

TO: -----, Instructor, Computer Science Department
-----, Research Administrator, K-State Engineering Department
FROM: Nate Lillich, Software Engineer
DATE: October 29, 2023
SUBJECT: Progress report on designing a mobile application for tracking an individual's environmental impact.
REFERENCES: Project Proposal, Approval of Project Proposal
ATTACHMENTS: Chart of development times

INTRODUCTION

On October 8, 2023, I sent a proposal to -----, Instructor in the Kansas State University Computer Science Department. The proposal was for the creation of a mobile application that is used to track environmental impact. The proposal was approved on the 15th of October.

The goal of the project is to create a mobile app that the user can input data about various things they do day-to-day or more broadly month-to-month. The app will take this data and calculate the carbon footprint or environmental impact of the user and provide them with ways they can lessen their impact. Within my research I am looking into other projects of similar caliber to get a good estimate of time and cost for the design and development of the app. I am also looking into any laws in place dealing with the use of personal data and how to ensure that data is kept secure while stored in the app. To successfully complete this project, I will be researching and completing the following tasks:

1. Researching various aspects of different application developments such as team size, cost of development, and time required to complete the project.
2. Research laws that deal with online privacy and regulations on applications tracking data.
3. Review the necessary steps for publishing an application.
4. Create a UML diagram of the structure of the application along with a mockup design of the user interface.

TASK SUMMARY

Task 1: Research various aspects of different application developments such as team size, cost of development, and time required to complete the project

Team Size

Development of a fully functional application requires a lot of time and resources. One of the main necessities is a team of software developers. For larger scale applications it is estimated that a team of around ten people will yield the best outcome. In a Rootstack article, it is stated that, "If the dedicated development team is too small, there can be an overload of work for team members, which can lead to bugs, delays, and lower product quality" ("What is the optimal size of a dedicated development team?"). It is important to have enough people on the team so that there is not an overload of work that could lead to a lower quality product. Another thing worth mentioning is if the team is too large issues with coordination and complexity can lead to misunderstandings and delays in development and a lower quality product. For smaller scale

projects the authors at Rootstack estimate three to five people on a team is enough people to manage a full-scale development while not overcomplicating things (“What is the optimal size of a dedicated development team?”).

Development Cost

Development costs are one of the biggest concerns when it comes to developing an application. The cost of development depending on the time frame and complexity of the program can greatly impact the cost of a project. One of the largest expenditures is software developer salaries. It is estimated that the average mobile app developer in the United States has a yearly salary of about \$121,000 (Dogtiev). With the development of the application being done from within the Computer Science department at K-State, the overall costs with salaries are greatly decreased. Though salaries are the biggest cost when it comes to app development, there are still many other parts that can add up to a lot when calculating the overall cost of development. In an article on Couchbase many different smaller costs are analyzed such as App store fees, third-party integration, marketing, etc.

Development Time

One of the most prominent issues when it comes to the development of an application is the time it takes to develop and deploy a fully functioning application. There are numerous steps required to ensure an app is not only user friendly but also properly secured and maintained. Development time plays a huge factor in the cost of app development. Scale and complexity also play a significant role in development time with larger scale or highly complex applications possibly taking up to twelve months to complete (“App Development Costs (A Breakdown)”).

App Type	Estimated Time to Develop
Social Media	6-12 months
E-commerce	4-12 months
Gaming	2-12 months or more
Education	3-6 months
Health and Fitness	4-6 months
Travel and Hospitality	3-8 months
Productivity	3-6 months
On-demand	4-8 months

Figure 1: Table of Estimated Development Times

Source: <https://www.couchbase.com/blog/app-development-costs/>

As shown in figure 1, the estimated time for development is greatly affected by the type of application that is being created. The proposed environmental impact tracker application falls namely under the Education and Productivity categories which are estimated to take between three to six months to develop.

I have researched many different sources to gain a better understanding of the time and cost of development as well as the ideal team size. I still need to conduct more research on cost breakdowns for the development of a small-scale mobile application.

This task is 90% complete.

Task 2: Research laws that deal with online privacy and regulations on applications tracking data

Data security as well as transparency with what data is being collected and how it is being used have become a major issue with the exponential growth that technology has seen since the first smartphone was released by IBM in 1994 (Paavola). Over time there have been growing concerns about privacy from the public and with that many laws are in place today that restrict what data can be collected and how that data can be used and distributed. In this task I am researching various laws that deal with data collection and security. Listed below are some laws both national and international that pertain to the data collection and security within the application.

