Basic Information

Project Title: D&D Monster Statistics

Team members:

- Name: Bryce Gillespie
- Email: (u1328400@utah.edu)
- UID: u1328400

Repository: https://github.com/fordahalibut/4630-project

Background and Motivation

I'm an avid D&D player and longtime dungeon master and have often bemoaned to my friend group that there isn't a good way to visualize important monster statistics (such as hit points, challenge rating, type, damage vulnerabilities or resistances) when designing encounters.

Project Objectives

Imagine that the party of player characters is travelling through a swamp. As a dungeon master, I know that the party's fighter can easily keep the attention of one large, challenging creature while the rest of the group attacks from relative safety. I know the sorcerer prefers to use spells that deal fire damage, and that the cleric can make swift work of any undead, but he's been feeling a little underutilized lately, so he needs a moment to feel special. I want to design an encounter that will challenge the group and set up a heroic scene for the cleric.

The goal of this visualization is to assist the dungeon master in this situation. Rather than flipping through sourcebooks or tables of monster data, they should be able to first filter to monsters of interest (undead creatures that live in swamps), and then display the relevant statistics of those monsters (in this case, challenge rating, size, and damage resistances).

By seeing this data represented in a visualization, they should be more easily able to design the desired encounter.

Data

The 5th Edition System Reference Document (SRD) is available from Wizards of the Coast through the Open Gaming License and contains the relevant statistics for several hundred monsters. There are several sites dedicated to displaying the data in this document, but none that I have found effectively visualize the data.

To collect the data, I made use of www.dnd5eapi.co, to generate a JSON file from a REST query. The resulting file contains 334 5th edition monsters and their associated attributes and statistics.

Exploratory Data Analysis

After obtaining the base data from the 5e SRD API, I began by designing the sortable table view to check expected versus actual values. I then created a rough scatter plot to visualize different numeric values against each other to see how the planned visual design would look.

Visualization Design

The main components in this visualization are:

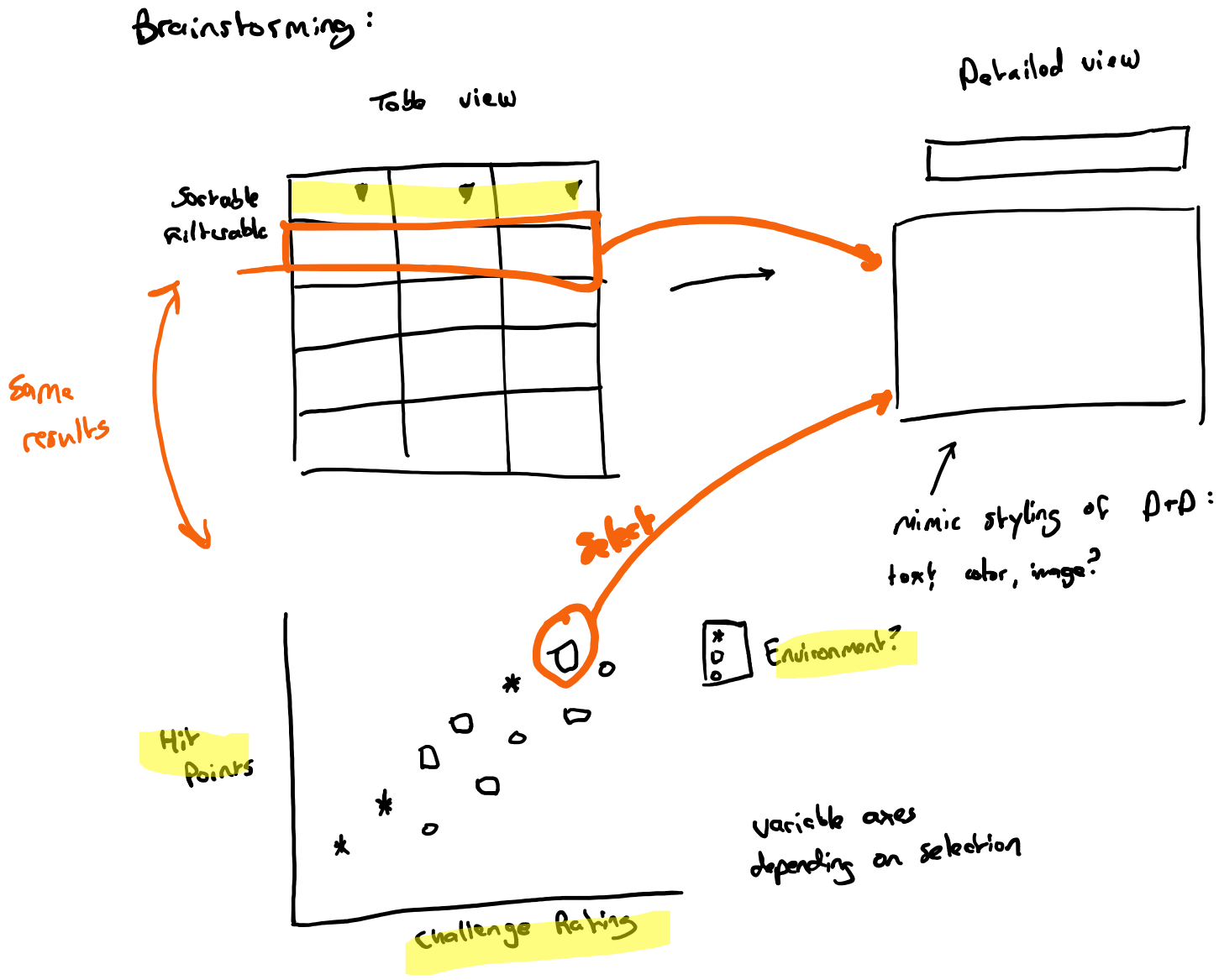
- Table display of filtered results
- Overview of selected statistics (scatter plot)
- Detailed view of a selected creature

