

PlantMe-NJ

Utility-Based Application for New Jersey Garden Planners

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Summary

Tired of trying to figure out if your plants have enough space to grow? Do you find it challenging to map out if you have enough room for the crops you want? The new Android mobile app, PlantMe-NJ, seeks to reduce that stress by introducing features that will promote a successful planting season every spring and summer. Designed for an IMM Thesis Project, PlantMe-NJ will be solely focused on the aspect of gardening, specifically selecting prosperous crops grown in New Jersey. The program maps the ideal planting spots of your plant beds, depending on the vegetables you have selected, and it will have a feature that can display a potential plant in a specific spot using AR. It will also display plant information where users can view a list or gallery of plants best grown in NJ. They can read more about a plant's starting planting and harvesting dates, spacing, depth, and ideal environment. It will also feature the ability to select a plant based on two types: plant type or season.

Graphic Image



Colorized



Non-colored

Introduction

For my thesis project, my goal was to develop a mobile application using my programming skills and design abilities. Using Android Studio, the app would be focused on gardening, specifically selecting which plants would be ideal to plant in New Jersey, mapping out where to plant the crops, and visually displaying the potential plant in a certain spot using AR. It will also include information regarding a specific crop, such as planting type, planting distance, harvesting time, planting time, and more. To form the design features, I am planning on using Autodesk Maya and Adobe Photoshop/Illustrator for the visual aspect.

After contemplating thesis proposal topics for a solid three months, I knew that I wanted to create a project that could be useful in my life and that it would involve some sort of hobby that I am passionate about. About six years ago, when I lived at my old house, I grew several types of vegetables: tomato, jalapenos, cilantro, and mint. Through meticulous research, I bought seeds, indoor plant lights, pots, and a heating pad and learned about the concept of germination, transplanting, and growing seasons. However, once my parents had sold their house, I, unfortunately, had to remove all of the plants, and in our new apartment, there was no space to grow anything. Thus, I had to abandon my hobby and hope to one day rekindle my passion for gardening. Luckily, this year, my family purchased a new house, and there was plenty of space to grow any type of crop I wanted. This spring, I set out to complete my previous goal of regaining my green thumb, and I managed to get the flower beds ready for planting. Despite having experience with having plants produce frequent crops, most of my plants did not get to the seedling stage.

After an unsuccessful harvest season, I found it complicated to figure out exactly what went wrong. Why did my strawberries never grow? Did I plant them in the wrong spot? Why did

my watermelon plant take over the entire garden bed? Why did my watermelon never turn red inside? Despite researching numerous websites, I could not conclude what might have been the possible reasons behind the faulty growth. Reasons ranged from a weak seed, unhealthy soil, lack of sun, not enough space, and more. It was unlikely to be unhealthy soil since I had just bought a new potting mix, and it was not lacking sun since it is facing the sun's direction. However, one thing that I forgot to keep note of was the right planting time and enough plant distance. From brief research online, there were not many helpful tools to keep track of this information, only websites that gave the right watering day and possible planting formats to promote a good growing space. Thus, I thought this would be the perfect opportunity to turn this into a year-long project where I can turn my idea of an app that can map plant space and show an end-product of a plant into a functional product.

This project will showcase my ability to design a successful application from a planning phase to a finalized product. It will highlight my capability to code successful software based on my learning as an IMM major and Computer Science minor, and it will prove to me that I have the potential to complete anything that I set my mind to. The app will contain aspects of my interests such as 3D modeling and UI/UX design. I am very excited to create some of the plants that will be featured in the app using Autodesk Maya since I previously created flowers that turned out very life-like, and being able to model more, will challenge me to figure out what might be the best way to make it look realistic. Additionally, I enjoy the design phase where I get to plan out the icons, color choice, and format of the app, but I do not have a lot of experience with it. Thus, this project will allow me to experiment more with design choices, and it will help me grow my mindset in terms of UI/UX, potentially turning it into a piece of work that I can show off to future employers.

My future aspirations are to be an individual employed in either a technical department or a graphic design field. Creating this app will put me in a position where I am able to be well-informed about topics relating to Android Studio, coding, UI/UX, 3D modeling, or design. My project will contain features of my creative interests that I have learned about from being a student at TCNJ such as 3D modeling, design, and programming.

My target audience will be planters from New Jersey. This idea will be useful to those that are having difficulty plotting their plants in appropriate spots within their garden, and it will be interesting to those who wish to view how their plant will look if it is grown to its highest potential. It will also be helpful for people who wish to know more about their current plants, and it may be practical for those who wish to know when it will be best to begin their planting journey.

