Lab1: Descriptive Paper of ODU Spring 2019 CS411 Team Silver Project

Crime HotSpot

CS411W Spring 2019 Team Silver
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1. Introduction

Description of crime mapping and Crime HotSpot.
- The need for publicly available crime mapping software
  - Personal Safety
  - Hearsay vs fact-based knowledge concerning crime

Background of what the current problem is:
- Differentiating violent crimes from nonviolent crimes
  - Difference between crimes occurring and the risk of crime impacting user
- Cluttered interface/information overload

Characteristics of an ideal solution:
- Provides context to data
  - Crimes shown relevant to user
  - Different crimes are weighted differently
- Conveys information in a meaningful and understandable way
  - Minimal clutter
  - Provides relevant statistics that complement map
    - Method for comparing areas

2. Product Description

- Discuss what a heat map is, why we are using one, what advantages that has compared to the problem we mention with traditional tools.
- Solution flow:
  - Simplify crime mapping
  - Reduce data noise
  - Visualization of crime statistics

2.1. Key Product Features

2.1.1. Crime Statistics

2.1.2. Geographical Crime References

2.1.3. Crime Heatmap

2.1.4. SafetyScore

2.2. Major Components

2.2.1. Crime HotSpot Website

2.2.2. Google Maps API

2.2.3. Crimes Database

2.2.4. Application Server

3. Identification of Case Study

- The general public
- Businesses
- Local Governments/Non-profit organizations

5. Glossary

5.1. Application Programming Interface (API) - a set of functions and procedures allowing the creation of applications that access the features or data of an operating system, application, or other service.

5.2. Crime Map - A map that has crime statistical data overlaid on it to provided information on the criminal activity of an area.

5.3. Heatmap - a representation of data in the form of a map or diagram in which data values are represented as colors.

5.4. Javascript MEAN Stack - MEAN is a free and open-source JavaScript software stack for building dynamic web sites and web applications. The MEAN stack is MongoDB, Express.js, AngularJS (or Angular), and Node.js.

5.5. JavaScript Object Notation (JSON) - a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language

5.6. SafetyScore - A number, proprietary to Crime HotSpot, that represents the relative safety of an area.

6. References

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Figure 1. Screen shot of crimes for the city of Norfolk, Virginia. Reprinted from Helping You Build a Safer Community in CrimeMapping.com., 2018, Retrieved from CrimeMapping.com

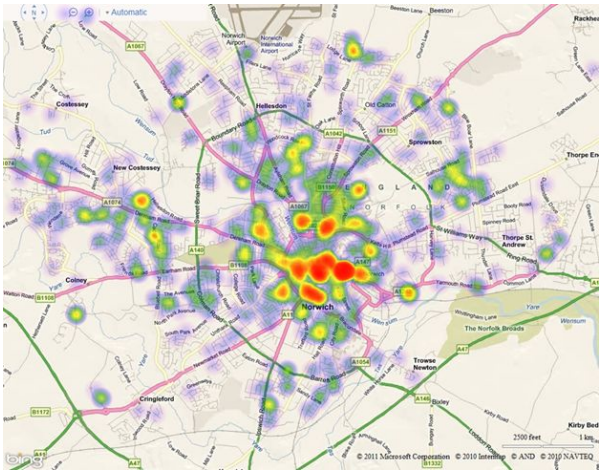

Figure 2. Example of a heatmap, with the red areas depicting a hotspot which where there is higher density of crimes. Reprinted from "Heat Map" by

Microsoft, 2011, Retrieved from alastaira.files.wordpress.com/2011/02/image24.png.

Figure 3. Theft of political campaign signs is a minor offense but can be over-represented in an area during campaign season and make the area appear unsafe
"Campaign Signs." *Minnesota Brown,* minnesotabrown.com/wp-content/uploads/2018/07/campaign-signs.png.

Figure 4. Cluttered Current Process Flow. This flow is hard to follow and may lead to inaccurate information.

