Lab 1 - CropCircles Product Description

Chance Sadler

Team Red

Old Dominion University

CS 410

Professor Janet Brunelle

12/08/2023

Lab Version 1

Table of Contents

List of Figures

1. Introduction

Within the past few years gardening has seen an increase of 18 million people joining the hobby (Marturano, 2021). With so many people joining the hobby there are knowledge gaps between the people just starting and the ones that have been gardening for years. New gardeners face challenges including knowing the right crops to plant, time management, and knowing what to do with the harvested crops.

Novice gardeners lack the knowledge of what plants they can grow in their area (Brad, 2022). There are many contributing factors such as lack of general crop knowledge and what plants are best for the use case. With many varieties of each plant, it can be difficult to know which would be the right one to plant(Marc,2023).

Lack of experience and knowledge to transform a garden's yields into various post-harvest products, such as wine or jam cause many gardeners to waste crops. There is a knowledge gap among gardeners regarding post-harvest processes, as highlighted by the limited adoption of mobile apps and extensive internet use for gardening-related information. Addressing these knowledge gaps, leveraging community resources, and fostering individual motivation are crucial elements for effectively harnessing a garden's potential and ensuring that the homegrown produce does not go to waste.

CropCircles provides users with a central hub for product making and community driven growing solutions through the implementation of CropCircles, product forums that provide users with likeminded individuals with similar growing goals where they can foster a sense of community. Users can ask questions to get answers on product and crop best practices. CropCircles allows for users to get the answers they need to make the products they desire.

2 CropCircles Product Description

CropCircles is a mobile application aimed at forming a community of gardeners for the purpose of spreading knowledge of post-harvest product development. The app is split into three major sections: forums, journal, and direct chat.

2.1 Key Product Features and Capabilities

The main feature of CropCircles is the forum section. In the forum section users can create posts for questions about products or plants, crop and method recommendations, or progress updates. The questions can be responded to by all users. Known expert users are highlighted by the app to allow other users to know the information is credible. The second forum is for growing recommendations where users can provide information they would like to share with the community about best growing practices. The crop recommendations are organized by final product and crop. The final type of forum we call a CropCircle. A CropCircle is a user created sub-community where members can post their progress to get feedback and encouragement from approved users. Users can only join a CropCircle upon approval of a member of that CropCircle.

The app provides users with tracking features in the form of journaling and notes about logging growing information. The journaling feature automatically adds weather data to a daily log for each tracked crop or product. Historical product completions will be stored for future reference by the user. CropCircles also provides users with a chat function for direct messaging with other CropCircle members. Direct messaging through the app allows users to not have to share personal information such as a phone number.

2.2   Major Components (Hardware/Software)

The required hardware for all users to utilize CropCircles is a compatible phone running Android 10 or later. An internet connection is required for access to social features and weather updates. Offline users have access to their notes section, which is stored locally on their device.

