CS M117 Final Report

Fall 2016

Project: Beverly Hills Corporations Database Application

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1. Project Motivation

The motivation for this project was to create an application that can access the online database for all corporations within the Beverly Hills area. In recent years the city of LA has made an effort to make available a plethora of information and open data in order to encourage innovation and research. There are now hundreds of databases supporting topics like the economy, public safety, the environment, city services, etc. There are databases available of all the corporations listen within every district or city within LA County. We decided to use the Beverly Hills database since when we first looked at Westwood there were very few corporations and the app would not have been very useful or interesting. We decided to search the databases for some of the areas around UCLA and found the Beverly Hills one to contain the most information about relevant and upcoming local businesses in a major city.

2. Project Functionality

Our application pulls data from the online database in order to show all the businesses and key information in a user friendly manner. This makes searching for businesses within a certain area incredibly easy to do. Our app lists all of the corporations listed within the Beverly Hills area along with their addresses and email addresses in order for contact. This application could be further developed by extending to multiple cities as opposed to just the Beverly Hills area and eventually across the entire United States. Eventually it could also be extended to allow businesses and individuals to set up meetings and interviews and include a function that would help people searching for jobs. Learning how to use these databases and how to interact with them through the internet is a very useful skill that can allow for the public to become more aware of their surroundings and learn important information about their city. It can also make

searching for information much simpler. For these reasons we felt that it was important to learn more about these databases and how they can be used to create an application pulling useful data from them.

3. Wireless Networks Used

In order for our application to work we needed to use wireless internet to pull data from the online database. This ensures that all of our information is accurate and updated as the online database is updated since every time the application is opened it pulls the data anew. The internet is a network that was created as a way to share information across the world and to ensure that regardless of any disaster information would remain secure. The first instance of this was the government funded project called ARPAnet which was created during the Cold War. The government wanted to ensure that even if a disaster was to hit the US, information would not be lost but would remain in this network. In 1969, UCLA sent over the first message over this network to the Stanford Research Institute. Many more universities were eventually added into this network until it became available to the public and became known as the internet. Eventually the wireless internet, or WiFi, was created to allow users to connect and share information over this ever expanding network without needing to be connected through wires or cables.

The current Wireless LAN network used is the IEEE 802.11b specification. In this protocol communications all go through access point. This allows new connections to be created in a much cheaper manner. As opposed to Ad Hoc networking where every new node would have to be connected to each existing node, each new node only much be connected to a base station -- or access point -- and they will then have access to all the currently existing nodes in the network. The base station is connected to the wired network which can then go between other

wired networks. In order to multiplex across these networks either Space Division Multiple Access (SDMA), Frequency Division Multiple Access (FDMA), or Time Division Multiple Access (TDMA) can be used. These separate information being sent over the network either by space, frequency bands, or time in order to avoid collision and allow successful transmission. They can also be used together for a more robust and secure network. The two main protocols used for transmitting data in the transport layer for wifi are are the user datagram protocol (UDP) and transport control protocol (TCP). UDP is a connectionless protocol that doesn't focus on ensuring that every packet is necessarily sent but instead it sends messages much quicker. While it is less reliable it is often used for voice and video when lagging is not acceptable. TCP on the other hand is a connection oriented protocol that will resend packets if they get lost. This protocol uses error control and flow control in order to handle congestion. While it is slightly slower than UDP it is more reliable and for the purposes of our application that is the protocol we used. Since our app was to download information from a website it was more important to get accurate data without any missing information than to have speed.

4. Implementation Details

As a basis for creating the design for our app, we used a model view controller (MVC) framework, which allowed us to set up a storyboard that contained all the views for our application. A view is simply defined as a screen that outputs information in any format, such as a graph, an image, or information about a local business; a storyboard that contained views connected by various segues would provide an adequate high-level design for the application's user interface.

The first view we have on our storyboard is the navigation controller, which contains all the information about which view leads to which. For instance, if the main view has buttons for the user to click, the navigation controller has information stored on which button leads to which view. For our application, the main view contains an "Enter" button that leads to a controller containing all the businesses found in the Beverly Hills area; this controller then has more options from which the user can scroll down and choose from, which leads to another view; this continues so on and so forth until the last view, which in our case contains the desired company name, company address and zip code, and an email so the user can contact the corporation.

After the navigation controller, we then have the main view, which contains an elegant and refined sunset picture of Beverly Hills' iconic palm trees, and the "Enter" button referred to above. This button leads to a list of business names in the city, which we refer to as the table view controller. The user can scroll down through all the businesses we obtained from the City of LA API, accessible to all developers under the Open Data Initiative. After the user selects a company from this list, he or she will be then directed to our last view, our detail view controller. This controller displays contact and location information about the specific company the user has selected.

Given that Xcode gives us this MVC framework to work with when developing an iOS application, the implementation is fairly straightforward, and is done in the objective C language. The API provided by the City of LA is used to obtain information about the business directories, and JSON objects are used to create a dictionary for the table view controller. We used representational state transfer (REST) web services to request info such as city and council district, and receive authentication responses.

5. Project Results and Evaluation

As a result of this project, we were able to make an application that used a wireless local area network to obtain information from the internet and display it in a user friendly environment. With the information about Beverly Hills' corporations at our fingertips, users could find out what their local businesses are to use their services or even contact them via email or phone to apply for a job. The application works successfully when a wireless internet connection is present, as expected. Loading times for the corporations whenever the "Enter" button is pressed are also very small, which indicates a high level of performance and speed.

After evaluating our work in making this application, we realize there are places for this app to improve and provide more useful information to the users. For instance, instead of limiting the scope of the app to Beverly Hills, we can collect the business directory APIs for most of the major cities across the country and modify the app that lets the user choose which city he or she wants to browse for local businesses. We also realized after finishing the application that adding a search bar in the table view controller would enable a more intuitive mechanism by which people can look up specific companies; currently, they'd have to manually scroll through hundreds of businesses that were obtained from the online database.

6. Member Contribution

- **Naomi Esserman:** Helped write the final report and project proposal, and found the valid database from the City of LA API from which we obtained corporation and city/council district information for our app.

- **Shashank Khanna:** Developed the main view/homepage of the application, and designed the table view controller, or scroll down menu, using the information from the database pages. Coding was done in objective C.

- **Vamsi Mokkapati:** Helped write the final report and the project proposal, and designed the layout of the detailed view controller, which is the design layout of each individual company page on the app. Coding was done in objective C.

- **Dhruv Thakur:** Created the final presentation slideshow, and enabled the intuitive UI features on the app. Found and resized all the logos and background images for the app.