Senior Design Final Report

Mobile App for LA County Bureau of Victim Services

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1. Introduction:

1.1. Background:

The Bureau of Victims Services (BVS) provides financial compensation and litigation help to victims of violent crime in LA County. After a violent crime takes place, usually what will happen is a police officer refers the victim to the BVS. The victim will then get in contact with the BVS, either over the phone or by going to one of their offices. They will then be assigned a BVS “advocate”, who stays as their main point of contact throughout the process. The advocate will meet with the victim and explain what forms and applications they need to complete to receive compensation for any damages from the crime, including medical, financial, and property damage. The advocate will also help them navigate the confusing maze that is litigation, and help the victim understand what they need to do as a witness or otherwise. In many cases, the victim is under massive stress, and so the advocate greatly helps them deal with a traumatic event after the fact. However, there are issues with the BVS. For one, they only reach about 50% of victims in LA County. In addition, the process to help a victim once they are in contact is a long and arduous one. It can take up to 6 weeks to process forms for compensation//benefits for the victim, and all forms need to be filled out in person at their offices.

Our senior design project aims to mitigate these inefficiencies in the BVS. We have built an Android/iOS app that clearly organizes and explains much information that victims need to know after the crime, including nearby helpful services, rights, and explanation for the litigation process for different types of crime. Additionally, the app allows the victim to fill out most forms (the few exceptions being ones that require a physical signature) for the BVS digitally from their phone. We hope that this will specifically minimize the time in which victims have not yet submitted forms so that they will receive feedback sooner, and that this will reduce the confusion victims have about this complex process after a traumatic event.
1.2. Design Principles:

The main deliverable is an iOS and Android app that helps victims access information easily as well as helping advocates streamline the process of helping victims. Our team focused on 2 main principles: the ease of use, and simplicity. During development, we aimed to create a simple environment for the District Attorney’s Office’s advocates by including a content management system. A content management system allows non technical users to update information inside the app easily themselves, rather than requesting for another department to handle the information changing. For simplicity, our team went with a graphical user interface that included huge buttons that use a warm color scheme. A warm color scheme along with big buttons gives victims the ability to distinguish between the features easily.

1.3. Design Benefits:

Developing both an iOS and Android app allows the District Attorney to reach more users. Although the United States is primarily dominantly using iOS, there are many victims that currently are using an Android based phone. Also development with Xamarin Forms allows for our application to be deployed into both iOS and Android. Using Xamarin Forms allows us to consistently control what our app looks like in both iOS and Android. This gives the District Attorney an iOS and Android app that are uniform in design.

Designing with a content management system allows for non technical users to change information on the application without touching its code base. This benefit allow our user to concentrate on what information to display rather than how to display. This allows benefits the victim’s point of view as well, because the app will display information in an uniform state.

1.4. Achievements:

Over the course of the academic year, our team has been able to develop an app that allows advocates and victims to streamline the process of providing and receiving information. This app
is built in Xamarin Forms to emulate development in both iOS and Android. The static information that the app provides is auto generated with a headless content management system, Kentico. Using Kentico’s API, our team has been able to dynamically generate content for our app without the worry of format. This allows for a systematic and uncomplicated way for the non technical team at the District Attorney Office to display information for their users.

The location services feature was also implemented. The location services feature generates a map of the current location marking important services for a victim. These important services might be local hospitals, police stations, or court houses. The location services features gives victims a way to find themselves should they be lost.

A small escape button feature was also created to help domestic violence victims. After a single press of this button, the button opens the phone’s browser to Google.com to deter the victim’s spouse from finding out that they are actively seeking help.

An applications feature was created to help victims quickly fill out information at the ease of their palms. After the victims sends their forms, the form gets encrypted and sent to the District Attorney’s email inbox. Through that main inbox, it can be filtered to the respective departments. This can help save a massive amount of time for advocates as advocates mainly use their time contacting victims a second time because the victims did not properly fill out the information in the beginning.

