

No One Left Behind

by

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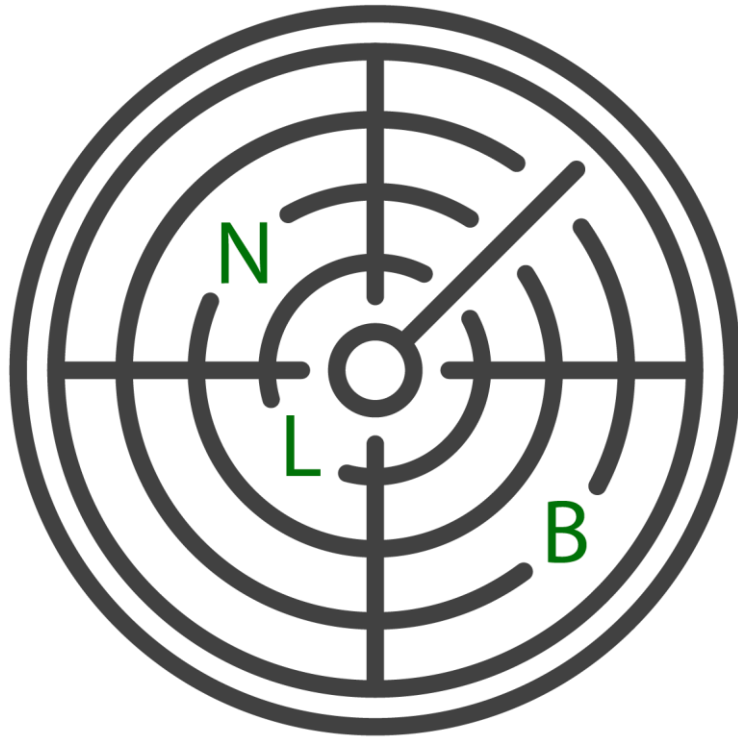
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Acronyms and Abbreviations

UI - User Interface

NLB - No One Left Behind

QR Code – Quick Response Code

Abstract

Over 200 million 911 calls are made every year¹. For first responders and dispatchers fast flowing information and communication during an ever-changing emergency is crucial to saving lives. No One Left Behind has focused on improving emergency response by managing and presenting data to 9-1-1 dispatchers and has improved upon the existing process of dispatching. Currently, the standard way of first responders receiving information is through a slow relay over radio between dispatcher and first responder. With No One Left Behind we improved communication, enhance situational awareness, and better crisis remediation through our easy to use UI. NLB is designed to utilize user's smartphones for a quicker yet more accurate and detailed description of what is happening. Furthermore, NLB was built to improve upon 'Areas of Refuge' that currently lack in assisting the disabled. Our UI has been tailored for quick and easy use by both dispatchers and users.

Introduction

Problem

According to the National Emergency Number Association an estimated 240 million calls are made to 911 and emergency services in the U.S. each year. 80% or more are made from wireless devices². Many calls in an emergency situation may overlap and flood a local dispatching office, giving the same information over and over again and high call volume can delay and slow down getting new information. Accounting of people can prove to be tedious and labored most often times recording who has made it out of an emergency by simply writing down names. According to our research, there is no current application on the market that allows for a crowdsourcing of information during a large emergency situation. No matter the size or severity of the emergency, it is crucial dispatchers receive fast and effective information to better respond to an emergency.

In our research we have found that people with disabilities are disproportionately affected in emergencies and experience particularly high rates of mortality in these contexts. Particularly those who are immobile or wheelchair bound. Currently, most 'Areas of Rescue' only contain a push-to-talk phone to a dispatcher³. Dispatchers have no other means of contact with those in the Area of Rescue other than what is relayed to them by the dispatcher. We currently view that these Areas of Rescue can be improved upon and save more lives.

Solution

No One Left Behind's goal is to streamline and digest high volumes of information during an emergency crisis and have an easy to use UI so that anyone can make 9-1-1 requests. No One Left Behind is most effective in large gatherings of people where a crisis may occur. In

an event such as a fire, flood, or active shooter dispatchers can pull massive amounts of user sourced data into a concise and real-time description of events unfolding and better assist those who are still in need of first responders. No One Left Behind will include various features such as QR codes in Areas of Rescue to quickly identify location and allow users to fill out quick and vital information that first responders often need for helping disabled users in need of rescue. Databasing victims who have responded as safe will allow for quick and easy search of those who may still be missing during an emergency. No One Left Behind must also be an easy to use interface and meet the varying needs of both victims and dispatcher.

Project Objective/Deliverables

Develop a web application that will allow those in emergency situations the ability to create a quick and efficient way of communicating specific information to dispatchers. No One Left Behind will use a variety of features to accomplish this goal and be easy to use for people of all ages. We will strive to have a UI that is focused around efficient and effective communication.

The features of No One Left Behind will include:

- QR code accessible ‘waypoints’
- Be able to input information and generate new QR codes for the app to use
- Uncumbersome UI
- Communication to dispatchers will be based off the feedback we receive from them.
- No One Left Behind will be database the status of users’ during a crisis for dispatchers

- Have a way of receiving feedback from both users, dispatchers, and first responders to constantly improve the effectiveness and efficiency of the app.

Together, and in time, these features may change to better accommodate the needs of the consumer but the main goal of No One Left Behind will remain the same (including being free).

Project Source

No One Left Behind's creation came through our desire to help those affected by terrible disasters and situations. With recent catastrophes such as hurricane Dorian and the mass shooting in Dayton, OH we feel our app is needed more than ever. No One Left Behind was our idea that we felt would benefit the most amount of people and still survive in the competitive market as we felt this is a niche that has not yet been filled. We also feel that there is much growth to be had with No One Left Behind and could become the first step in utilizing mass cell phone ownership into efficient emergency response. Currently, other market competitors include Rave Guardian and Life360. Our product looks to compete and out rank these competitors by being free (which the others are not) and by providing real time updates. Competitors we have found simply do not allow mass use of their app in one specific event, but rather focus on the safety of an individual or family group.

