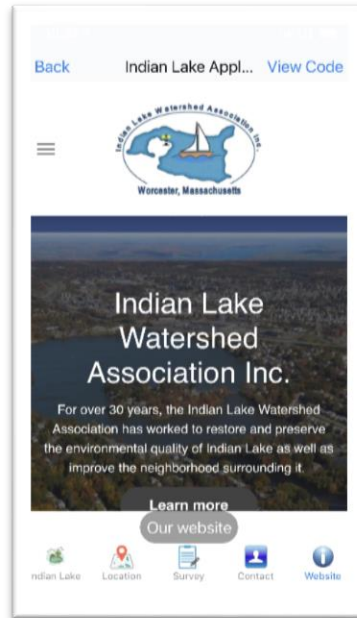


Development of a Mobile App for Indian Lake



An Interactive Qualifying Project Report Submitted to the faculty of WORCESTER POLYTECHNIC INSTITUTE in partial fulfillment of the requirements for the Degree of Bachelor of Science in cooperation with the Indian Lake Watershed Association.



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Abstract:

The purpose of this project was to design an app that would allow Indian Lake residents and other users nearby the lake and use the loop to get direct access to Indian Lake information and resources. Through interviews and observation, we found that the app should include a GPS map, a survey button, a contact button, and a link to all the previous research projects upon the Indian lake. We recommend the mobile app design be implemented using Thinkable. The result of the project is a future design of an app people can use.

Overview:

Indian Lake is one of the most beautiful lakes located in Worcester, MA. The lake attracts visitors year-round for its natural beauty and outdoor activities. In our previous project, we worked on implementing a plan to create a walkable pathway. Now, we aim to design an app that people can use. In this paper, we review background info on mobile technology and explore our stakeholder's needs.

Increasing importance of mobile apps:

Today we are living in a world where mobile technology has increasingly been used. Many mobile apps have been developed for various fields like education, business, entertainment, social networks, etc. A mobile application is a type of software designed to run on a mobile device, such as a smartphone or tablet.

Apps are typically small software platforms with limited functions designed for a particular purpose. Apps may be games, e-commerce apps, calculators, etc. They are also called web apps, online apps, iPhone apps, or smartphone apps. To develop applications for mobile devices like smartphones, mobile app development tools nowadays make it an easy task. A developer can create a mobile app using a mobile app development tool, using a drag -and-drop user interface component. There are several app-building platforms available today.

Mobile applications are a brilliant idea and dealing with them is quite easy. They are not difficult to create, but anyone who has knowledge of programming or can study it can design their application and publish it on Apple Store or Play Store stores. Globally, there are more than 5 billion smartphones around the world. The reality is that people spend more time on the phone these days than on personal computers. In the past few years, there has been significant growth in technology, particularly telephone technology. Today, smartphone technology has occupied the world, intending to facilitate human lives and help daily life through many applications that can be used in communication, learning, entertainment, and many more.

Moreover, now it has become necessary to create and develop applications for various mobile devices worldwide, not only for personal use in everyday life, but applications have grown to include companies, banks, and other institutions.

Assessing apps for this project:

We assessed and considered three drag-and-drop apps that could be used for this project. Bubble, Build Fire, and Thunkable are some examples of drag-and-drop building tools. Bubble is one of the top no-code platforms. It allows users to build fully customizable web applications and workflows, ranging from simple prototypes to complex marketplaces and more. BuildFire is a high-performance do-it-yourself mobile app builder for iOS and Android phones and tablets. This platform is easy to use to create apps, so that anyone can build a fully custom app in a small period of time and a fraction of the cost. It uses the drag-and-drop aspect without writing any code. This platform is powerful and flexible and can be scaled as a business grows.

This paper will focus on Thunkable, an app builder designed to replace other programming languages and frameworks conventionally used for app development. Founded in 2015, Thunkable is a San Francisco-based company that describes its product as a "drag-and-drop mobile app builder". Drag-and-drop app builder's products allow non-developers to create or build applications by simply dragging and dropping. Users can quickly build solid mobile applications using this technique. It enables people to create beautiful and powerful Android and iOS apps, as well as mobile responsive web apps. Although those are great examples, many features set Thunkable apart from other applications, such as how simple it is to learn. Additionally, it has both the screen design and code-behind functions, a technique in object-oriented programming in which the visual and back-end source code are stored in separate files, allowing designers and programmers to work independently. The code behind is done with blocks (Figure1), and it has different screen sizes that can be set at design time.

