview has a long history of pizza/taxi driving. His name is Anit. I used to be a pizza driver, and we worked together, so I feel comfortable to talk with about the issue. As in the contextual inquiry paper, maintaining the original relationship during the interview is also easy with Anit. So, I felt him to be best fit for the interview. Since I personally had work experience of more than 2 years of delivery driving, I interviewed him in his own house, but I could relate each of his ideas in the work place as if I were working there. As an apprentice, I think I had a good experience of delivery driving. I was able to map down all of our conversation to the real world experience. In fact, I didn’t feel I had to go to the workplace for the inquiry, because it is the same place I used to work earlier.
Contextual Inquiry Results

A common high level task for both taxi and delivery drivers was to go from point A to point B safely no matter who the client was or where the destination was. Something unique I felt from this interview was that the driver was concerned about the safety devices currently made available to him by the company, which were none. He mentioned that other companies such as Orange Cab have a panic button on the left side of the dashboard panel that the driver can activate in case of an emergency or attack. The panic button would contact his company and they in turn would contact the police providing location and other relevant information given by the GPS tracking device installed on the vehicle. He also shared an experience in which he was robbed and the attacker had a gun behind his neck, threatening him to give him the money. We further analyzed that in this case, if he were to have some kind panic button, it would not be appropriate for this situation, since the attacker could potentially pull the trigger. We therefore concluded that some sort of voice activated feature must be included in our interface design, which could be preset by the user that in case of an emergency the user would call out the preset pass phrase but would not alarm the attacker.

What was learned from the contextual interview with Bob the delivery driver, was that a GPS device with crime reports could very beneficial even though he never faced any threatening dangers while delivering. He mentioned how people he worked with had problems with people ordering food but then grabbing it from the driver and running without paying, but didn’t know of anyone being held-up. He particularly wasn’t interested in a crime reports incorporated into a device, because even if someone in a bad neighborhood placed an order, he would still have to deliver there. However, an Panic feature would be more helpful if he ever came into an unavoidable dangerous situation. This focused our device more into having a useful panic feature so police can quickly be dispatched and find the victim.

During the interviews, we also realized one situation when these guys are really in need of help. They have to go through this nasty process of identifying themselves and locating them before they get help from the police. Besides, we could use the GPS to locate exactly where the user is located, and help user to respond to emergency button so that the authorities can reach into the exact location without any delay. One example that I can map into the participant’s situation was when he was delivering food and one guy robbed his phone and ran away. He followed him, caught up, and called the police. The robber escaped again, and the victim again caught him but he fled away. While he called 911, he has to authenticate and locate his position before he could get help. The problem he was facing there was to handle the robber as well as trying to describe to police where he was located. He was also looking for the same kind of panic feature that was described earlier.

One more problem we found out from the inquiry was knowing about how many people are located in the delivery areas. The company warned drivers to analyze the situation before the
drivers go to the location. This task is one more problem we are proposing a solution for. An infrared camera that can locate the number of people that are situated in an exact location will help the drivers be aware of the situation and tackle the problem with caution.

**Analysis of existing and new tasks**

After the contextual inquiries, we did receive good feedback for our tasks. Our original idea was to have, first and foremost, a feature for a GPS device that would include crime statistics for taxi and delivery drivers. This feature would show the user where crimes have been committed and would give them the ability to stay clear of those areas and avoid any bad situation.

However, during the interviews, we discovered that taxi drivers and delivery drivers did not really need to have crime reports. If a delivery driver had to deliver food to a bad neighborhood, they would not be able to avoid it. Same with taxi-drivers, they might avoid a bad neighborhood if they were picking someone up, but they couldn’t easily drop a customer off in the wrong place. Or they could pick up a dangerous person in a good area, and get robbed on the way to another good area. As a part of their job, they have to be into that bad areas anyway. But knowing crime statistic about the place they are going to be, will help them be aware of the place.

