Lab 1 - Pest Patrol Product Description

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Lab 1

Rough Draft

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1. Introduction

Everyone hates pests, they always seem to show up out of nowhere. Members of a community have no reliable way to stay informed on local pest encounters. Wouldn't it be nice to be able to know where pests have been seen recently to help better you prepare? That is where Pest Patrol comes into play. Pest encounters in communities are a common occurrence, but due to the isolated nature of these experiences and fragmented means of reporting, community awareness and an informed collective response rarely occur. Large-scale coordinated strategies have been demonstrated to be successful against pests. We plan to facilitate this coordination by providing an alleyway for effective communication, awareness, and coordination among community members. Pest Patrol will be a mobile and PC application that will allow individuals to report, monitor, and communicate the overall pest activity in their community; as well as allow users to coordinate a community-based solution to pest problems.

2. Pest Patrol Product Description

Pest patrol uses community crowdsourcing to provide real-time awareness of pests issues and their location. Users can offer guidance to other members of the community on how to effectively manage/resolve pest problems and identify unknown pests. It maintains a collective knowledge base of all past reported incidents to streamline user efforts in finding effective prevention strategies as well as solutions to current pest problems. The app will also use heat

mapping and predictive modeling so users are aware of significant pest problems within their community and when seeking assistance from pest control companies is necessary.

The goals of Pest Patrol are to make communities safer by minimizing the frequency of unwanted pest encounters and also minimize the severity of pest problems that do occur.

We will provide a streamlined interface for reporting and learning about pest encounters in a community. Enable users to tie reported incidents to their exact location. Provide a means for users to communicate with one another on reported incidents directly. Aggregate reported incidents and related discussion threads

2.1 Key Product Features and Capabilities

2.1.1 General

Pest Patrol will include PC and mobile versions of its software and will support Windows and Android operating systems.

2.1.2 Account Setup

A valid account tied to a valid account email address is required to use any interactive aspect of the application. The application will be view only without an account.

2.1.3 Dashboard

The Pest Patrol application will offer a variety of features to help people access information they need. When a user logs on they will start at the dashboard. Here the user will have the ability to access all the features/modules of the application. There will be three view modes of the application. The incident map will show a map of reported incidents. Discussion will provide a list of discussion threads related to the reported incidents. Users can seek help from the community and/or offer guidance/assistance. There can be multiple of these discussions. Hybrid will display the incident map, discussion threads, and an expanded view of the currently selected discussion thread simultaneously.

2.1.4 Incident Map

The user can then switch views to show just the incident map. The map will display reported incidents based on the user’s location. The location on a PC will tie the user's location to the user's selected community. The location on the mobile version is tied to the user's physical location. The incidents are customizable based on location, time/age, pest type and the user that submitted the incident.

The user can add new incidents straight from the incident map.

The map also offers a heat mapping feature that will show hot spots based on age of the pest activity and type of pest to highlight significant emerging pest problems.

2.1.5 Pest Alerts

Users will receive customized mobile alerts about the recent pest in their vicinity.

2.1.6 Thread Activity

Users can have quick and easy access to the threads related to the user. Users can also subscribe to other threads.

2.1.7 Recent Activity

The application will compile all recent events in the users community and display them. These include, new reports, new decision threads, and preemptive alerts to the user on potential problems to anticipate.

2.1.8 Direct Messaging

The user will be givin the ability to direct message somebody without having to create a public thread.

2.1.9 Community

Users will be part of their community by being able to follow/friend each other or report others for inappropriate behavior.

2.1.10 Profile Settings

The user will be able to customize their profile by adding information like their name, photo, username, and password. They will also be able to customize their display and alert settings.

2.1.11 Search Options

The application will offer a search auction option by using the ad hoc method for filtering items on the incident map without needing to modify profile settings.