Overview

The remainder of this report outlines in detail how No One Left Behind was completed. It will include the uses of various technologies, coding languages, design implementation, and testing amongst other things. The following pages are meant to delineate and expose the inner

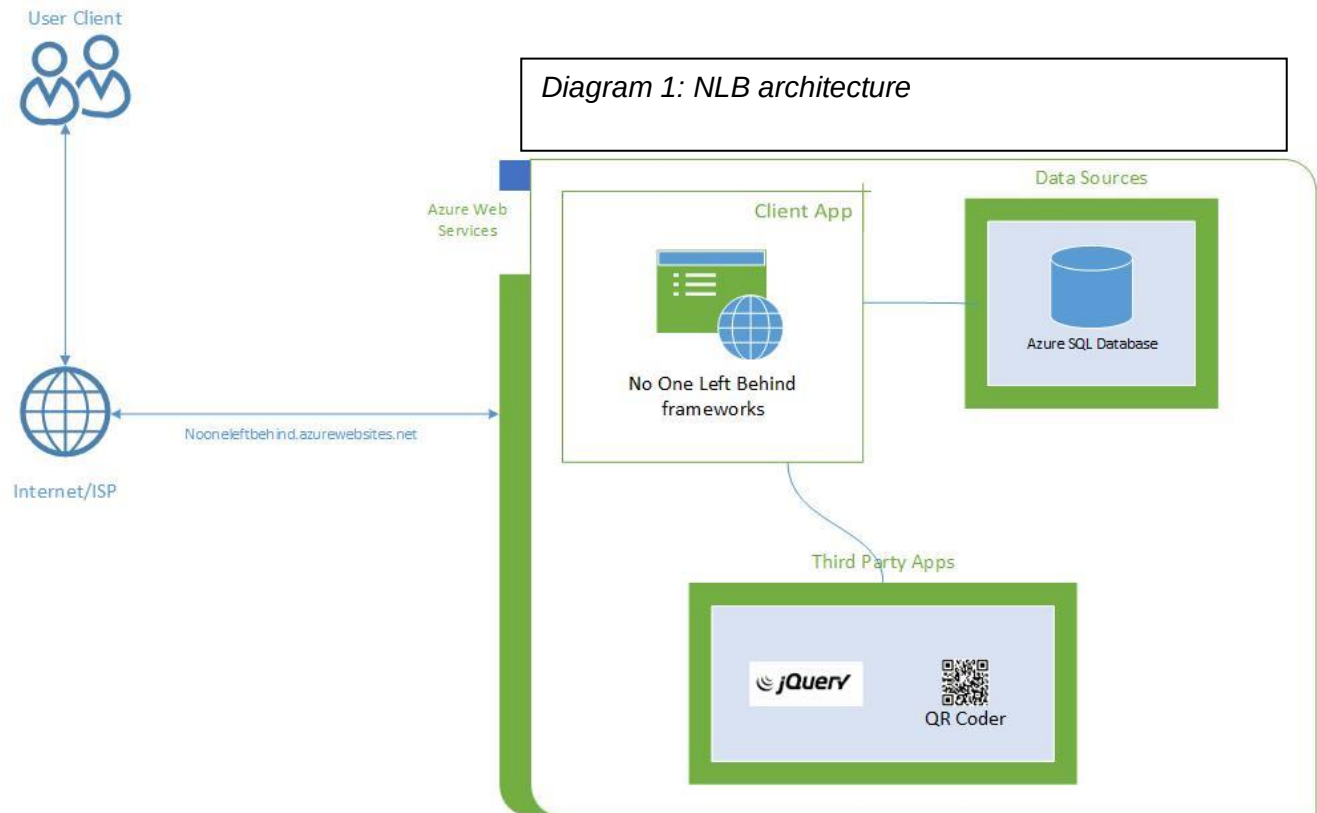
workings of No One Left Behind and give the reader an inside and technical look at how our app was created and operates.

Technical Elements

Design Methodology and Technical Approach

The primary objective of this project is to deliver a simple to use application that allows users to quickly and effectively communicate lifesaving information to dispatchers. To accomplish this goal, we first set out to implement an environment suitable for building and hosting No One Left Behind and all its expected deliverables. Naturally, projects of this scale undergo removal of initial goals that must be abandoned. We initially wanted to scale NLB all the way into first responder's vehicles, but this proved to be difficult and moot because dispatcher, as we came to learn, shorthand information for first responders in a very unique way. To accomplish storing user submitted data, we selected to use Microsoft Azure hosting. With an SQL framework this allows us to store data in a way that is cost-efficient and resizable. The fast performance and high availability of Azure was also key and allowed us to be confident in the uptime and usability of our application. We also selected Azure to deploy and host No One Left Behind. Naturally, this was a prime choice for us to use in the development of our app because of its integration capabilities with our database also being hosted by Azure. Along with this, Azure has inhouse security capabilities that allow us to leverage different security controls very easily. This includes encryption, monitoring, and release management. To get a better understanding of the architecture of NLB, please refer to *Diagram 1*, on the next page. It is important to note Azure also supports .NET, which is used as our framework. While .NET is a very popular

framework to use this was something that had to be guaranteed. Unsurprisingly, a project of this scales undergoes many goals that have to be dropped due to various constraints.



User Profile

On the following page, *Table 1: User Profile* illustrates the human interaction experience for No One Left Behind. It denotes potential users of the application, related experience and similar applications that the user may encounter, along with tasks that we expect the user to complete when using No One Left Behind. The UI is particularly important to the user of No One Left Behind given the purpose of our app. Time and ease of use was a serious concern during our development.

Table 1: User Profile

User Profile (Individuals): The individual is a user of No One Left Behind that is using the app in response to an emergency. They are the ones that fill out the information forms that will be viewed by dispatchers and send appropriate first responders to their location.

Table 1: User Profile

User Profile: Individuals
Project: No One Left Behind
Potential Users: -Individuals involved in an emergency
Software, Interface, and Related Experience: This project will be primarily targeted at individuals involved in an emergency or crisis and the 9-1-1 dispatchers involved. The app will be designed in such a way that it is very easy to use in high stress situations for both adept and non-adept technology users. The individuals will only have to point their phone's camera at a QR code and open the app/webpage. There will be a simple form to fill out that will be routed to the dispatchers with all the relevant data. The app will be able to submit emergency requests without QR codes as well by filling out more of the form.
Experience with similar applications. Most individuals today have had some kind of experience using QR codes on their phones. This part of the process is even easier now that most of the cameras on smart phones can read QR codes natively, rather than relying on a third-party app.