So the first task we will be handling now is to help them be aware of the bad places. We will use the crime statistics to make users aware of the situation. Our proposed solution will be able to populate the map with the crime flag, so that looking at the crime map, drivers can know where the bad areas and where the good areas are. Also, drivers can be more specific about the certain area. They can enter the specific areas they want the detailed crime report of, and that way they can be real aware of the situation. Most of the time, as we come to know from the interview, drivers, specially pizza drivers, tend to call the customer to the vehicles rather than walking to the door, when the area is real bad. So, if the drivers can know the crime statistics for the place they are going, they can follow the guidelines that they felt will be safe for them. This will help them be aware of the places and avoid the bad situation as much as they can.

Our second idea was to include a Panic feature that would notify the police about the crime/danger situation. It would basically send an alert to the public safety officer when a person activates the feature. One implementation of this would be to have a special button the user could press. However, one of the people we inquired was in the a position where he had a gun pointed to his head. In this situation, he might not be able to reach up and press a physical button on his GPS, or else the gunman might think he wanted to react and aggravate the situation.

So, the second task we will be considering in our design is to make it easier for users to find help during crisis situations as mentioned above. So, on top of the Panic feature, we decided to add voice activated feature to obtain that task. Lets say a driver is dragged away from the car and the
physical device and can’t reach to the panic button, he can shout for help and the device will recognize the voice and triggers the panic feature. So, here we are giving user a flexibility during the real bad situation. The voice could be set up by the user as they want to be. It could be anything that is helpful for the user to shout during the worst situation. This proposed solution will help the user to get help in the real bad situation and get rid of nasty authentication and locating the user when calling 911.

We also thought about friends/family tracking the device via social network so in dangerous situations they get a notification and call public safety officer. But after interviewing different people we decided to directly alert police and not to involve friends/family members.

The third task we came up with after the interview was finding the people around a certain perimeter. After the interview, we came to know that drivers want to know how many people are in the place where they are going to drop off the food or a person. One of the participant in the inquiry, Anit, wanted to find out a way to figure out how many people are there in the place he is delivering the food. There could be people trying to rob him. Most of the times, as from the interview, people falsify their orders or address and make a trap to rob the drivers. In this kind of situation, either there are group of peoples waiting for the drivers in the designated location or hiding somewhere waiting for the driver to arrive. What Anit is looking for, is to find a way to figure out how many people are there in the designated place without actually going into that exact place.

From other interviews and from the discussion, we came to know that drivers are facing the same problems a lot of times. For this particular task, we came to a solution with infrared vision. Infrared vision can be defined as the capability of biological or artificial systems to detect infrared radiation [7]. With an infrared camera, we would be able to find people who are around a certain area. With the use of an infrared camera, a user can specify the area where he want to see how many people are located at the exact destination. If the camera shows a bunch of people around or in the exact destination, drivers can take appropriate steps to avoid the bad situation. This solution will help users stay away from the dangerous people, and help drivers stay away of the bad situation like in the case of false calls with wrong address.

After holding the contextual inquiries, we found that our original design would not suffice as far as safety features for delivery and taxi drivers. We therefore want to implement the Panic feature in case one enters a crisis situation, while the infrared camera a crime reports are preventive tools to help keep our users from entering a dangerous situation in the first place.
**Sketches of Design**

Yell "Help" or press HELP button to alert police.

Silently press the help button or yell "HELP" if user is incapacitated.

Activate the heatmap when near the destination to see how many people are around.

Crimes will show up on the map and the user can choose between a fast route or a safe route by touching the button on the screen.
3 in 1

destination

people

Crime alert.

Shortest route
but alert.
Crime

Taxi driver.

Safest alternate route suggestion.
"HELP!!"

"HELP"

"HELP is on the Way"

"Calling 911"

"Safe path"

"Taxi"

"Police con."
STAY SAFE

Heatmap

HOME

STAY SAFE

Heatmap

MAP

Crime

HELP

Circle radius

Please input the valid range

BACK HOME
References