2.2 Major Components

2.2.1 Hardware

- *Mobile Application* - internet enabled mobile device with camera
- *Desktop Web Application application* - computer with access to internet, keyboard, mouse, and camera

2.2.2 Software

- Web browser
- Front End: JavaScript (Angular.js / TypeScript)
- Middleware: Node.js
- Code editor: Microsoft Visual Studio Code
- Repository: Github
- GraphQL (Stretch)

2.2.3 Database

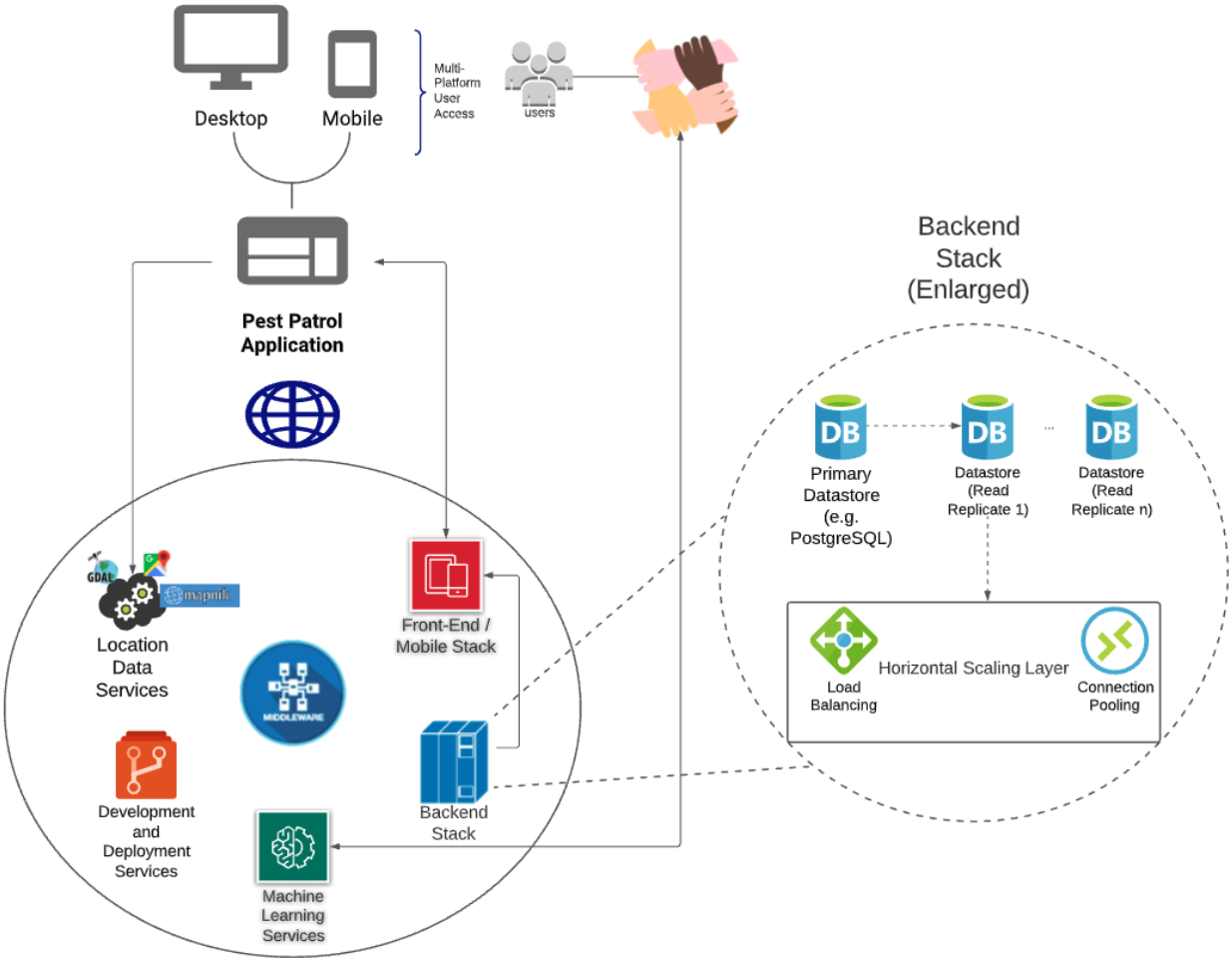
- PostgreSQL - for transactional data
- Cloud Storage - for Blob Data
- Big Query - Data Ware