Task Experience:

Most individuals are aware of QR codes as how often they are used in advertising and filling out web forms.

Frequency of Use:

The use of the project would be anytime someone (a user) is in an emergency and needs to get their information and status to 9-1-1 dispatchers.

User Profile (Dispatchers): Dispatchers are users of No One Left Behind that are actively responding to an emergency crisis. They will be able to view the web forms submitted by the individual user.

User Profile: Dispatchers
Project: No One Left Behind
Potential Users: -Dispatchers in remediating an emergency
Software, Interface, and Related Experience: This project will be primarily targeted at individuals involved in an emergency or crisis and the dispatchers arriving on the scene. The app will be designed in such a way that it is very easy to use in high stress situations for both adept and non-adept technology users. The dispatchers will only have to access the webpage/app that hosts the user submitted data forms. It will be as simple as reading the results of a webpage. This will allow for a

streamlined and easy to use interface and experience. This is pinnacle to allow dispatchers time to focus on the many other aspects of responding to a call.

Experience with similar applications.

Most dispatchers today have had some kind of interaction with text based webpages and simple web forms.

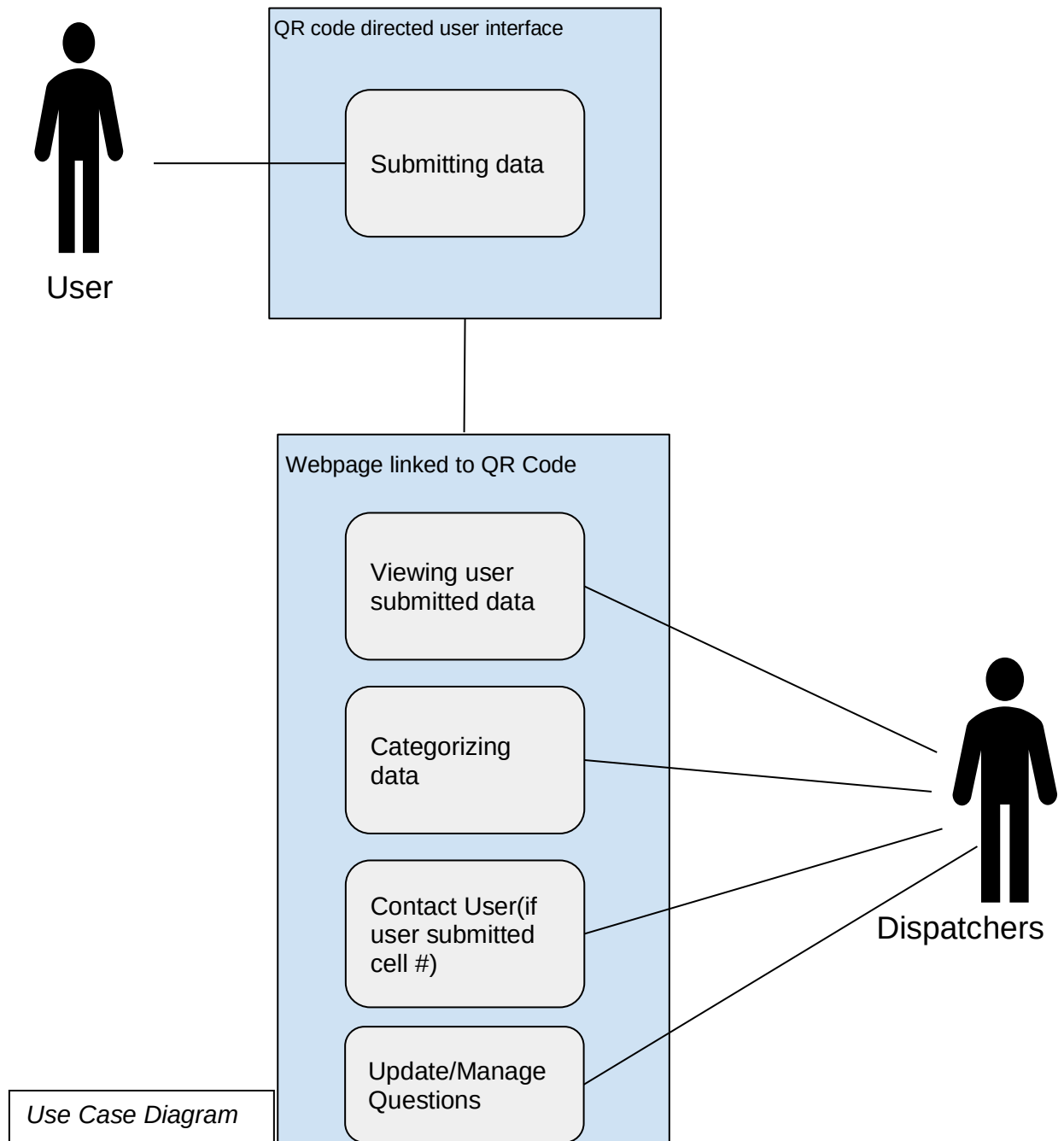
Task Experience:

Most first responder users are aware of QR codes as how often they are used in advertising and filling out web forms.

Frequency of Use:

Dispatchers would use the app whenever they are sending the appropriate first responders to an emergency location.