The CropCircles app uses Java Script for the user interface. The backend server hosting is provided by Amazon Web Services. The Database management for the app uses MySQL on Amazon's RDS. The weather information is provided by the OpenWeatherMap API.
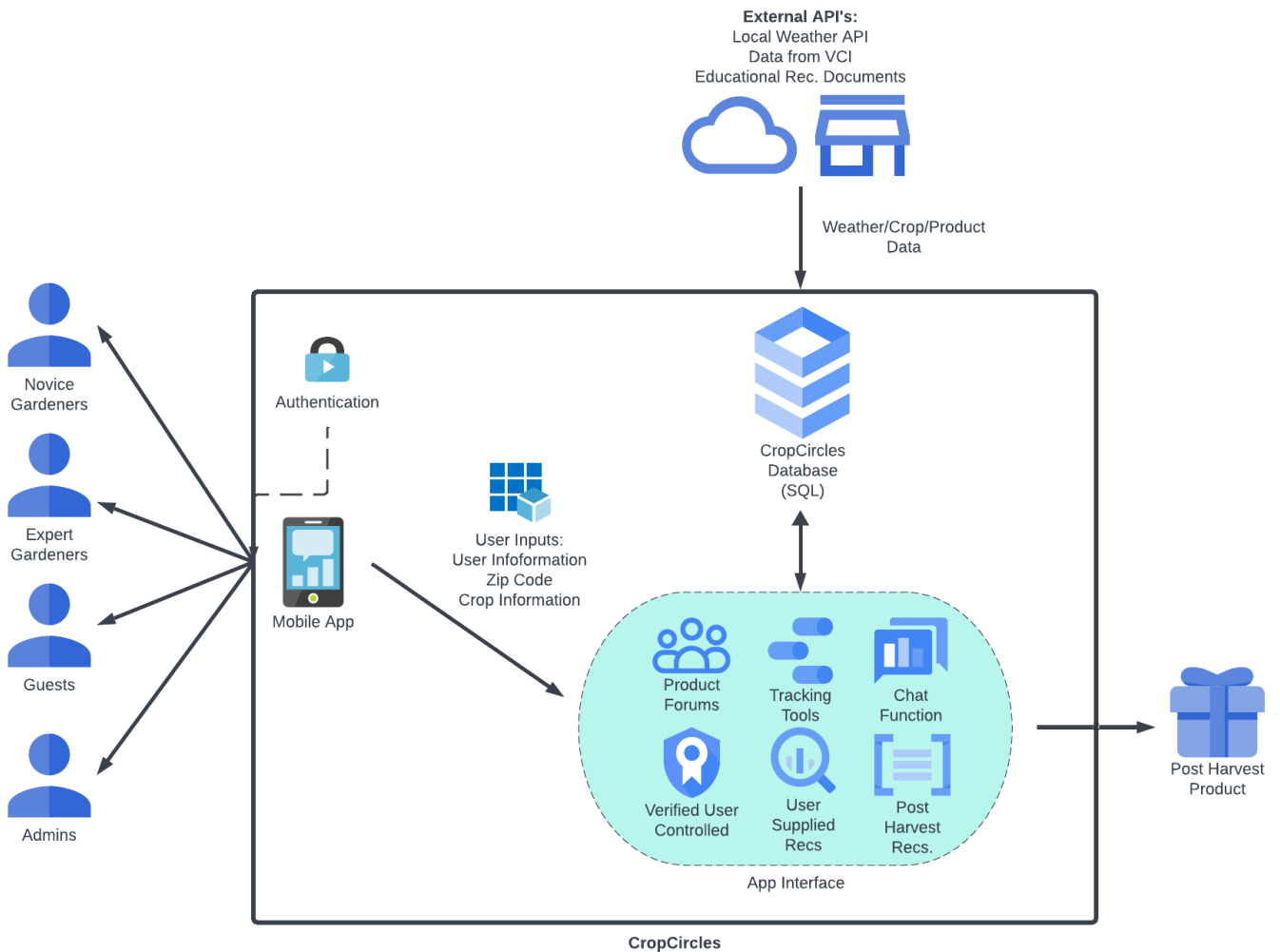
Figure 1: Main Functional Component Diagram

3. Identification of Case Study

CropCircles is designed to cater to a diverse range of users, with the primary audience being new individuals interested in cultivating a home garden and transforming their harvests into various products. The forums require a portion of the users to be verifiable experts, which ideally, are people who have years of experience and knowledge. People from other platforms and from educational institutions are examples of experts. All users benefit from open communication on the forums and direct messages.

A user looking for information on how to make good use of their strawberries would browse the strawberry forums. If the user can't find a post that already exists that fits their needs they would post a question to the forum. Alternatively, if a user wanted to make wine and wanted to know what crops would be best they would browse the wine forums.

An expert wanting to help new gardeners and artisans would conversely look through the forums for questions to answer. An expert user would also be able to post information without needing to reply to a question.

5. Glossary

- **Annuals:** Plants completing their life cycle in one growing season, providing vibrant blooms and requiring replanting each year for seasonal color and variety in gardens

- **Blanching:** A brief exposure of harvested vegetables to boiling water or steam, often followed by rapid cooling, to halt enzyme activity and preserve color, texture, and nutritional value

- **Brining:** The immersion of harvested produce, particularly fruits or vegetables, in a solution of salt and water to preserve, flavor, or enhance texture

- **Canning:** A preservation method involving the sealing of harvested food in airtight containers and heat processing to prevent spoilage, commonly used for fruits, vegetables, and sauces

- **Cider:** A beverage made from the fermentation of apple juice, resulting in a mildly alcoholic drink with various levels of sweetness and carbonation