History of the Field

Created in the 1980s, mobile applications have been used as a small feature within basic hand-held devices. An example includes the Psion Organiser 1, a gadget with the claim of being the “World’s First Practical Pocket Computer.” The Psion machine carried the ability to be a calculator, clock, and calendar. However, as time progressed, companies would soon find success in creating apps within their devices. In 1993, IBM would release the world’s first smartphone that contained many of the features that the Psion device had. Eventually, in 2002, the BlackBerry would be made available, but it introduced a new application: email. However, the big breakthrough in relation to mobile applications would occur when Apple launched its app store in 2010. Additionally, for android devices, Google Play would be released in 2012, allowing users of both types of devices to enjoy what mobile developers have created.

In 2020, nearly 108.5 billion mobile applications were downloaded from Google Play while 34.4 billion downloads were made from the App Store. It’s quite obvious how significant mobile applications have made an impact on the phone industry and its users. According to the original planners behind the App Store, the success was unexpected, and the benefits for both developers and users involve less complexity in terms of distribution and allow for growth and innovation. To Apple, the App Store was the easiest way to get developers more in touch with their audience, and it makes applications more accessible for everyone of all sizes and regions.

For other mobile application developers, one noted how the App Store had transformed their small studio into a larger team where they were able to create over 10 mobile games with nearly one billion downloads. In the majority of the developer’s stories, their journey began on a small note, attempting to decipher how they would be able to release their product in the hands

of their users without a centralized product that would allow for easy access. Many began to think about how their systems would be able to handle payments, distribution, etc, and luckily, the release of the App Store simplified the process.

Based on the history of mobile applications, my project builds upon many of the previous developers' ability to use Google's Play Store to spread their products to their intended audience. Like previous developers, my project allows for my own creativity and innovation that I have planned for to be brought to fruition, and it lets me focus on my passion to create an app that was made to the best of my ability, using skills that I have developed over the years. It also allows my product to be built in an app system environment that believes in me.

Leaders In The Field

Within my thesis project, there are three concepts involved, which include gardening, application development, and graphic design. Based on these important areas, there are three leaders that inspire my work towards my application, PlantMe-NJ.

One prime role model relating to gardening and their ability to share their talent with the world is a YouTuber who goes by the name '[*How's It Growing*](#)'. Living in Southern New Jersey, *How's It Growing*, otherwise known as Laura Boissonault, shares her planting expertise and records silent walkthroughs of her garden. She was first inspired to create her channel based on her affinity with gardening during her youth and motivation by her son. She notes that her love for gardening began as she helped her parents tend their rose gardens and spent time with her grandfather, a landscaper. Her official house gardening project went off on a rocky start since the garden was initially riddled with weeds and completely messy, but she saw potential in it, and her ambition to start her YouTube series paid off. As of October, she has nearly 37,000 subscribers, and her highest-viewed video has over 170,000 views. Just from her work, she has managed to initiate conversations with other enthusiasts, sparking friendships as well as opportunities for others to share their progress. Through her story, her efforts inspire my application since I also want my project to be something that can serve a strong purpose for others, whether it be something with a minor or major impact. Similarly to her idea, I want to motivate people of all different gardening backgrounds to not be discouraged or overwhelmed by the amount of effort that may be needed or by doubts about success. Using her first situation, I want my project to help people see the potential of what their gardening plot holds and envision the accomplishments that can be achieved once they use my application features.

In relation to application development, the creator of *Flappy Bird* is a great role model for a developer who used their coding abilities to create a simple application that encouraged people to participate. Created in 2013, Dong Nguyen first developed *Flappy Bird* reusing a bird icon that he created for a previous game he made. He was inspired by the physical game Ping Pong, and he explained how each game that he creates is always reflective of a sport since it is something that can be easy to learn but difficult to fully master. Thus, using sports as motivation, *Flappy Bird* was invented where players could tap on a phone screen to make a small bird fly through small spaces between two pipes. As he developed *Flappy Bird*, he found the game a bit too easy, thus he slowly improved the difficulty level in each demo, and ultimately, it lead to a simple-to-play game with a tough high score achievement. He noted how in each of his games, there is no such thing as impossible as long as people play his game as long as they can. Using his situation as inspiration for my project, although not game-related, I feel that his reflection of something related to a real-life encounter is something that PlantMe-NJ definitely features. It includes gardening and even though I may not be a master at it, I am determined to do my best towards achieving my highest potential. Additionally, I plan to use a similar approach to how he was able to improve his game since I feel that there may be features that need some refinement or could possibly be excluded from my current idea. Through user testing, I want to determine whether or not the application could be something that they would use or feel inspired to start gardening.