Use Case Diagram



The diagram on the next page (pg. 9), *Figure 1: Use Case Diagram*, displays the use case for No One Left Behind. It depicts all users along with the corresponding task each user will have access to interact with when using the application. Use case diagrams are useful in mapping

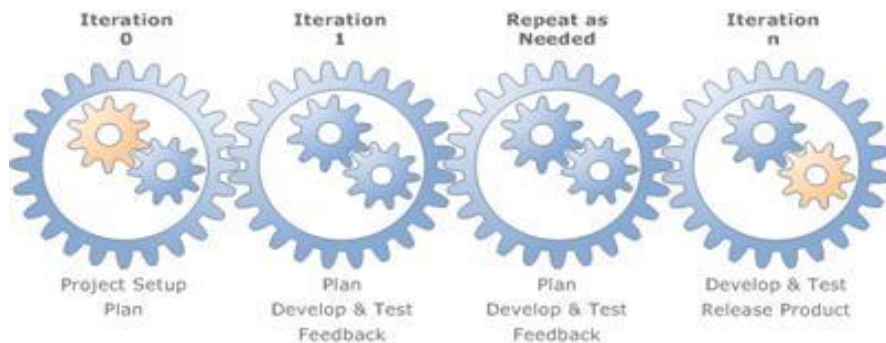
out the dynamic behavior and functionality of a system using models with sets of actions or functions that can be performed.

Figure 1: Use Case diagram

Testing and Feedback

Overview and Methodology

For our testing methodology, we primarily focused on implementing the iterative development process. This approach was chosen as our overall testing strategy as it is the most advantageous to No One Left Behind given how dependent and imperative ease of use is for the user. Our UI strives to be simple and intuitive and this testing approach allows each iteration of our web app to be thoroughly tested and enhanced to ensure a seamless and bug-less user experience.



With iterative development we can break No One Left Behind into smaller pieces that can be more flexible and adapt to changes in features, graphics, etc. This also allows us to take advantage of what has been learned during any testing of other aspects of our web app.

Scope of Testing

No One Left Behind (NLB) is in a distinct position where all demographics can benefit from our app. This is to say that anyone can find themselves in an emergency situation where NLB can be utilized. As such, we test and develop NLB to be used by the young and old, the technological literate and illiterate, and everyone in-between. Other groups such as developers and UI designers can benefit from this section for an in-depth look at how we maximized UI design for natural and impulsive decision making from the end user within NLB.

Not only do we need an easy-to-use and intuitive app, we need one that is solid in its code and works bug-free when users need it the most. Naturally, our scope of testing also includes assessing the reliability and functionality of all features that have been included thus far in our app. Since users would be utilizing our app as a substitute to 9-1-1 we want to have extreme consistency.

Objectives

The primary goal of testing is to evaluate the app's compliance with specified needs that we as a team have established. It is important to note that acceptance testing is a natural part of an app's development and some bugs may even be deemed as acceptable for initial testing with the user. In each phase of testing, features, UI, and overall functionality of NLB will be tested.

Testing Procedures

The following will be established to begin testing NLB and its features.

- Pass/Fail conditions. Either acceptable or unacceptable results.
- Create a table to record all test attempts and notable results

General overview of the tests performed will be:

- **Launching Tests:** These tests will determine if NLB can adequately be loaded for users on iOS and Android.
- **Stability Tests:** Establish how long the application can run without performance or other degrading issues.
- **User Interface Tests:** As previously stated, due to the nature of our app, the data we obtain from these tests are crucial. This will be the most extensive testing.
- **Functionality Test:** Each element of our app will be tested to make sure they work in conjunction smoothly with other elements of our app and are working the way they are designed to.

System Testing

Launch Tests

The launch test is conducted using both Android and iOS software. Both operating systems are being hosted on physical smartphones. Specifically, the iPhone 6 and iPhone 7, with Android OS being hosted on a Galaxy Note10. The purpose of this test is to primarily determine the overall reliability of the app launching to a useable state for the user. Other metrics such as time-to-load will be looked at and tracked. Each OS will be launch tested 25 times and given a PASS/FAIL grade along with how long it takes (in seconds) to fully load. The questions asked in this scenario are:

- 1. Will the application successfully load after multiple launches back to back (25 times with 5 second intervals in between launches)?**
- 2. Did any crashes or failures to load occur?**

In *Table 4*, the results from the above questions are answered and the overall results are displayed. Any notable errors were recorded in the results section.

Table 2: Launch tests

OS	Times Tested	Times Successful	Results
Android 10	25	25	PASS
iOS 11 (iPhone 6)	25	25	PASS
iOS 13 (iPhone 7)	25	25	PASS

These results were very pleasing yet expected. Azure is a very fast and reliable web host and we are happy with the results.

Stability Tests

The Stability Test is designed to see how stable the code and NLB is overall in varying scenarios. These tests do not necessarily test the limits of the app but test for extreme parameters that a user can *realistically* impose upon NLB. The objective of the following tests is to answer the following questions:

1. **Is there any slowdown to the app when a user uses any of the features of NLB?**
2. **Is there any performance degradation that can be found?**
3. **Given that many users may utilize NLB at the same time due to a crisis scenario, can NLB handle the increased traffic load?**

In *Table 5*, the questions are answered by using the following criteria:

- **Hours Tested**
- **Pass / Fail Conditions**
 - Green check or Red mark

- **Crashes**
 - This includes tracking if any individuals features affect a crash.
- **Slowdown**
 - Record average time needed for certain features; anomalies will be noted.

Table 3: Stability Tests

Stability Test	Times Tested	Crashes	Slowdown	Pass / Fail Conditions
Submitting requests	Once per minute for 15 minutes.	0	None	PASS
Graphical UI interaction	Consistently for 5 minutes.	0	None	PASS
Dispatch login	Once per minute for 15 minutes.	0	None	PASS
QR Code Generator	Once per minute for 15 minutes.	0	None	PASS
Dispatch View map	Once every 5 seconds for 10 minutes.	0	None	PASS
User map location update	Once every 10 seconds for 5 minutes.	0	Very minimal (possibly due to phone bandwidth)	PASS

*Given the nature of our app we do not expect real word use times to exceed 5 minutes.

Overall, we are very please but expected results like this given how light weight our app is and how powerful Azure hosting is. The load demand is minimal and many modern phones can easily handle the requests of No One Left Behind.