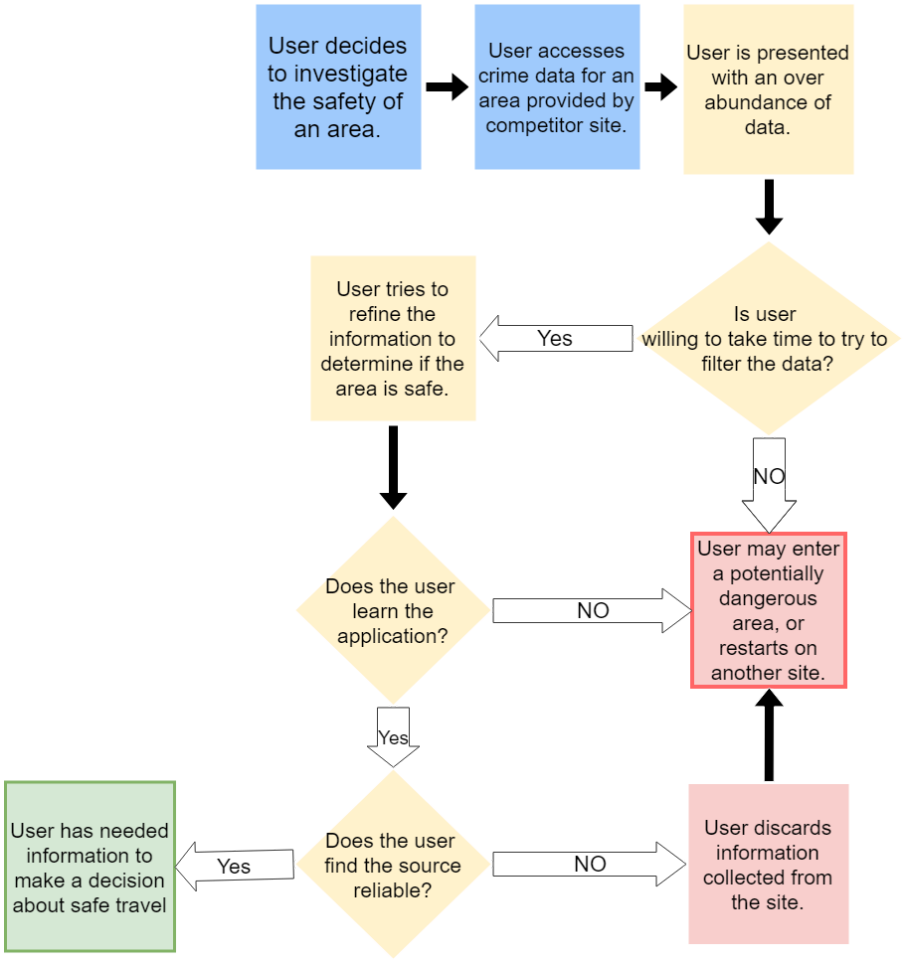

Figure 5. Basic current process flow.

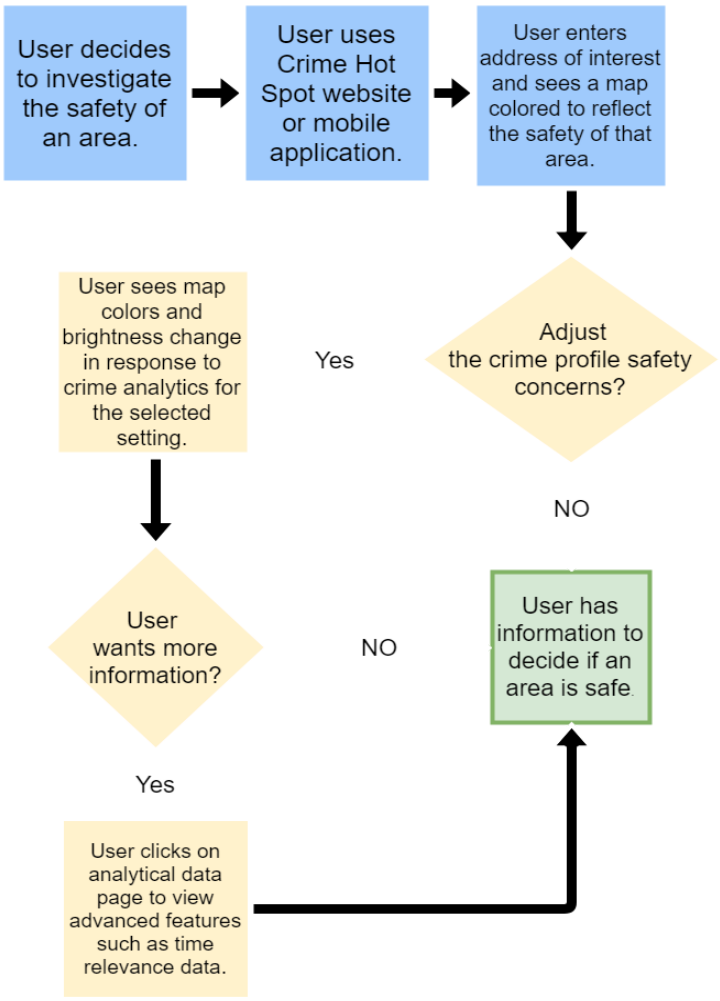

Figure 6. Solution process flow. The flow is easier to follow and ensures correct information presented in context to the user's requirements

