

Lab 1 - CropCircles Product Description

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CS 410

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12/05/2023

Group Outline Version 1

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1. Introduction

Societal Problem

The effectiveness of harnessing a garden's potential and transforming its yields into a wide range of post harvest products is contingent on addressing knowledge gaps, utilizing proper community resources, and fostering individual motivation. Gardening has witnessed a substantial surge in participation, marking a 35% increase since 2021, with 55% of American households engaged in gardening activities. However, a notable issue persists: gardeners lack guidance on utilizing harvested produce efficiently, evident from the mere 20% usage of mobile apps for information. Moreover, there exists a significant gap in leveraging garden yields for post-harvest products, especially evident in the realm of winemaking. Despite 79 million Americans consuming wine, only 500 thousand North Americans pursue winemaking as a hobby, and there's an untapped potential for making wine from various fruits, including strawberries—a popular small fruit in home gardens.

2. CropCircles Product Description

CropCircles is an application aimed at forming a community of gardeners for the purpose of post harvest product development.

2.1 Key Product Features and Capabilities

CropCircles will provide users with a Q/A forum to generate posts and respond to other users posts, it will also provide users with a chat function for direct messaging with other members. We will provide users with a growing recommendations forum where users can provide

information they would like to share with their CropCircle(group) about best growing practices, as well as provide users with a growing updates forum where progress posts can be sent to encourage discussions and encouragement amongst team members. CropCircles will provide users with tracking features in the form of journaling and notes to log growing and product information. Historical product completions will also be stored by the application for future reference by the user. And we will provide users with a post-harvest forum for browsing recipe suggestions and recommendations on activities such as storage practices and handling techniques.

2.2 Major Components (Hardware/Software)

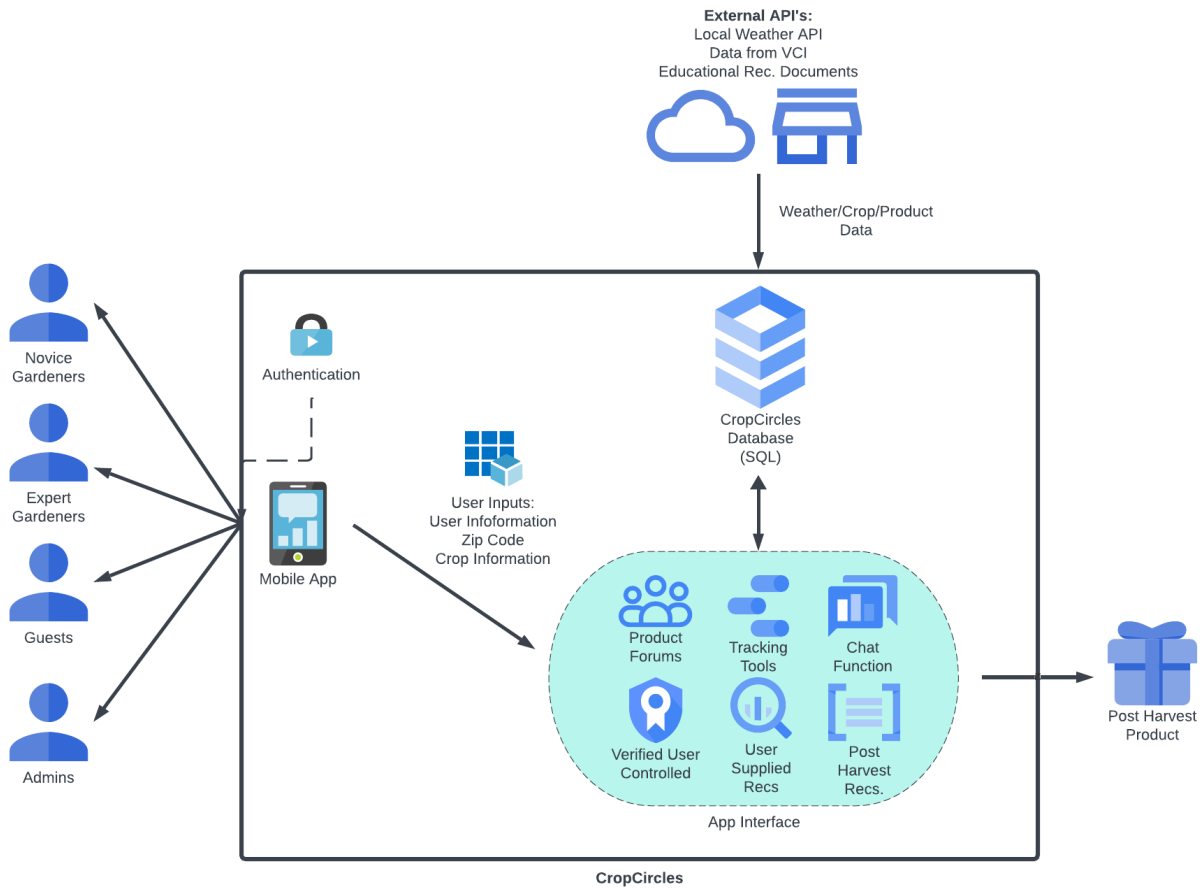


Figure 1: Main Functional Component Diagram

2.2.1 Hardware

CropCircles will require an Android smartphone with internet connection to download the application.

2.2.2 Software

For software CropCircle will feature secure authentication, we will also use OpenWeather API to get local weather information, we will use either AWS or ODU servers as backend servers, we will use MySQL for database, Git/GitHub will be used for version control, issue tracking and

continuous integration. We will also use Gradle for doing any testing, and Docker for containerization. As for the innovative software, we will provide users with chat functionality, product forums, community(CropCircle) finder/generator. The programming language of choice would be JavaScript.

3. Identification of Case Study

- **Intended Users**

CropCircles will target **novice gardeners** who want to make products from their home grown harvest, **expert gardeners** who want to share their knowledge with others, and **other users** who are interested in crop and product information without participating in more in-depth groups.

- **Case Study Characteristics**

- The CropCircle(group) will contain a minimal number of users (10) with the following backgrounds:
 - Users with no prior gardening experience
 - Users with standard(some) growing experience
 - Users with growing proficiency
 - Users with certifiable growing expertise

- **Reduction in Scale: Expected user cases to be demonstrated in the prototype**

For demonstration purposes we will use one type of crop, which will be strawberries and two types of products, which will be jam and wine.

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:** The 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

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