User Interface Tests

The following user interface tests check to see how the user and NLB interact, in particular the use of input elements. UI is especially important to NLB as those who use our app in most cases are expected to be in a high stress environment. Stressful environments are known to effect mental and decision-making performance⁴. While it is hard and unethical for us to emulate a stressful environment while testing, we have asked beta testers to imagine a scenario such as a fire or flood (sans QR code generating testing). With this in mind we strive for NLB's UI to be as intuitive and out-of-the-box comprehensible as possible. Naturally, this is the most extensive testing area we conduct for NLB. Three age groups with *no familiarity* of NLB will be tested to ensure everyone can make the most out of our user interface and baselines will be established to compare this test date. Two adolescents, two adults, and two seniors will be asked to perform tasks within NLB and their results averaged below. The baseline is defined as what we believe an average adult user of NLB can accomplish within a given timeframe. For example, it takes 7 seconds for the average adult user to pick their emergency situation graphic. All tests are completed on iOS and it should be noted the UI will look the same for all devices. *Table 6*, on the next page provides numerical and pass and fail data on the previous test groups and parameters described.

Table 4: UI Tests

		Completion Time			
Task	NLB performance issues?	Adolescents	Adults	Seniors	Baseline
Request Information	None	45s	51s	1m 15s	50s
Fill out Contact Information	None	12s	10s	15s	13s

QR Code Generator	None	11s	10s	16s	14s
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*It is important to note that times are fairly dependent on length of user name and location.

Likewise, we want to also test for users who may check out the app before they actually need to use it in a real-life scenario. For this UI test, the same groups of users were again asked to pretend they were in an emergency situation (thought of before launching the app) and asked to complete the same tasks after being exposed to the UI. The results in *Table 7*, below represent these findings.

Table 5: UI Testing pt. 2

Completion Time					
Task	NLB performance issues?	Adolescents	Adults	Seniors	Baseline
Request Information	None	38s	40s	1m 5s	30s
Fill out Contact Information	None	10s	10s	17s	11s
QR Code Generator	None	9s	11s	14s	14s

The results of this UI testing allowed us to make some critical changes to improve our UI. Most notably the size of drag bubble icons and more concise language throughout the request. It should be noted that average typing time and the length of user data (such as name and address) is a huge contributing factor to completion time. Some of the most valuable data we obtained was watching the users complete the test and receiving feedback and overall sentiment from them.

Functionality Test

The purpose of a functionality tests is to focus on the features of No One Left Behind. This includes things such as the QR Code Generator, Dispatch View receiving reports, Map API functionality, and other miscellaneous features offered by NLB. Both OS's were tested on.

Questions asked in this scenario include:

- 1. Does location information auto-populate?**
- 2. Does dispatch view properly display user submitted information?**
- 3. Do all graphical interfaces work as intended?**
- 4. Can NLB call the camera to natively scan QR codes?**

Table 6: PASS/FAIL displays our current testing scenarios and their respective PASS/FAIL grade.

Functionality	PASS/FAIL (ATTEMPT 1)	PASS/FAIL (ATTEMPT 2)	PASS/FAIL (ATTEMPT 3)
Location auto-generation	PASS	PASS	PASS
Dispatch View properly displayed	PASS	PASS	PASS
All graphical interfaces work as intended	PASS	PASS	PASS
Camera call and QR code reading	PASS	PASS	PASS

We were very please with the results of our testing and didn't see any failures. QR code reading by both OS software natively within their camera app was surprisingly fast.

Location auto-generation was fast and accurate thanks to Google Maps API and all other graphics and views were displayed properly and how we wanted them.

User Testing Sentiment

As with the testing and development of any application we want to obtain the general opinion and attitude of NLB. For this we have asked general questions and logged the results to better tailor our app to the needs and wants of the user base. Below in *Table 7: User Sentiment*, the questions and their respective answers are presented. These questions were randomly asked from our pool of testers.

<i>How do you feel about NLB and its would-be effectiveness in an emergency situation?</i>	"I would use it in situations I need to be quiet or where I don't know where I am. For sure."
	"I like it and would use it, for a very dire situation I think I would like to talk to someone. Maybe I'm just old fashioned."
	"I think it would be very effective, especially if you knew how to use it beforehand."
<i>Can you summarize what NLB is in one or two sentences?</i>	"A substitute to 9-1-1 with extra features."
	"Another way to keep safe and be prepared."
	"I would say it's a good alternative to calling 9-1-1 but not really a replacement."
<i>If you found yourself in an emergency situation would you use NLB before 9-1-1?</i>	"I would call 9-1-1 but that's because I'm an old timer."
	"It's hard to say in an emergency situation as my brain automatically thinks, 'Call 9-1-1!'"

“Yes, I would use it.”

Would you recommend NLB QR Codes as an addition to ‘Areas of Rescue’?	“Yes! I think it was a brilliant idea and so fast too.”
	“I would, I can see businesses and schools adapting something like this.”
	“Yeah, I think they add in an extra layer of safety to ‘Areas of Rescue’.”

Overall, we were pleased with the responses. We overlooked the fact that many may automatically think ‘call 9-1-1’ over ‘Open No One Left Behind’ but as technology becomes more ingrained in our lives, we believe that may change. Represented in *Figure 2: UI Pictures* is NLB’s current UI configuration and iteration sourced directly from an iPhone.