Lastly, regarding graphic design, my prime role model is my younger sister, a TCNJ Fine Arts Junior. Last year, she graduated from our local community college with an associate's degree in Illustration, and she is heavily experienced in creating posters, icons, logos, and art pieces. Ever since she was in elementary school, I could always see her with sketchbooks,

colored pencils, and markers drawing in a variety of art styles relating from realism to cartoons. In her college career, she worked on a copious amount of projects such as designing a poster for the college's theater show as well as posters for her graphic design club, which were used in a show in Philadelphia and at the college's jazz festival. Additionally, she paints in her free time, and she has sold several paintings to friends and a few teachers back in high school. Despite her success, there have been a few struggles that she had to overcome, which became rampant prior to her graduation from high school. Even though I was supportive of her studying a career involving art, she was overwhelmed by the potential for unsucccess once she graduated, and she was hesitant to even pursue her degree (and college at some point). However, she was able to overcome her doubts with reassurance from me and my parents. Overall, I find her a great resource to lean on if I need help with UI or graphic design, in general. Her story and work inspire my project greatly since I rely on her guidance and reviews if I am creating the PlantMe-NJ logo, application pages, icons, and more. Through her art, she is able to relay her hobbies and interests, and my application carries nearly every topic that I am interested in, which will involve 3D modeling, coding, and planting. I am inspired by her ability to create designs that are simple yet effective to format information, and in my designs, I strive to achieve something similar where the design will not be overly complex but it will be useful and functional for gardeners to use as a resource.

Industry Events

In connection to my thesis project, there are three events and conferences that relate to the topics of gardening and application development. These workshops highlight many of the high-quality and innovative work that inspires the expansion of my application, and it gives me a sense of what types of products exist in the current field as well as what kind of processes were involved.

For instance, the [*New Jersey Home and Garden Show*](#) is a popular exhibition that takes place from February 24 to 26 and is located in Edison. The event is meant to be a marketplace for home decor and improvements as well as outdoor plant nurseries and gardening tools. Since 1989, homeowners from all over the state have flocked to the show, and most have a planned project and budget in mind. Nearly hundreds of companies attend the show annually, varying from landscaping professionals to gardening glove shops. This event influences my thinking about my thesis project since my application could greatly benefit from advice from those in the professional gardening industry. They may be able to guide me toward finding ideal plants to grow within New Jersey, which is what my application is hoping to accomplish. It can also expose me to finding possible plants that I could grow either indoors or outdoors, which may impact the current direction of my project greatly.

Another affiliated event is the [*Worldwide Developers Conference*](#), a convention created by Apple. It takes place from June 6 to 10 online, and anyone ranging from creators to enthusiasts is able to participate. The conference is meant to be a week of showcasing current and upcoming technology projects either made by Apple or by selected developers. For instance, the first session consists of a keynote presentation by Apple that reveals new features made to

Apple products, and the following session includes the Apple Design awards, which are given to published apps and games that won in categories such as innovation, delight and fun, visuals and graphics, and more. There is also an ability to attend labs where you can get a one-on-one session with Apple engineers, designers, and experts regarding current Apple systems or even self-created projects. This conference influences my thesis project approach since I could receive useful feedback regarding my application whether it be regarding my UI design, code, or current platform implementation. In addition, by viewing the other product winners by various developers, I can get a sense of what ideas might be possible within my product or even how to improve it.

In addition, the [Google I/O](#) is another development convention that is held by Google, taking place online from May 11 to 12. It is meant to show keynote, product announcements, technical reviews, and other important informational sessions. There are several different videos that explain new platform features for Android, Flutter, Google Play, and more. In addition, there are also video tutorials that explain how to use tools in platforms such as ChromeOS, and it also involves basic coding concepts such as Fragments and building apps with Jetpack Compose. In regards to my thesis project, this event can greatly assist in reinforcing currently existing topics within the application, and it can inspire new functionalities that I may have not been initially familiar with. The videos can serve as a reference tool for figuring out how to adjust certain bugs or errors that I may struggle with upon further development, and I can also learn about what platforms may be best on the chance that I decide to fully publish my application for anyone to use.

