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Final Project Writeup – The Plant-gorithm

Introduction

The houseplant industry boomed during the COVID-19 pandemic, leading small and large suppliers alike to scramble to meet the newfound demand. However, thanks to mass production methods like tissue culture, air layering and propagation, the practice of acquiring rare plants became popularized and more accessible. The emergence of trendy varieties and species, often sold at hefty prices, meant many beginner plant owners were unaware of how to care for their new houseplants. Marketplace apps, like Etsy and Palmstreet, also allowed individuals to purchase globally sourced plants from the comfort of their homes. The demand for indoor plants has not ceased, and the availability of various hybrids and cultivars has only augmented the availability of plants coming in all shapes, colors and sizes. Despite the rapidly increasing market size, an automated tool to recommend houseplants on the basis of experience level and personal preferences does not currently exist. Thus, to empower buyers with accurate and comprehensive information, the Plant-gorithm collects user-inputted information, such as the available sunlight and desired height, to suggest the plants that best fit one's lifestyle and space.

Data & Methods

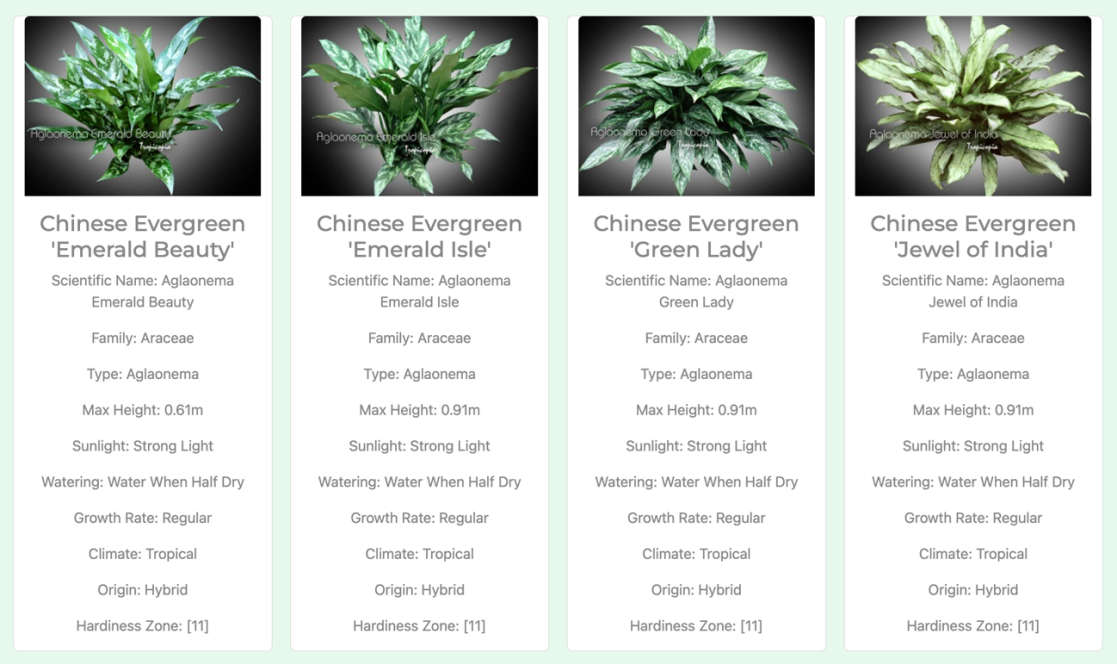
The algorithm utilizes the public dataset entitled "Indoor Plants Data Set From API" (Kaggle).

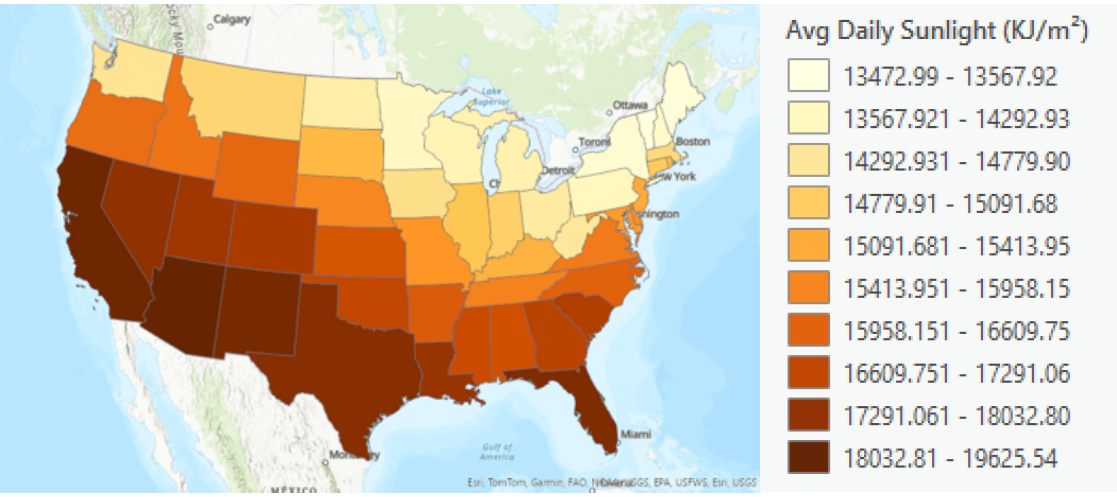
This data is scraped from Tropicopia, which features an alphabetical catalog and image gallery with care instructions, habitat details and photos to aid in identification (Tropicopia Online). The dataset originally consisted of 8 columns: the row index, common name, family, category, area of origin, climate, hardiness zone and image URL. I removed the nonessential row index and supplemented these variables with the plant's scientific name, growth rate, appeal (flower, foliage, etc.), maximum height, availability, light criteria and required watering—all sourced from the same website. I then created the following filters: available sunlight, watering frequency, desired height, degree of rarity and best feature. I performed a moderate amount of data preprocessing, as there were numerous missing values and instances of outdated nomenclature. In order to properly import the CSV file into my Dash app, column names were standardized using underscores, leading zeros were removed and data values were capitalized. In addition to built-in Dash components like dcc, Input, Output and State, I also utilized the external dash_bootstrap_components library to display the plant suggestions as Bootstrap card components. Included in the body of the card is the plant's genus and care information, with an additional card above showcasing the Tropicopia photo.

Conclusion/Demonstration

When a user first navigates to the landing page, they are met with the title, a brief description of the Plant-gorithm app's functionality and a clear call to action. In order to maximize readability, the page's structure has a well-defined content hierarchy. The main visual element is an image of several houseplants, and I changed the background color and style of the buttons to fit the desired aesthetic of the app. On the form page, where users input their preferences, the default values for the radio buttons and dropdown menus are set to the most common data values. For reference, I also included a map showcasing average daily sunlight (insolation) by U.S. state that

I created using ArcGIS Pro and CDC data (Centers for Disease Control & Prevention). It utilizes a yellow-to-red color scheme with values ranging from 13,473 to 19,636 KJ/m^2. For example, if a user wants to find a small foliage plant that thrives in strong light, is not rare and only needs watering when the soil is half dry, they should buy a Chinese evergreen cultivar. The main use case for this app is as a purchasing tool that also aids in education, simplifying the day-to-day care for over 200 different houseplants. The Plant-gorithm's personalized suggestions streamline the process of choosing the perfect plant while also preventing improper growing conditions.





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