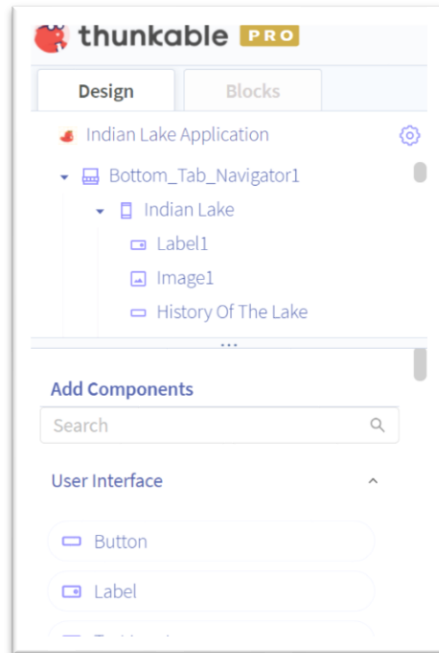


Figure 1: the screen design and blocks_(Thinkable, 2021)

As mentioned above, complex apps can be built with Thinkable by dragging and dropping different logical components as if they were blocks. Using these building blocks (Figure 2) are reminiscent of Scratch's visual programming language, an educational tool that creates limited logic and teaches basic coding. Thinkable allows its users to preview other developed apps. Therefore, you can build off of other people's apps that are available for public use.

Developing a smartphone app will allow those visiting the lake and using the pathway to have direct and better access to the lake's map and information. The app will allow the people who download it to get recommendations for local shops and restaurants near the Indian Lake and read about its history.

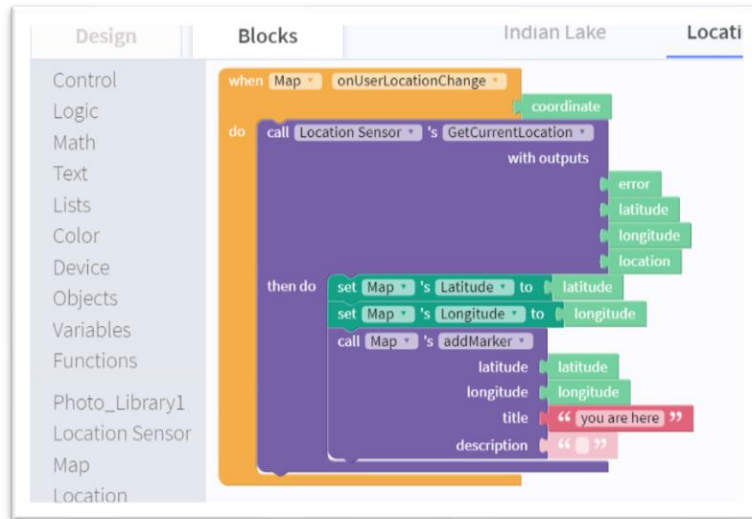


Figure 2: building blocks in Thunkable

The app type we can build using Thunkable will have multiple screens (Figure 3); each screen can have a list of commands like the Location and the website.

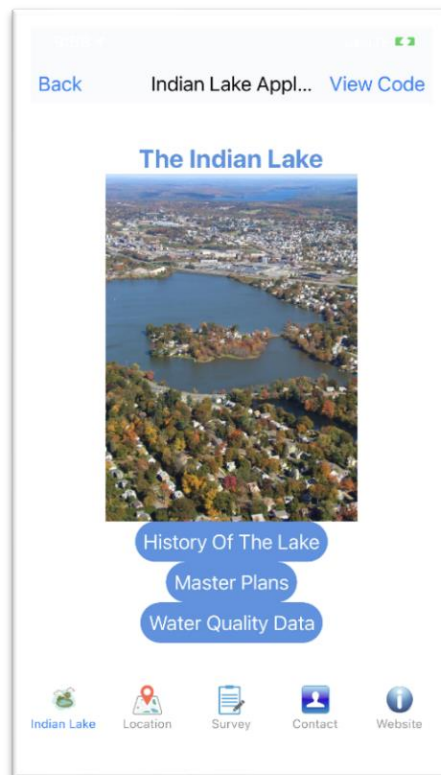


Figure3: Homepage of the Indian Lake Application

Indian Lake App:

The Indian Lake app can offer its users access to information to help the public discover the lake, parks such as Shore Park, Morgan Park, etc. Besides that, when downloading this free app to the phone to find the nearest park and recreation areas with the activities users want to do anytime from wherever they are, users can get detailed guides, including GPS-enabled maps and maps that can be used offline for each park and sidewalk. The app will integrate the immediate need for information and instant communication and connection. We probably hear the sentence 'just Google it' at least once daily. Indian Lake app will allow its users to search for any essential information about the Indian Lake anytime, anywhere, easy, and straightforward.