Nuts and Bolts

List of Materials/Software

- Laptop (Mac or Windows)
- Android Device (personal phone)
- Autodesk Maya
- Adobe Photoshop
- Adobe Illustrator
- Adobe XD
- Android Studio
- GitHub
- Knowledge in GitHub
- Play Store Developer's License
- Knowledge in Kotlin
- Resources in Kotlin/Android Studio ([Kodeko](#))

Budget

To create the PlantMe-NJ project, the budget required would range from zero to \$25 depending on the app's final functionalities. If my end product has the completed planned abilities, then I will look into publishing the application to the Play Store, which requires a developer's license and costs \$25. Excluding the cost of \$25 for a developer's license, I have the needed materials and do not need to buy any other products. Since the IMM department gives access to Adobe products, I have the necessary Adobe Suite software that will aid the program.

In addition, with my student email, I have free access to Autodesk Maya, and since I already own a laptop and an android device, I am able to test and debug my application. Furthermore, Android Studio is free to download, and GitHub is a free site where I can upload the source code of my completed project remotely for sharing and portfolio purposes. Hopefully, if nothing goes wrong, then I will not need any materials from the cage.

Help

When developing PlantMe-NJ, if I encounter any problems, I do have some personal resources that will be able to answer Android Studio questions. For example, I have a couple of Computer Science classmates who have significant knowledge of Android Studio and may be able to provide a few pointers, feedback, or information. In addition, there are online resources such as Stack Overflow and Reddit where people have uploaded their solutions to some of the problems I may encounter.

In terms of graphic design and forming 3D modeling, I am able to consult IMM professors from previous classes I have taken, and I have a few classmates who have significant design knowledge. If I encounter any issues, then online tutorials and resources such as Reddit, YouTube, and LinkedIn Learning can help lead me to a solution.

If I encounter any issues with advancing in my thesis project or feelings of uncertainty, then I am able to discuss with my thesis professor about my future plans, and they will be able to guide me towards a better understanding and pathway needed for the application.

Timeline

Fall Semester:

Dec 6: AIMM After Dark

- Project Proposal Draft
- Project Pitch
- Project Presentation
- Project Website (Squarespace)

Dec 15

- Final Presentation

Winter Break

- Final UI design for the application
- Implementation of the UI design in the current application
- Program the design functionality (i.e. button leads to a different page)
- Research into the AI aspect in Android Studio
- Research into the plant grid aspect in Android Studio

Prototypes

Beta Version of the App

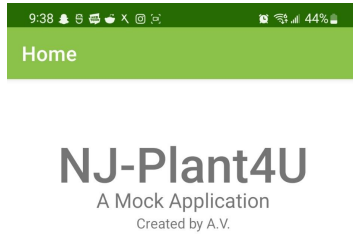


Figure 1.1
Home page of PlantMe-NJ
(*but with an older title*)

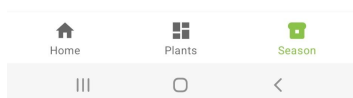
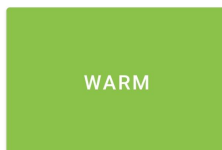
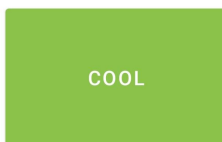
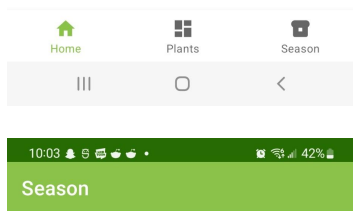


Figure 1.2
Seasons Page with the options of Cool or Warm

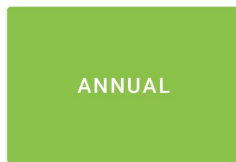
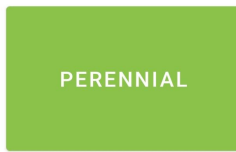


Figure 1.3
Plant Types Page with the options of Perennial or Annual

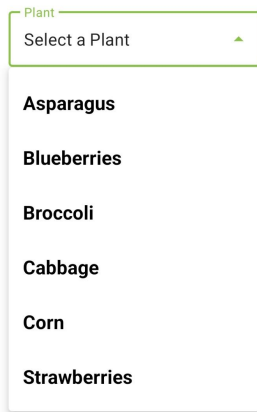
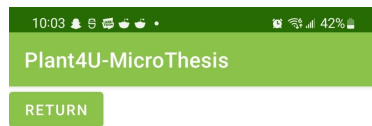
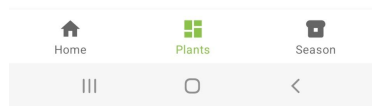