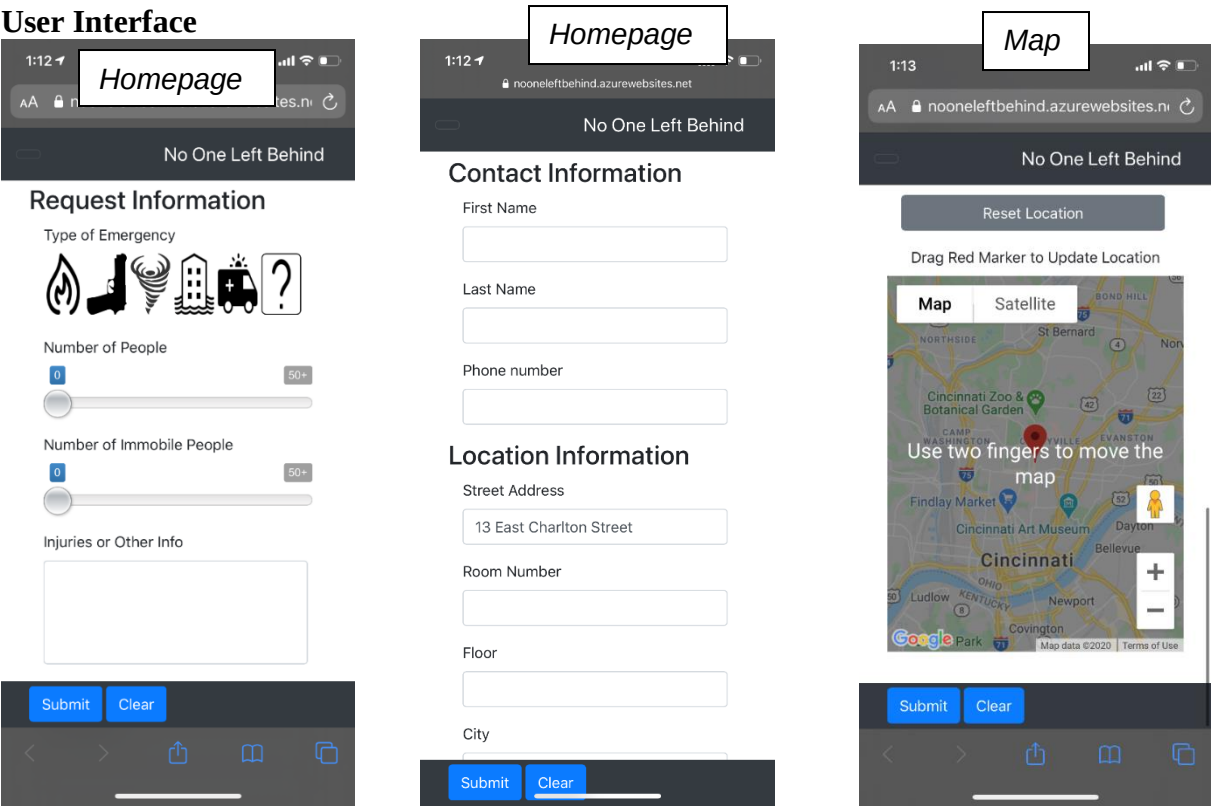
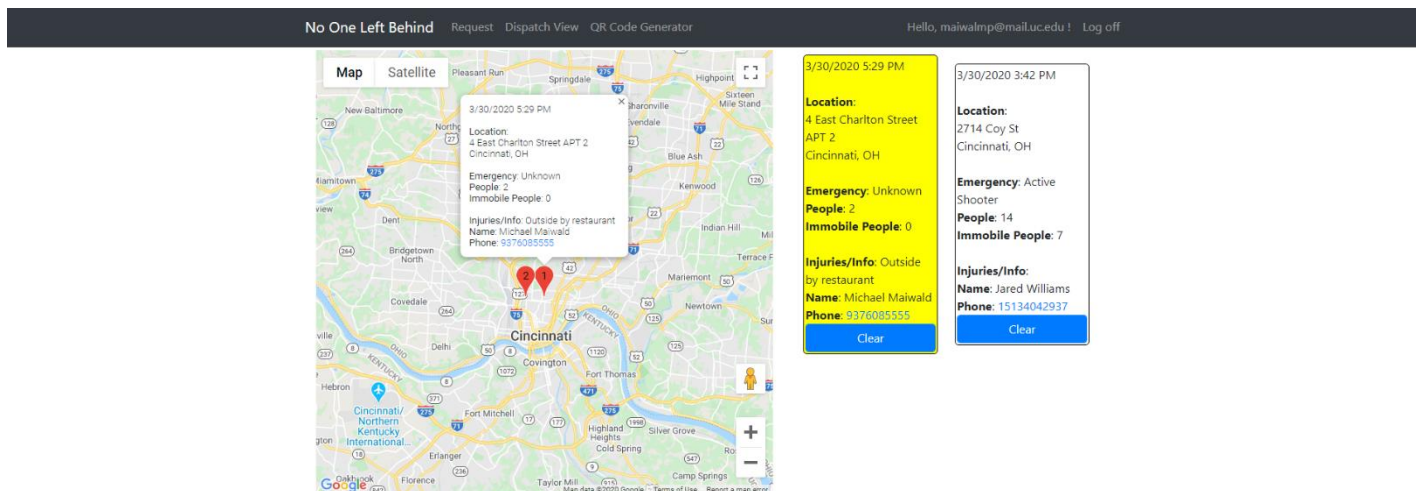


Figure 2: UI Pictures

As stated previously, user interface is of the upmost importance to No One Left Behind. Previous text-based questions have been replaced by an easy-to-understand graphical interface with buttons and clickable images. The ‘Dispatch View’ below in *Figure 5: Dispatch View* is what a dispatcher for a local city municipality would see from incoming requests for emergency personnel. In development, it was crucial for this page to have all the information a dispatcher may need and in an easy-to-read format.

Figure 3: Dispatch View



Note: Any good developer knows that UI is an ever changing and evolving aspect of their application. These pictures are the current release that will be presented at IT Expo. These may change overtime.

Project Management

Budget

Below *Table 8: Budget* outlines our budget for the development of No One Left Behind. While done in the pursuit of completing Senior Design for University of Cincinnati, this is a good representation of what the real-world cost would be.

Table 8: Budget

No.	Item	Unit Count	Unit Price	Line Item Total	
Programming					
1P	Developer Labor	180 hours	\$30/hr	\$	5,400.00
Software					
1S	Microsoft Office	3 Licenses	\$ 69.99	\$	209.97
2S	Microsoft Visual Studio	3 Licenses	\$ 165.28	\$	495.84
3S	GitHub Repo.	3 Accounts	\$ -	\$	-
4S	Azure Free Hosting	1 Account	\$ -	\$	-
General Labor and Documentation					
1L	Project report documentation	20 hours	\$30/hr	\$	600.00
2L	Beta testing (6 people)	10 hours	\$10/hr	\$	100.00
General Supplies					
1G	Office/Planning supplies	1 Time Fee	\$25	\$	25.00
				\$	6,830.81

Below and on Page 24 in both Figure 4: 2019 Fall Semester Gantt Chart and Figure 5: 2020 Gantt Chart displayed is our schedule for developing NLB.