To ensure that the app will meet the intended design specification and guidelines and understand what is essential for a stakeholder, we investigated what can be helpful in the app. We created questions that allowed stakeholders to give their suggestions. We interviewed two of the stakeholders Christina Puleo and Aaron Sakulich. From those interviews, we have found that the essential features to include in the app were:

- A water quality data button to show a map of the lake with the most recent water quality data generated by testing the water quality in Indian Lake for future growth and improvement of Indian lake.
- A master plans button: these are architectural drawings showing what the parks should look like once the city is done working on them (Figure3).
- A survey button to encourage people to get involved in the Indian lake. In the future, the ILWA can decide what questions to include in the survey. It is essential to include a survey button for ILWA to motivate local citizens to participate and help identify which problems were most prevalent. The survey button will direct the user to a list of questions. It will allow time to arrange and complete a list of concerns that the surveyors might encounter.

- We also recommend adding those essential buttons to the app History of the Lake, tips on water safety, GPS map, and previous research projects on the Indian Lake. (Figure 4).

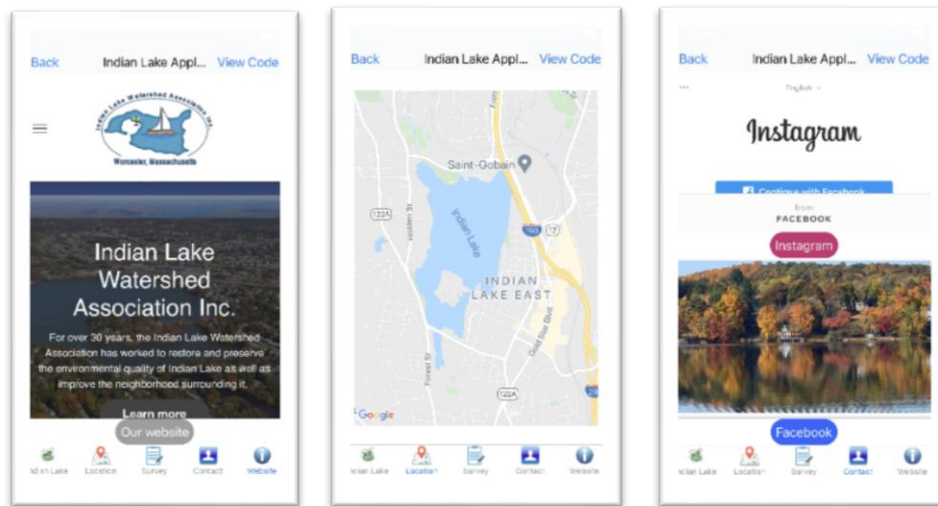


Figure 4: Different screen on the app

We learned other information from the interviews too. In particular, with regards to safety, Christina Puleo expressed that she was concerned about water safety. She mentioned it is essential to create a feature on the app that includes tips on water safety, including swimming, boat safety, etc. Also, she said that there are a lot of people running around the lake to access physical activities around the lake like cross-training or any other activities. Mrs. Puleo recommended that the app could show people the location and length of the loop. Another recommended feature was to include the YMCA calendar, or there will be an opportunity for somebody on a rainy day to get a guest pass at the YMCA, and they can click on a link and get a guest pass.

To create the app using Thinkable:

To design and edit different pieces of the app components like pages and properties the design screen will be used in Thinkable, where it is found in the left third of the screen components section is broken into two large parts the top part.