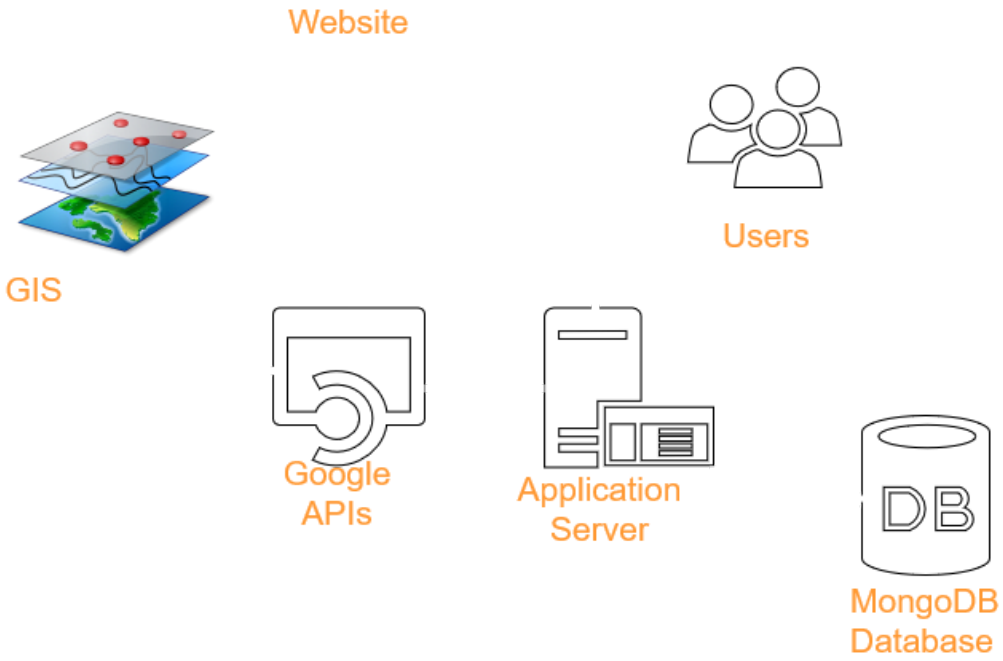

Figure 8. Major Functional Components Prototype Diagram

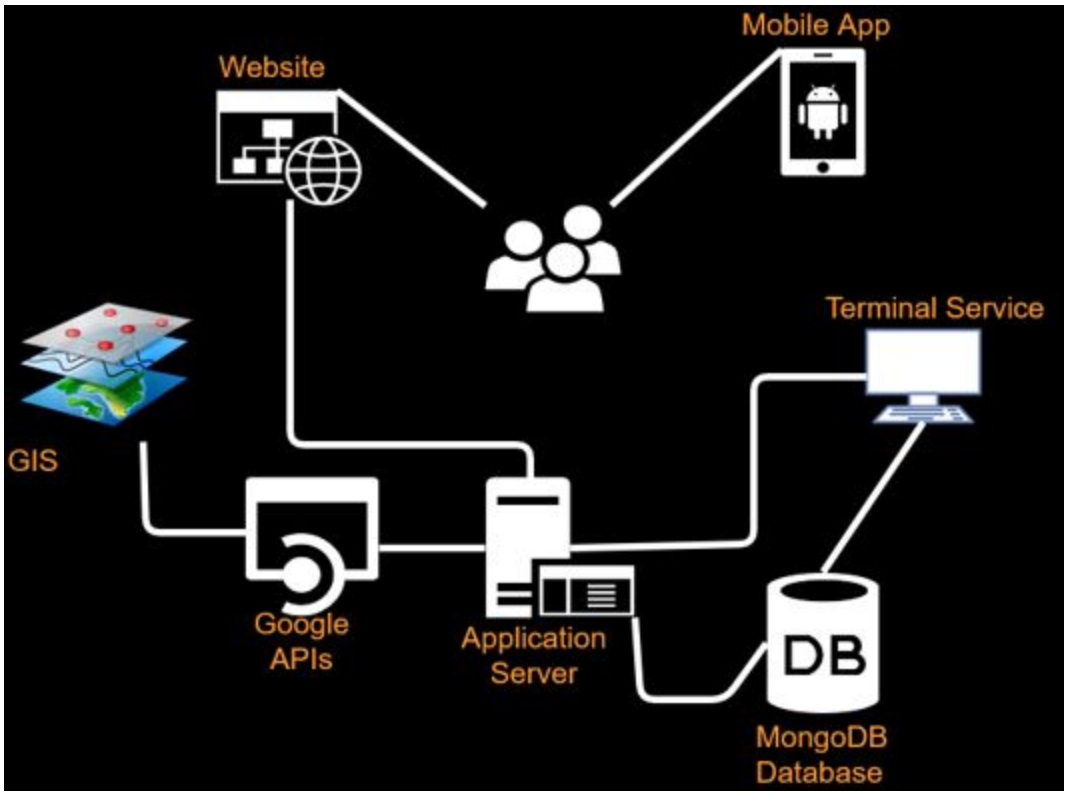

Figure 9. Major Functional Components. This diagram illustrates the relationships between the main application components. Reprinted from "Presentations" by Crime HotSpot, 2018, Retrieved from https://www.cs.odu.edu/~cpi/old/410/silverf18/presentation