The final feature implemented into the app was a personal court case login. This allows non technical advocates at the District Attorney’s Office to give out unique username and passwords for victims. Through this, victims can login into the app to view all their current court cases. The page will display all the court cases that applies to them as well as the data and location of the court house. This can help advocates alleviate the huge influx of phone calls they receive about court case information. Instead, the time saved can be used helping more victims in need.
2. Related Technologies:

2.1. Existing Solutions:

We used the Xamarin Forms framework by Microsoft to create the app so it could be distributed to both Android and iOS devices. The background database is a Microsoft Azure database and the CMS used is Kentico. We used an Azure database since it was part of the Microsoft technologies that the District Attorney is used to using and also because their databases are hosted on a Windows based server, rather than the Linux based servers that many other database options had. The CMS we decided to use was Kentico because it has it’s own REST API to allow a user with little technical knowledge to easily edit static content and have the content appear on the mobile application in real-time after publishing.

On the mobile application, Google Maps API was used to acquire user locations and display the nearby Victim Services office locations. Google SMTP (Simple Mail Transfer Protocol) is used to allow the user to fill out contact forms to send their information. We decided to use those technologies because for the purpose of creating and testing the app, it was free since Google allows free usage of their API limited to a few thousand requests per month, but for future use by the District Attorney, purchasing keys to use their technologies will be required. For sending and receiving contact forms, another option is for the District Attorney to set up their own mailing server.
3. System architecture:

3.1. Overview:

The architecture for the App can be broken down into three main factors: Xamarin Forms, the Content Management System, and the Database.

Here is a diagram (DFD level 0) that shows how this architecture works at a high level:

- **Xamarin Forms**: Through the use of Xamarin Forms Framework, three different mobile platforms can be developed using one source code. Many interfaces are available in order for the app to display the necessary content to the user.

- **The Content Management System**: The main purpose of the content management system is to allow admins to change or update any static content information for the app to display.

- **The Database System**: The Database allows the application to store and retrieve secure content regarding victims court case information.

3.2. Data Flow:

Here is an overview of the Framework as a system, and how it connects to the App (Implementation Activity), incidentally, this is also our DFD level 1:

There are six major modules in this system. They are described in more details in section 6. Here is a brief overview of them:

3.2.1. **Office Locations Map**: The Office Locations module allows the user to easily access all the available office locations closest to their current location. It uses Google maps API in order to display the office locations and also get the users current location.
3.2.2. Request For Assistance: The request for assistance feature allows the user to fill out a form to request for assistance. The request for assistance feature gathers the information from the user and sends it through a secure email to the BVS Office.

3.2.3. Court Case Information Request: This feature allows the user to view any available court case information regarding them. The user goes through a secure login verification feature with a username and password. Once logged in it communicates with the database in order to display the appropriate content to the user.

3.2.4. Escape Button: This feature allows the user to quickly terminate the app process and open up their default web browser on their device. It allows the user to quickly hide that they’re using the app to request for assistance or to look up information if they don’t want anyone to find out.

3.3. Implementation:

The project was split into three sections to allow for efficient development: Content Management System, Database, and Google Maps API. Each section plays a key role in presenting the progression of the project.

3.3.1. Content Management System(Kentico):

The application gathers static content from Kentico Content Management System. The application communicates back and forth making sure its displaying the most current information on the specific pages.

3.3.2. Database:

Using the database the application was able to save and gather important information when user tries to login to the court case information feature. The database stores users court case information such as, court case number, court date, and court case city. All this information is retrieved at request.
3.3.3. Google Maps API:
Google Maps API was used to gather all the office locations. Through the office location feature, the user can see what office is closest to them based on their phone's current location. Google Maps uses the phone's location in order to present an accurate map display.

3.3.4. Google SMTP:
Google’s SMTP (Simple Mail Transfer Protocol) was used to send and receive contact forms with victim information so information could be quickly passed on to Victim Services to efficiently provide their services.

4. Conclusions:

4.1. Results:
A completed app with all features was presented at the expo and the county has plans to absorb the project.

4.2. Future:
The BVS plans to take our existing code, integrate it with their servers, and publish on the iOS App Store and Google Play.
5. References:

Xamarin Forms: https://docs.microsoft.com/en-us/xamarin/xamarin-forms/


OAuth: https://oauth.net

Kentico Cloud: https://www.kentico.com/product/kentico12