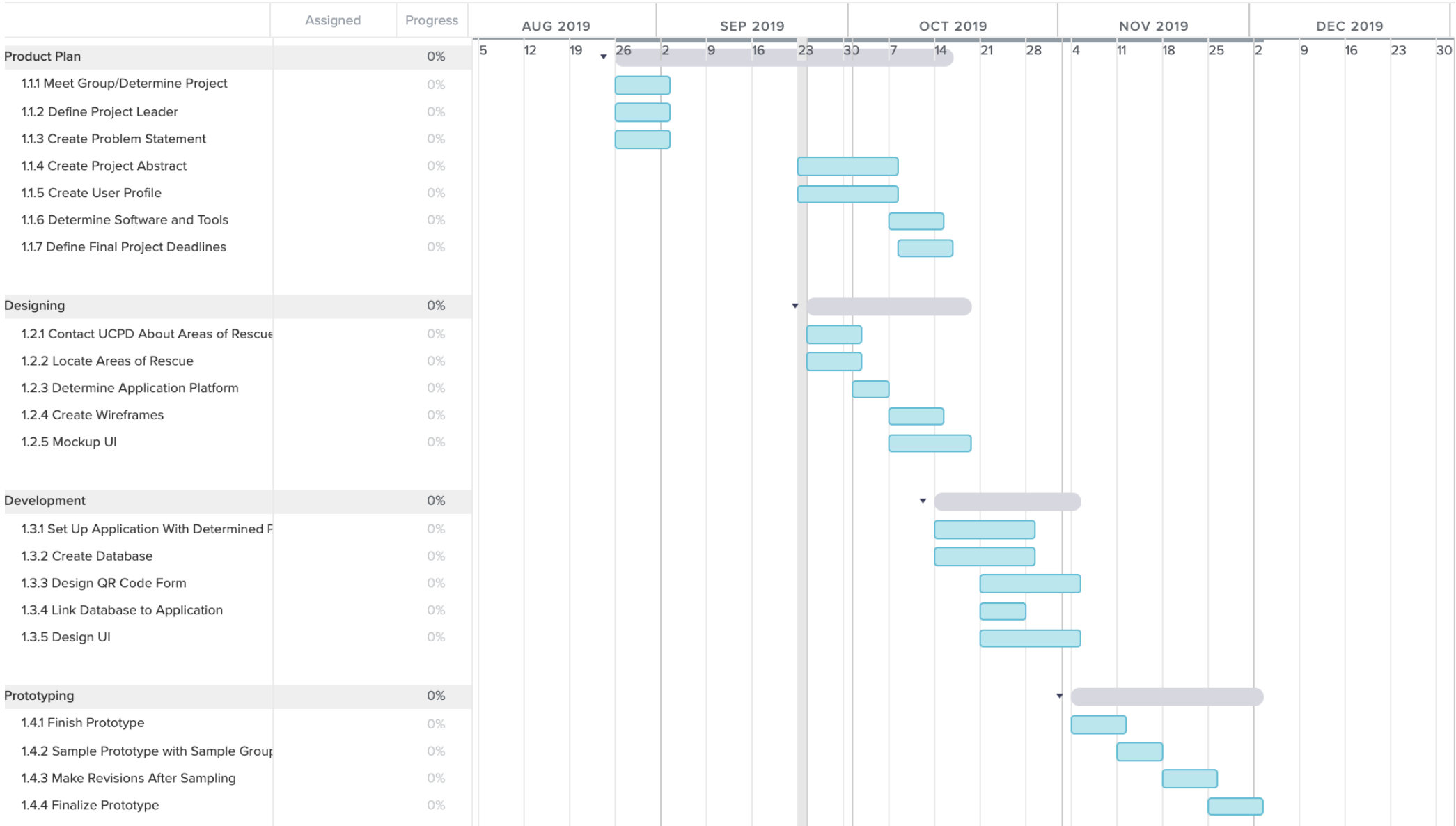


Figure 4: 2019 Fall Semester Gantt Chart

	Assigned	Progress	JANUARY 2020	FEBRUARY 2020	MARCH 2020	
1.3.2 Create Database		0%	<			
1.3.3 Design QR Code Form		0%	<			
1.3.4 Link Database to Application		0%	<			
1.3.5 Design UI		0%	<			
▼ Prototyping		0%				
1.4.1 Finish Prototype		0%	<			
1.4.2 Sample Prototype with Sample Group		0%	<			
1.4.3 Make Revisions After Sampling		0%	<			
1.4.4 Finalize Prototype		0%	<			
▼ Refactoring		0%				
Code Testing		0%				
Refine UI/UX From Presentation Feedback		0%				
Add/Update Features From Feedback		0%				
▼ Testing		0%				
Small Group Tests Application		0%				
Analyze Group Feedback		0%				
Fix Potential Bugs		0%				
▼ Closing		0%				
Prepare Presentation		0%				
📍 Present at IT Expo	assign	0%				

Table 9: Work Breakdown Structure

A	B	C	D
Designing	9/23/2019	10/12/2019	21
1.2.1 Contact UCPD About Areas of Rescue	9/24/2019	10/1/2019	7
1.2.2 Locate Areas of Rescue on Campus	9/30/2019	10/7/2019	7
1.2.3 Determine Application Platform	9/30/2019	10/3/2019	3
1.2.4 Create Wireframes	10/7/2019	10/14/2019	7
1.2.5 Mockup UI	10/7/2019	10/14/2019	7
Development	10/14/2019	11/11/2019	28
1.3.1 Set Up Application With Determined Platform	10/14/2019	10/28/2019	14
1.3.2 Create Database	10/14/2019	10/28/2019	14
1.3.3 Design QR Code Form	10/21/2019	11/4/2019	14
1.3.4 Link Database to Application	10/21/2019	10/26/2019	5
1.3.5 Design UI	10/21/2019	11/4/2019	14
Prototyping	11/4/2019	11/25/2019	21
1.4.1 Finish Prototype	11/4/2019	11/11/2019	7
1.4.2 Sample Prototype with Sample Group	11/11/2019	11/16/2019	5
1.4.3 Make Revisions after Sampling	11/18/2019	11/25/2019	7
1.4.4 Finalize Prototype	11/25/2019	12/2/2019	7
Refactoring	1/13/2020	3/3/2020	42
1.5.1 Code Testing	1/13/2020	1/27/2020	14
1.5.2 Refine UI/UX From Presentation Feedback	2/3/2020	2/17/2020	14
1.5.3 Fix Potential Bugs	2/17/2020	3/3/2020	14
Testing	3/5/2020	3/27/2020	21
1.6.1 Small Group Tests Application	3/5/2020	3/12/2020	7
1.6.2 Analyze Group Feedback	3/12/2020	3/16/2020	4
1.6.3 Fix Potential Bugs	3/17/2020	3/27/2020	10
Closing	3/30/2020	4/7/2020	8
1.7.1 Prepare Presentation	3/30/2020	4/6/2020	7
1.7.2 IT Expo	4/7/2020	4/7/2020	1