(See included prototype designs)

In iterating through multiple design prototypes, I realized that the most interesting visual element will be the detailed view of a particular selected monster. I tried to encode the most relevant and useful information in such a way to be easily digestible at a glance, to see where particular strengths and weaknesses of an individual monster are.

Including the encounter builder idea is interesting technically and would be very useful in practice, however, it lies somewhat outside the scope of a project focused on visualization.

Prototype Designs



Detailed View:

Name

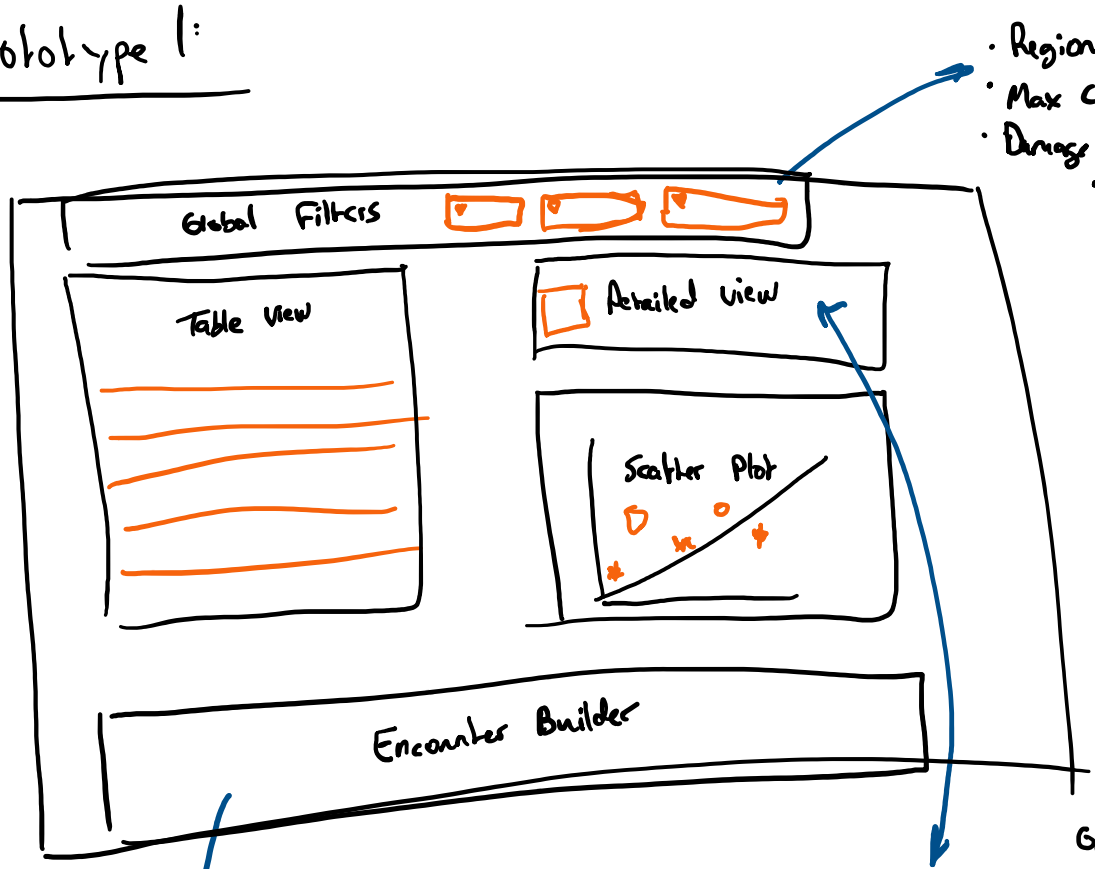
Image?