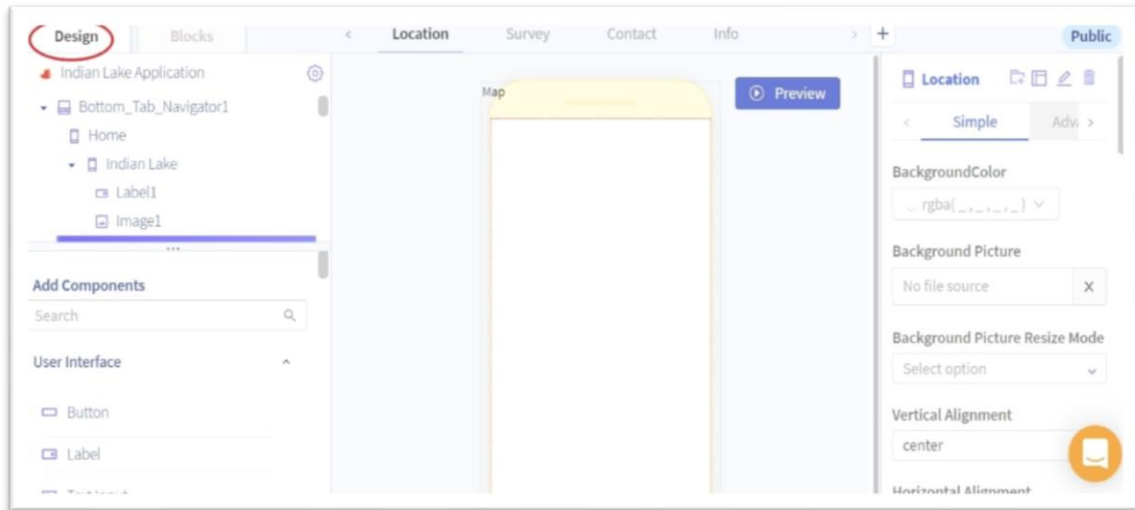


Figure 5: The main screen of Thinkable (thinkable,2021)

Components that users must often interact with are buttons and labels. As the app gets complex, the layout components allow the creator to change where certain parts of the app are found. The image components they allow to add images and take images within the app data can be used to insert a gallery of pictures of the Indian lake. Sensor and location components will allow us to store data in a variety of places.

For example, the Map button can be added to the app by using the design screen and choosing the sensor as an invisible component.

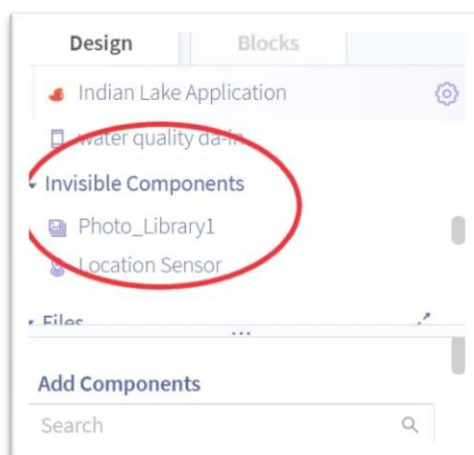


Figure 6: the invisible component (Thinkable, 2021)

To build the code, the block screen can be used to add a tree of functions that can be connected to achieve the required code (Figure 7).

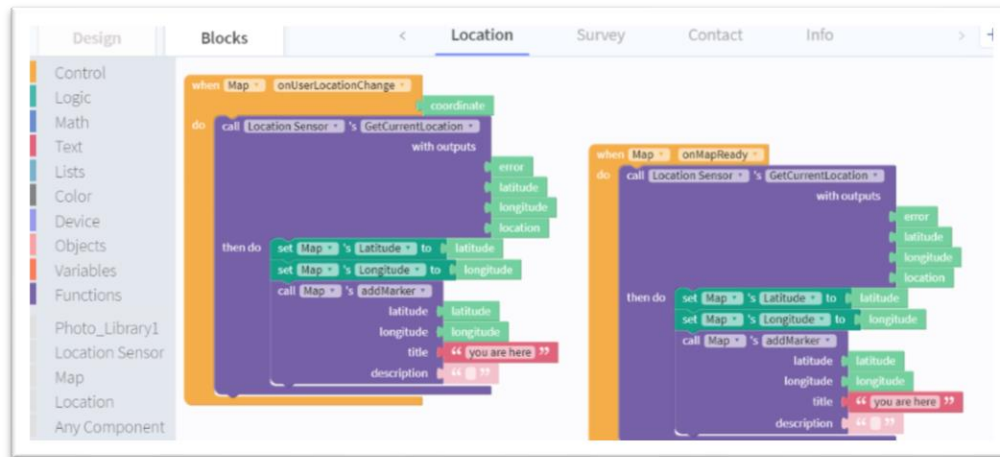


Figure 7: The full code of the map (Thunkable, 2021)

Conclusion:

In an attempt to help Indian Lake area residents and pathway users, we designed an app that would allow the community to more easily access information on the Indian Lake area, also give people the opportunity to communicate with one another using the survey page. We were able to successfully verify the inclusion of these features into our app and another suggested feature to provide tips on water safety. In order to execute this design, we used an app development software called Thunkable to build a visual layout of the app. All the intended features of the app were included in Thunkable. The hope for this app will be given to a software developer with mobile development experience to be made into a completed app.

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