- **Community Forum:** A social feature in the gardening app that enables users to connect with other gardener users, share experiences, ask questions, and seek advice on various gardening topics

- **Compost:** Decomposed organic matter, such as kitchen scraps and yard waste, used as a nutrient-rich soil amendment to improve soil structure and fertility

- **Curing:** The controlled drying and conditioning process applied to certain crops, such as tobacco or onions, to enhance flavor, texture, or storage qualities

- **Dehusking:** The removal of the outer husk or shell from a harvested crop, commonly applied to grains, nuts, or seeds

- **Expert Gardener:** A gardening professional with certified expertise gained through formal education, training, or hands-on experience in product-related subjects. They lead and manage groups focused on specific gardening products

- **Fallow**: Allowing a field or garden bed to remain unplanted for a season to naturally restore fertility, control pests, or prevent soil erosion

- **Fermentation:** A microbial process used in the post-harvest stage to transform certain crops, like cocoa or coffee beans, through the breakdown of compounds, often resulting in improved flavor or quality

- **Frost Date:** The average date of the last spring frost or the first fall frost in a specific location, crucial information for gardeners to determine appropriate planting times and protect sensitive plants

- **Harvest:** The point at which the crop is ready to be gathered for use

- **Heirloom Seeds:** Seeds from plants that have been passed down through generations, maintaining their original characteristics, and often valued for their historical, cultural, or genetic significance

- **Jam:** A sweet spreadable product made by cooking fruit with sugar to a gel-like consistency, often containing whole or pieces of fruit

- **Microgreens:** Young, edible greens harvested at an early stage, typically within a couple of weeks of germination, prized for their intense flavors and nutritional content

- **Mulching:** The practice of covering the soil around plants with a layer of organic or inorganic material (mulch) to conserve moisture, suppress weeds, and regulate soil temperature

- **Novice Gardener:** A gardener with limited formal training, education, or professional background in the subject matter, possessing some knowledge but lacking accreditation

- **Oils:** Extracted from fruits, seeds, or nuts, oils serve various culinary purposes. Olive oil, for example, is pressed from olives and is a common cooking and salad oil with distinct flavors based on the olive variety and processing methods

- **Pickling: T**he preservation of harvested produce, typically cucumbers or other vegetables, in an acidic solution, often vinegar, along with various spices, to create pickles with a distinct flavor profile

- **Perennials:** Plants that live for more than two years, often returning each growing season, providing long-term stability in a garden

- **pH Levels:** A measure of the acidity or alkalinity of the soil, influencing nutrient availability to plants. Adjusting pH levels can optimize conditions for specific crops

- **Plant Care Reminders:** Notifications and reminders within the app that alert users to water, fertilize, prune, or perform other care tasks for specific plants based on their individual needs and schedules

- **Post-Harvest:** The phase following the harvest, including the processes involved in transforming a crop into a product

- **Preserves:** Similar to jam, preserves are a sweet spread made by preserving whole or large pieces of fruit in a sugary syrup

- **Product:** The end goal of a crop after harvesting, ranging from wine to jam or any other item that can be produced in the post-harvest stage

- **Raised Bed Gardening:** Cultivating plants in beds elevated above ground level, often enclosed by frames, allowing for better soil drainage, warmer temperatures, and easier accessibility

- **Relish:** A condiment made from chopped fruits or vegetables, often pickled, and seasoned with spices, vinegar, or sugar, used to enhance the flavor of savory dishes

- **Syrup:** A thick, sweet liquid often made by boiling sugar or fruit juice, used as a topping for pancakes, waffles, desserts, or in beverages

- **Thinning:** The practice of selectively removing excess seedlings or fruits to allow the remaining ones to grow more robustly, ensuring proper spacing and resource allocation

- **USDA Hardiness Zones:** A zoning system created by the United States Department of Agriculture (USDA) to classify regions based on temperature extremes. Ranging from 1 (coldest) to 13 (warmest), these zones guide gardeners in selecting plants adapted to their local climate, ensuring successful cultivation

- **Weather Integration:** The incorporation of real-time weather data into gardening apps, offering users insights into current and forecasted weather conditions to assist in garden planning and care

- **Wine:** An alcoholic beverage produced through the fermentation of crushed grapes or other fruits, with variations in flavor, aroma, and complexity depending on the grape variety, region, and production techniques