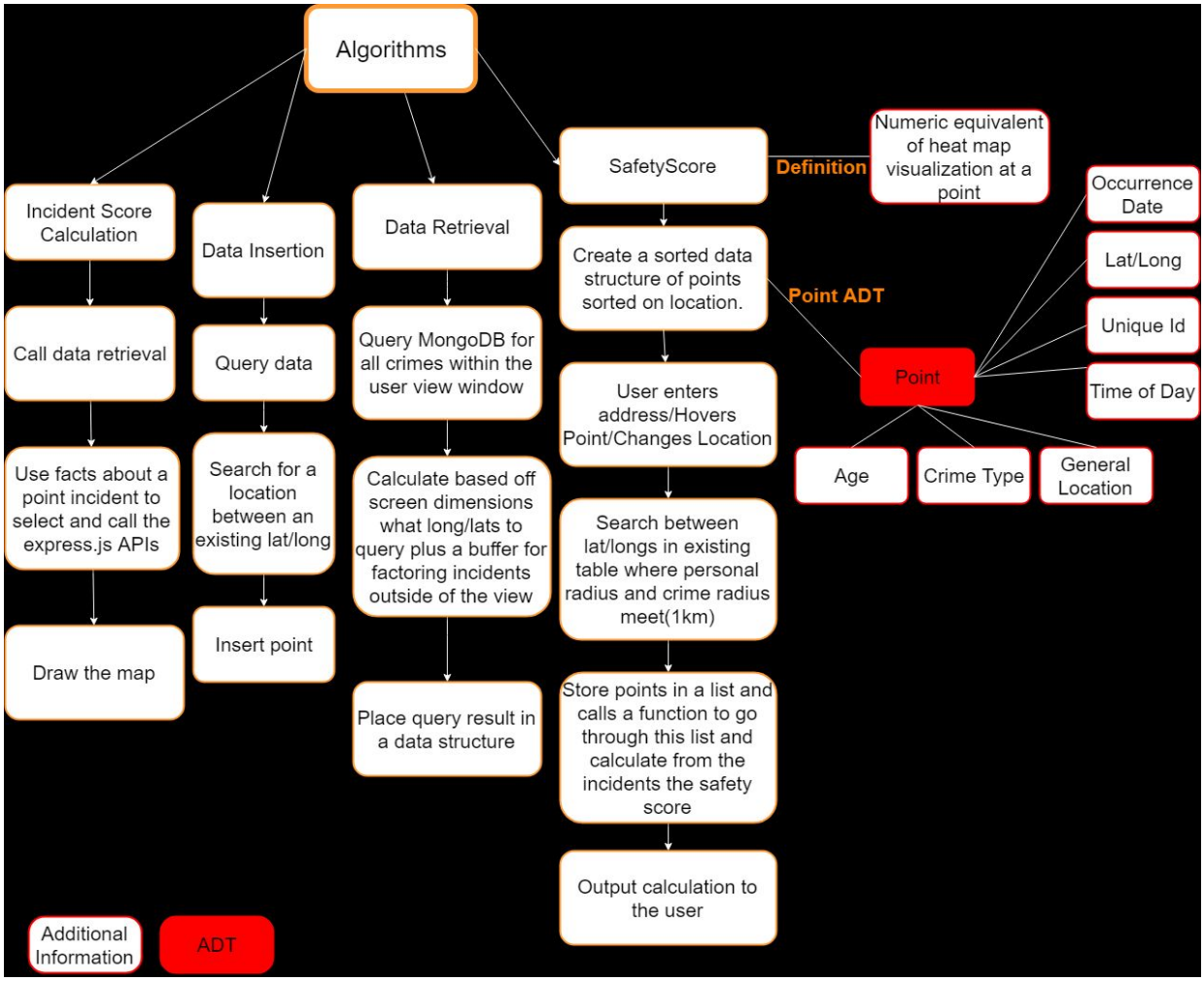

Figure 10. Algorithms Work Breakdown Structure. This diagram presents the algorithmic approaches used in Crime HotSpot. Reprinted from "Presentations" by Crime HotSpot, 2018, Retrieved from https://www.cs.odu.edu/~cpi/old/410/silverf18/presentation