Figure 1.4
Drop-down menu page based on the user button selection



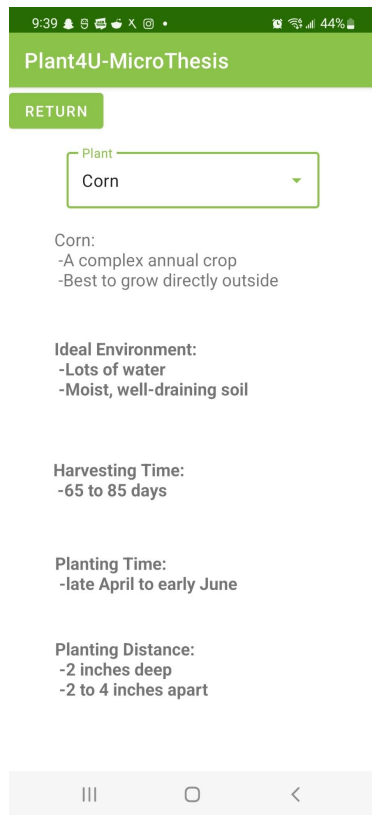


Figure 1.5
Sample Plant Page showing gardening information

UI Mock Ups of the App

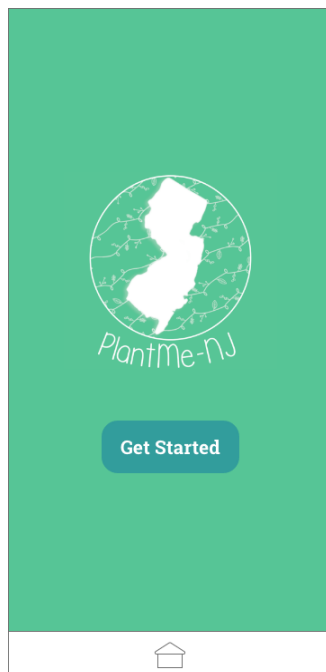


Figure 2.1
Opening Page of PlantMe-NJ



Figure 2.2
Home Page of PlantMe-NJ

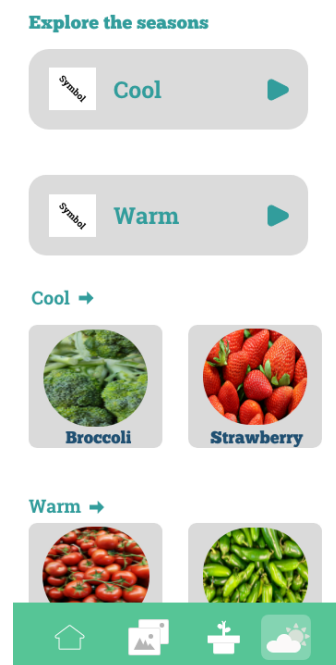


Figure 2.3
Seasons Page of PlantMe-NJ

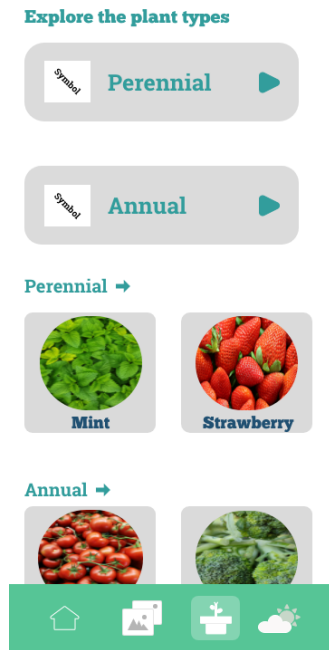


Figure 2.4
Plant Types Page of PlantMe-NJ

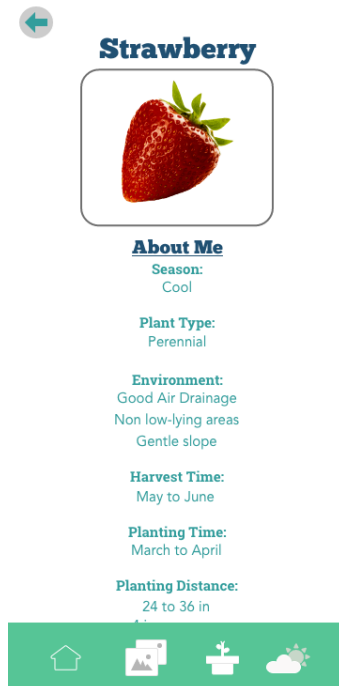


Figure 2.5
Sample Plant Page showing gardening information

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