Guillermo Vargas
6.170 Project 3
Part 1: Problem Analysis

StormSpot
One of the most dangerous characteristics of extreme weather conditions and natural disasters is their tendency to change suddenly. This leads to an unpredictability that makes it nearly impossible for people to anticipate how a severe storm might progress. We want to create an application that will allow users to stay informed, and inform others about severe weather conditions.

Purpose:
We want to notify users when new storms arise in their area.

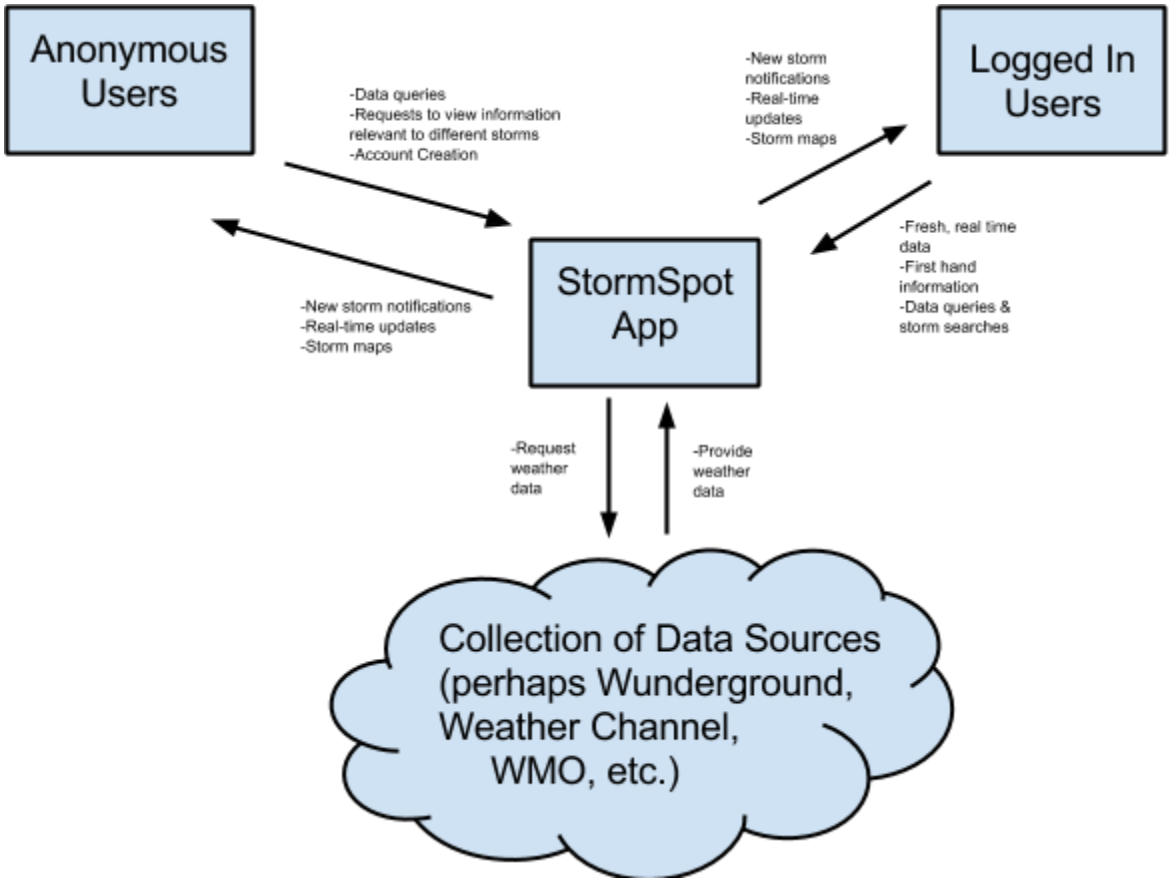
Once new storms develop, we want to create a real time feed that allows users to stay constantly informed about severe weather conditions in their area.

We want to crowd-source our dataset so that users can post their experiences as they happen with pictures, videos, etc. This will allow us to track the storm as it crosses our users' paths, and provide an accurate real-time portrayal of the storms behavior.

We want to provide data accurate enough for meteorologists to use when studying a storm's behavior.

Context:
The core of our application will be our server. Our server will scrape data from different meteorology data sources and weather data sources to get reasonable information about storms. From here, we extend our dataset to the users. They will be able to expand on this initial storm dataset by providing real-time posts and information regarding a storm. Our intention is that the initial data scrape will help us detect when new storms are forming as well as give us a general idea of how the storm might progress. The bulk of our feed, however, should come from our users. Allowing users to post real time experiences is what allows us to keep our subscribers informed with the most recent news. Because we want our app to help the general population, we want everyone to use it, so we will allow people to use the app without an account. These users will be able to read our feed as we get updates. Users who make accounts will be able to contribute to our feeds by providing first hand experiences and real time data to our server, which will then convey that data to all subscribers. This architecture leads to a

relatively simple context diagram, as depicted below.



Concepts:

Storm Scrapes:

The motivation for this is being able to notify users that a storm is coming before any users have submitted content relevant to that storm.

This is how we might determine a storm is beginning. Using data from another reliable source, we can create a new storm in our app that is the abstraction of the real storm. This way we can prevent users from incorrectly creating their own storms, keeping our set of storms reliable and unique. This step is crucial, as the first notification that a storm is coming is often the most important one.

Maps:

The motivation for this is being able to track the storm in real time, and provide data for meteorologists.