Problems Encountered and Analysis of Problems Solved

As with any major project undertaking, we as a group encountered a variety of problems both simple and complex. With the majority of our project relying on the durability and accuracy of the source code, we found many of our problems stemming from that. Simple fixes such as updating frameworks occurred but important to note as it is easy to overlook aspects such as this. One of the bigger challenges faced when starting off the build was implementing the QR code reading aspect of No One Left Behind. Generating custom QR codes for areas of refugee was vital to the user as it would save them (a victim of a crisis) valuable time in filling out information that could already be inherently determined by their location. This challenge was overcome by teamwork and filling the gaps in each other's knowledge, as well as referencing various websites.

A problem that is often shied away from when discussing about projects is that of uptime and availability. Not all apps are created equal in respect to their need for availability. If an online shopping app goes down there isn't much loss other than by a monetary measure. For our app we strive to have high availability and uptime as emergencies can happen any time of the day and thus rescue efficiency by dispatchers may decrease. To solve this issue, we looked toward the powerhouse of Azure web hosting. In their service commitment they commit to making efforts of having 99.99% uptime.

Another problem, which we found to be common across the board of all teams, was keeping NLB within scope. Scope creep is real and will happen. It is important to take time every so often to step back and keep in mind the original goal of your development and to have real and tangible completions that accomplish these main goals.

Future Recommendations for Improvement

Reflecting upon the last two semesters of senior design it is important to remember that hindsight is always 20/20. Planning goes hand in hand with how successful a project will be. There will always be unexpected occurrences that may set you back, we learned this as No One Left Behind was partially made remotely due to Covid-19 outbreak in the spring of 2020. Yet, it is important to keep to a schedule as much as possible. In the future, if NLB had to be developed again, it is our opinion that an actual application that can be installed on phones, rather than a web app, would be a great improvement. As stated before, many things were out of our scope due to time constraints but one feature we wish we could've implemented is video and picture sharing for people making emergency service requests. When this feature was brought to the attention as a possibilities to those who were beta-testing our app, it was received with very generous feedback. In the future, we plan to keep No One Left Behind hosted for as long as possible and will improve upon the application if there is interest in the open market, outside of Senior Design.

Conclusion

To sum up the collectiveness of our work, No One Left Behind has been a project that we are all proud to be building from the ground floor and has had an impact on all of us. Our senior design has given us skills that can only be acquired through long and intricate projects such as No One Left Behind. We are happy in knowing that we have created an app that will help in saving lives and improving upon areas of rescue for those with disabilities during times of crisis. While we are not the first app to have features such as location sharing or using QR codes to auto-fill information, we can say that we are first in offering emergency responders' valuable real-time data to improve their rescue operations.

After deciding our goal was to bring this project to fruition, we ran into issues that are often unfound in shorter and smaller projects. Things such as long-term planning, teamwork, and complex problem solving have all come together and have developed alongside our project No One Left Behind. Other skills which were key to success which must be noted is communication. Communication with your teammates is key to being successful and going far. In the second half of our senior design, we focused heavily on testing the UI and making it as intuitive to use as possible. This included very extensive testing with groups of all different ages and technology backgrounds. We needed to make No One Left Behind simple, yet powerful and efficient enough to be able to communicate large amounts of data in a quick manner – often in a stressful situation for the end user. Since fall semester, we have learned that UI is very imperative to how successful and willing users are to interact with an application. Whether we know it or not, we have been engrained to inherently understand certain ways of interacting with touchscreen technologies such as sliding a counter graphic or pinching to zoom in and out. These are important, yet subtle, ways of keeping your app intuitive and as simple as possible for the user. All in all, we were able to stick

to our Gantt chart for the most part and deliver on the biggest features and the most important aspects No One Left Behind promises for the end user.

Appendix

The team contacted the following professionals for clarification and guidance in regard to this paper and building No One Left Behind.

- Tony Iacobelli, Technical Advisor
- Jim Scott, Final Report Guidance

Figure 6: No One Left Behind Poster

No One Left Behind




 University of
CINCINNATI

The Problem

- 911 over telephone is a slow relay of information.
- Occasionally, those requesting 911 cannot speak on the phone.
- User location can be hard to pinpoint.
- 'Areas of Refuge' currently lack in assisting the disabled and immobile.

U.S. regulators estimate that as many as **10,000 lives could be saved every year** by reducing **911** response times by **just one minute**.

Our Solution

User Request

Request Information: Type of Emergency (Fire, Police, Medical, etc.), Number of People, Number of Immobile People, Injuries or Other Info.

Contact Information: First Name, Last Name, Phone number.

Location Information: Street Address, Room Number, Floor, City, Zip, State, Date.

Map: Drag Red Marker to Update Location.

Quick and Easy graphical UI for any age/situation

Detailed information for improved communication and enhanced situational awareness for dispatchers.

User's location is automatically generated

Dispatch View

Map: Satellite view of Cincinnati area with red markers for emergency locations.

Emergency Information: Location, Emergency Action, People, Injuries/Info.

Technology

HTML5, JS, CSS3

Microsoft .NET

Microsoft SQL Azure

Scan in case of Emergency



2520 Bearcat Way
Room Rec Floor
Cincinnati, Ohio

80% of all 911 calls are now made from a cell phone

Team 30: Michael Maiwald, Justin Siniawski, Jared Williams

Technical Advisor: Tony Iacobelli

CECH - School of Information Technology

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