6. References

- *25 fun facts about peanuts & peanut butter*. (n.d.). Retrieved October 19, 2023, from https://nationalpeanutboard.org/news/fun-facts/

- 7 benefits of eating local foods. (2023). Retrieved from https://www.canr.msu.edu/news/7_benefits_of_eating_local_foods

- 8 surprising health benefits of Gardening. (2022). Retrieved from https://healthtalk.unchealthcare.org/health-benefits-of-gardening/

- Brad. (2022). Disadvantages of gardening - what are your risks. Retrieved from

https://northernnester.com/disadvantages-of-gardening/

- Direct-to-consumer farm sales reach $10.7 billion in 2020, 35-percent increase from 2019. (n.d.). Retrieved from https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=104408#:~:text=About%207%20percent%20of%20America%27s,processors%2C%20grain%20mills%2C%20etc

- Disadvantages of buying local & why you should do it anyway. (n.d.). Retrieved from https://www.simpleminded.life/disadvantages-of-buying-local/

- Kileen, E. (2022). Why we should embrace eating locally. Retrieved from https://betterfood.co.uk/embrace-eating-locally/

- Farming and farm income. (n.d.). Retrieved from https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/

- Food Access, Food Waste. (n.d.). Retrieved from https://www.usda.gov/peoples-garden/food-access-food-waste

- Grapes 101: Grapes in a bottle of wine. (2021). Retrieved from https://cals.cornell.edu/news/2021/05/grapes-101-grapes-bottle-wine#:~:text=To%20finish%20that%20conversion%2C%20its,wine%20per%20ton%20%3D%20130%2D180

- Guy, C. (n.d.). Human health & plants research: Why do people garden? " Wilmot Botanical Gardens " college of medicine " university of Florida. Retrieved from https://wilmotgardens.med.ufl.edu/2021/09/17/human-health-plants-research-why-do-people-garden/

- Katharine. (n.d.). Strawberry Jam. Retrieved from

https://www.allrecipes.com/recipe/38410/strawberry-jam/

- Legendre, F., Humbert, M., Mermoud, A., & Lenders, V. (2020). *Contact tracing: An overview of technologies and cyber risks*. arXiv. https://doi.org/10.48550/arXiv.2007.02806

- Lisa Wimmer, A. (2022). Dig into the benefits of gardening. Retrieved from https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/dig-into-the-benefits-of-gardening

- Mayers, K. (2023). Gardening statistics in 2023 (incl.. Covid & Millennials). Retrieved from https://gardenpals.com/gardening-statistics/

- McCurdy, M., Intern, U. E., & Connections, N. (2022). Health benefits of eating locally. Retrieved from https://extension.unh.edu/blog/2022/05/health-benefits-eating-locally

- Mlblevins. (2011). The many disadvantages of local food that you are unaware of. Retrieved from https://nutrineat.com/local-food-its-disadvantages

- Mueksch, N. (2023). The number of farms in the world is declining, here's why it matters to you. Retrieved from https://www.colorado.edu/today/2023/05/11/number-farms-world-declining-heres-why-it-matters-you

- Naked Food Magazine. (2022). How old is the "fresh" produce we eat? Retrieved from https://nakedfoodmagazine.com/how-old-is-the-fresh-produce-we-eat/

- Semuels, A. (2019). American farmers are in crisis. here's why. Retrieved from https://time.com/5736789/small-american-farmers-debt-crisis-extinction/

- Stanborough, R. J. (2020). 10 benefits of gardening, plus helpful tips & recommendations. Retrieved from

https://www.healthline.com/health/healthful-benefits-of-gardening

- Tingly, L. (2023). Off the vine:optimize nutrients by eating produce immediately after harvest. Retrieved from https://growingspaces.com/off-the-vine/

- Xie, Y., Hunter, M., Sorensen, A., Nogeire-McRae, T., Murphy, R., Suraci, J. P., … Lark, T. J. (2023). U.S. farmland under threat of urbanization: Future development scenarios to 2040. Retrieved from https://www.mdpi.com/2073-445X/12/3/574 +

- Marc,(2023) Grapes Used in Wine Making, EverWonderWine? https://www.everwonderwine.com/grapes-in-winemaking