Passed in 2018 by the European Union and regarded as “the toughest privacy and security law in the world (Wolford)”, the General Data Protection Regulation (GDPR) does not only effect companies within the European Union but also any company that uses data that relates to European people (Wolford). The GDPR has a wide scope that covers the protection of personal data and data processing. Also covered are the regulations on who handles the data collected and any third parties that are handling data collected by the primary company (Wolford). The penalty for not complying with the GDPR is a fine of twenty million Euros or 4% of the company’s global revenue depending on which option is higher (Wolford).

In the United States there is currently no federal laws passed that deal with data privacy, but on the state level there is multiple states that have passed laws pertaining to the protection and privacy of data (“Privacy Laws for Apps: How to Protect User Data”). The state of California passed the California Consumer Privacy Act of 2018, this law granted the people of California more control over their privacy. The law gave people the right to know what personal information is collected and how it is used, the right to delete personal information collected, to opt out of sharing certain personal information, and the right to non-discrimination (“California Consumer Privacy Act (CCPA)”). The act was amended in 2020 granting the people of California the right to correct any personal information that is incorrect and the right to limit the use of their personal information (“California Consumer Privacy Act (CCPA)”).

This task is 60% complete.

Task 3: Review the necessary steps for publishing an application

To learn more about the required steps for publishing an application I am researching the steps for publishing an application in both the Apple App Store and the Google Play Store. Each

platform has a unique set of steps to follow to correctly publish an application. Listed below are some of the steps for each of the platforms.

Apple App store

To publish an application on the Apple App Store, Apple has a list of five steps to follow. The first step requires the developer to choose specifically which version and build of their application to submit. The next step requires the developer to select what regions their application will be available in and set the price of their application and what tax category the app is in. The third step is submitting the application to be reviewed by Apple. Once the application is reviewed, in the fourth step, the developer must fix any issues found in review. The last step simply allows the developer to get promo codes to their application before the application appears in the App Store. (“Overview of publishing your app”)

Google Play store

For the release of an application on an Android device there are two main phases, the preparation phase, and the release phase. Within the preparation phase there are a few key requirements. You must first configure the application and then build and sign a release version of the application (“Publish your app”). Next, is the testing portion of the application and preparation of the servers (“Publish your app”). In the release phase of publishing, the developer must configure the application to the settings of the Google Play Store and set the regions of release, the price, and the available languages (“Publish your app”).

This task is 90% complete.

Task 4: Create a UML diagram of the structure of the application along with a mockup design of the user interface

For the creation of the Unified Model Language (UML) diagram, I am using the web application draw.io. Draw.io is a website used to create various types of charts and diagrams with many different features and built-in libraries for all kinds of projects. I am specifically using the UML library to create the diagram. The library has many different shapes to represent multiple class types, interfaces, objects, components, databases, etc. Also provided within the library are lines representing dependencies and relationships between different classes/parts of the program. The UML diagram is mostly completed, I have created that basic class structure and relationships between the various classes, the database, and interfaces. I am still adding the functions, variables, fields, etc. to the classes in the diagram.

For the creation of the mockup design of the user interface I am using the website figma.com. Figma has a lot of unique tools that can be used to create a lot of things from diagrams to designs. The application is web-based, making it especially useful for collaborative projects with the ability to have multiple users working on the same project at the same time. This project is my first time using Figma to create any type of user interface design, I am still familiarizing myself with the program as I work. I currently have a base structure with a few features designed. I plan to continue to add more features to the design and add more detail to the overall design.

This task is 65% complete.

CONCLUSION

Technical Conclusions

Task 1: The ideal team size for a project of this size is three to five people. The most expensive portion of the development is the salaries of the team. With the project being developed through the computer science department, the cost of developing is greatly reduced. Finally, the time frame for development is likely to be between three and six months.

Task 2: With current laws and regulations on data privacy there should be no issues going forward with the data collected within the app. It is important to ensure the data is securely stored.

Task 3: The publishing process for both the App Store and Play Store is a straightforward process that should cause no issues if the proper steps are followed.

Task 4: The creation of the UML diagram and mockup user interface are slightly behind schedule due to timing.

Standard Conclusions

The research portion of the report is going smoothly and expected to be completed on schedule. The design portion is slightly behind schedule but still expected to be completed on schedule. The progress of the report is currently 76% complete and expected to be fully complete by November 26th.

References

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