2.2.4 Runtime / CICD / Microservices

- Google Cloud Platform
    - App Engine
    - Cloud SQL Instances
    - Maps APIs and Services
    - AI Platform (Stretch)

Figure

MFCD


Desktop
Mobile
Multi-
Platform
User
Access
users
Pest Patrol
Application
Backend
Stack
(Enlarged)
DB
DB
DB
Primary
Datastore
(e.g.
PostgreSQL)
Datastore
(Read
Replicate 1)
Datastore
(Read
Replicate n)
Load
Balancing
Horizontal Scaling Layer
Connection
Pooling
Front-End /
Mobile Stack
Location
Data
Services
Development
and
Deployment
Services
Backend
Stack
Machine
Learning
Services

3. Identification of Case Study

The product is for community members, hikers and campers, outdoor businesses, and cities. The purpose of the product is to allow individuals to report, monitor, and communicate the overall pest activity in their community; as well as allow users to coordinate a community-based solution to pest problems. Pest control companies, HOAs, government agencies, and researchers will all benefit from the product by utilizing the collected data.

4. Pest Patrol Product Prototype Description

4.1 Prototype Architecture (Hardware/Software)

How will the prototype be structured to demonstrate key features of the CS 410 product. Provide describe the Prototype MFCD.

4.2 Prototype Features and Capabilities

What does the prototype demonstrate? Why is that significant in showing how the problem is solved? How you have demonstrated success? How does the prototype address the CS 410 project risk mitigation? Describe the functional goals and objectives.

4.3 Prototype Development Challenges

Describe the expected challenges to be encountered while completing the prototype – e.g., knowledge missing, capability missing, supporting technology issues.

5. Glossary

Pest: Any animal or plant harmful to humans or human concerns

Community Member: A member of a community, see Community definition

Community: The people with common interests living in a particular area broadly the area itself

Incident: An occurrence or sighting of a pest reported by a user

Geo-targeting: Method of determining the geolocation of an application user and delivering different content to that visitor based on their location

Geo-tagging: The process of appending geographic coordinates based on the location of a mobile device

Bot Moderation: The automatic screening of user content to ensure proper user behavior

6. References

Abell, J. (n.d.). Nuisance Wildlife Encounters on the Rise. https://www.homestead.org/lifestyle/homesteading-life/nuisance-wildlife-encounters-on-the-rise/

Bugg, S., Colborne, S., & Haerther, D. P. (2020, March 2020). Great Lakes Invasives: Sea Lampreys. https://www.sheddaquarium.org/stories/great-lakes-invasives-sea-lampreys

Coyle, D. (2021, September 10). Not So Fast! International Biosecurity Program Succeeds in Preventing Spread of Invasive Moth. https://entomologytoday.org/2021/09/10/international-biosecurity-program-succeeds-preventing-spread-invasive-moth-lymantria-dispar-asiatica/

Herring, D. (2012, March 6). Climate Change: Global Temperature Projections. https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature-projections

How Warmer Winters Affect Pests. (2018, January 15). https://varmentguard.com/blog/warmer-winters-affect-pests

Japanese Beetle Repeatedly Eradicated from California. (n.d.). https://www2.ipm.ucanr.edu/Invasive-and-Exotic-Pests/Japanese-Beetle/

Lyme Disease Costs Up to $1.3 Billion Per Year to Treat, Study Finds. (2015, February 5). https://publichealth.jhu.edu/2015/lyme-disease-costs-more-than-one-billion-dollars-per-year-to-treat-study-finds

Parkman, K. (2021, September 23). Pest control statistics and trends. https://www.consumeraffairs.com/homeowners/pest-control-statistics.html

U.S. Census Bureau. (2021, April 21). Residents of 14 million housing units reported seeing roaches, 14.8 million saw rodents in last 12 months. https://www.census.gov/library/stories/2021/04/how-many-american-homes-have-pests.html