Our maps will create a user friendly interface through which people can track storms near them with high precision. It provides a relatable medium for users when they are trying to stay informed about

storms near them. It also provides meteorologists with a visualization to help them in their storm predictions.

Submissions:
The motivation for this is allowing users to post their own data on storms, thus supporting our real time information.

Allowing users to send submissions of their own experiences will help us track a storm's movements. It will also help other users anticipate what is to come, allowing them to be better prepared for the weather conditions that are threatening them. This feature is crucial if we want to maintain a real time feed of weather conditions, their paths, and their strengths.

Feed:
The motivation for the feed is to allow users to tune in to a real time feed, where they can reliably get the most recent updates on weather conditions that might be threatening their areas.

This step is the the core idea of our application. We want users to be able to view a live feed where they can quickly and easily find all of the newest information about the weather conditions affecting their area. This will help us keep our users educated about natural threats in their area, and provide them with the comfort of knowing that they have been equipped with as much information as possible.

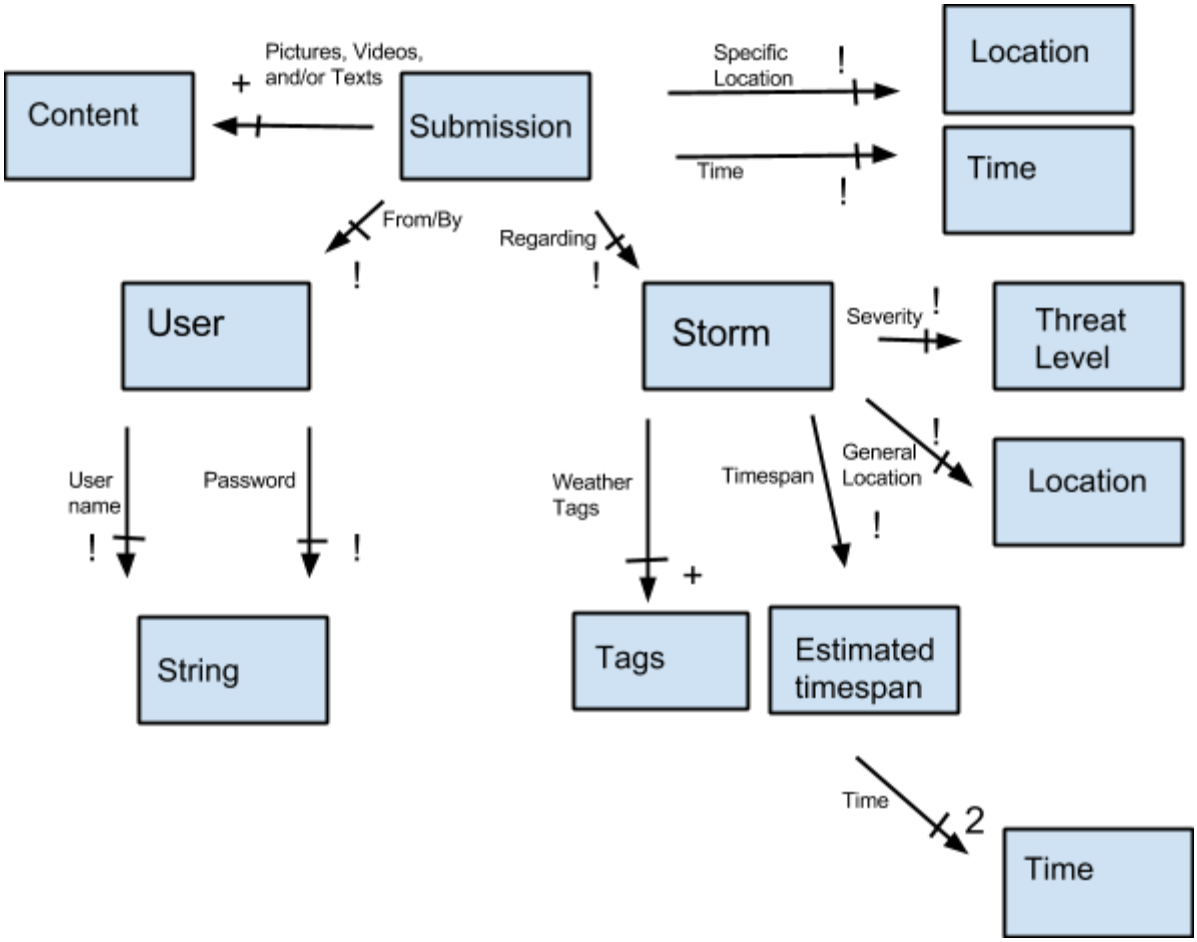
Data Model:
The data model consists of 2 main components, storms and users.

Each storm will contain tags with information about the storm, for example some tags might be: hail, tornado, flood, etc. Storms must also have a location, an expected timespan for the life of the storm, and information about threat level that corresponds with the warnings sent out by the National Weather Service.

Each user will consist of a username and password. Anonymous users will also exist, but they will not be able to submit their own content.

Encasing both of these large components is a submission by a user in regard to a specific storm. Each submission will include the user that it was submitted by, the storm it refers to, as well as a specific location, exact time, and some sort of content submitted by the user (video, blogpost, picture, etc).

The following diagram represents what our data model might look like based on the previous outline.


Content
Pictures, Videos, and/or Texts
+
Submission
Specific Location
!
Location
Time
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Time
From/By
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Regarding
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User
Storm
Severity
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Threat Level
User name
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Password
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String
Weather Tags
+
Tags
Timespan
General Location
!
Location
Estimated timespan
Time
2
Time