Summary:
- HP
- CR
- Size
- Legendary
- Mythic
- attack bonus?

Visualize:
1. Resistance
2. Immunity
3. Vulnerability

Damage Type / condition

Prototype 1:



- Region / Environment
- Max CR
- Damage vuln / resist / immune?
  - Multi select

Gradient scale instead?

Damage Type

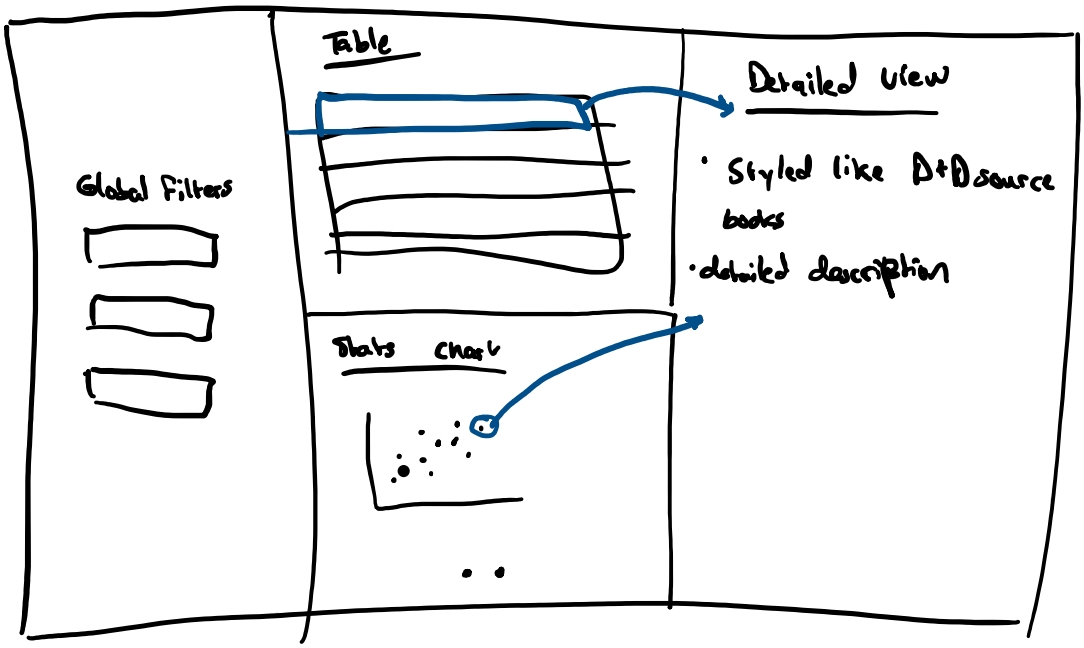
- Vulnerable
- resistant
- immune

- Input Prompts
- Output table:
  - rows represent monster

How to visualize stat comparison in a more interesting way?

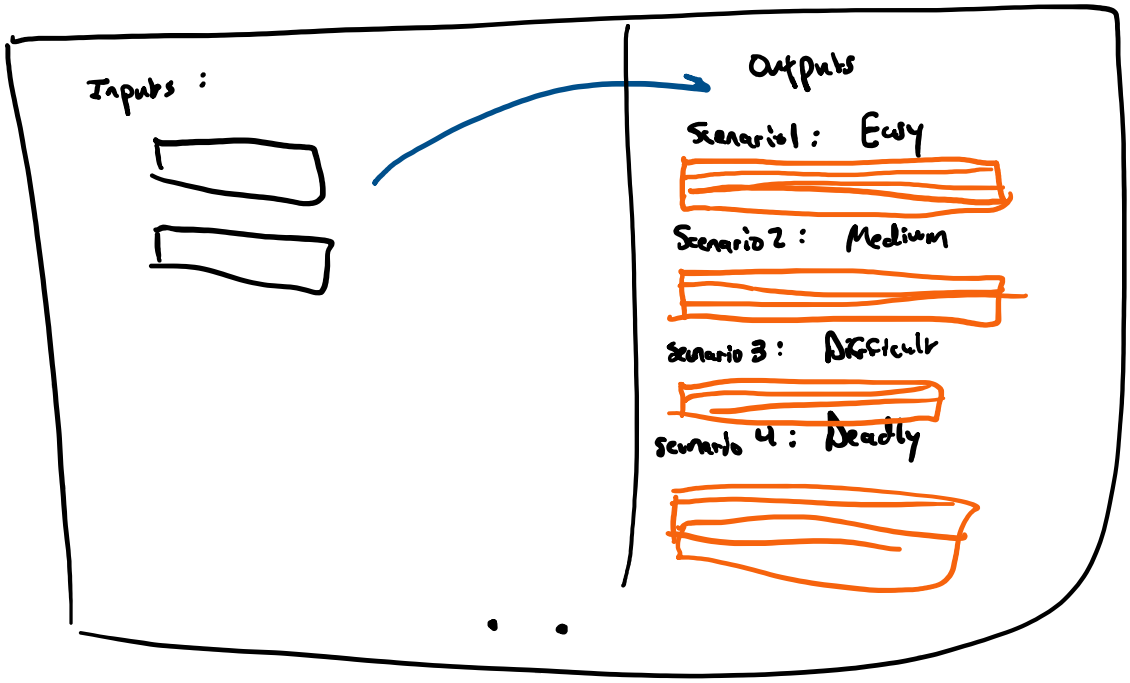
Prototype 2:

Page 1: Display Stats

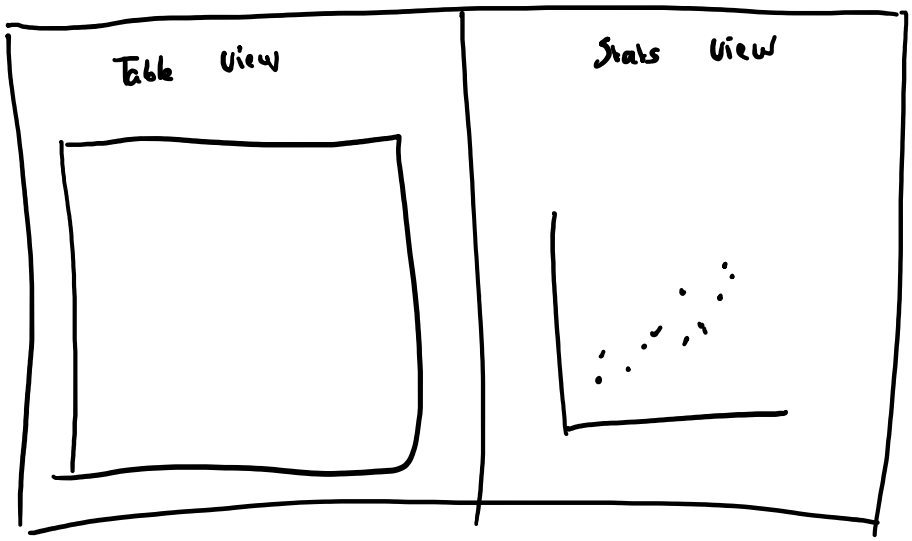


• selection feeds detailed view

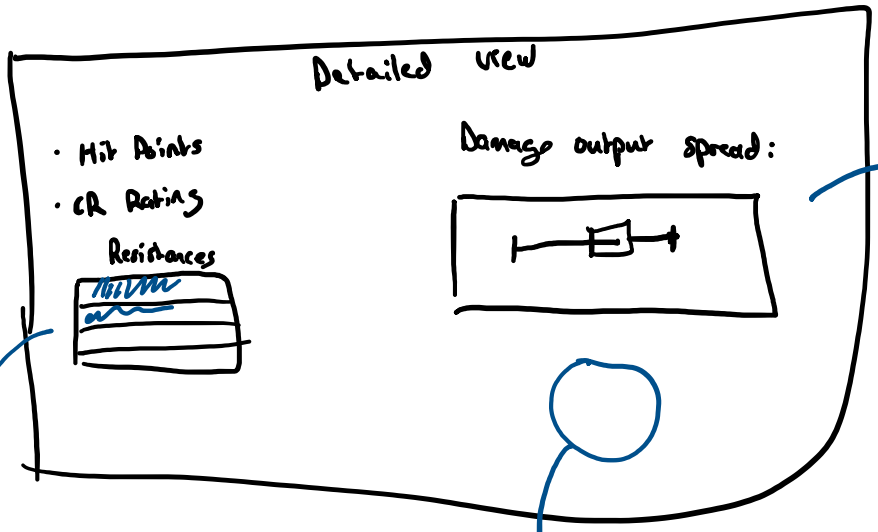
Page 2: Encounter Builder



Prototype 3:

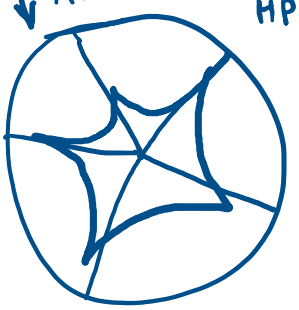


Scroll down



Per round, each attack type. Might require more data than available in API.

Gradient heatmap

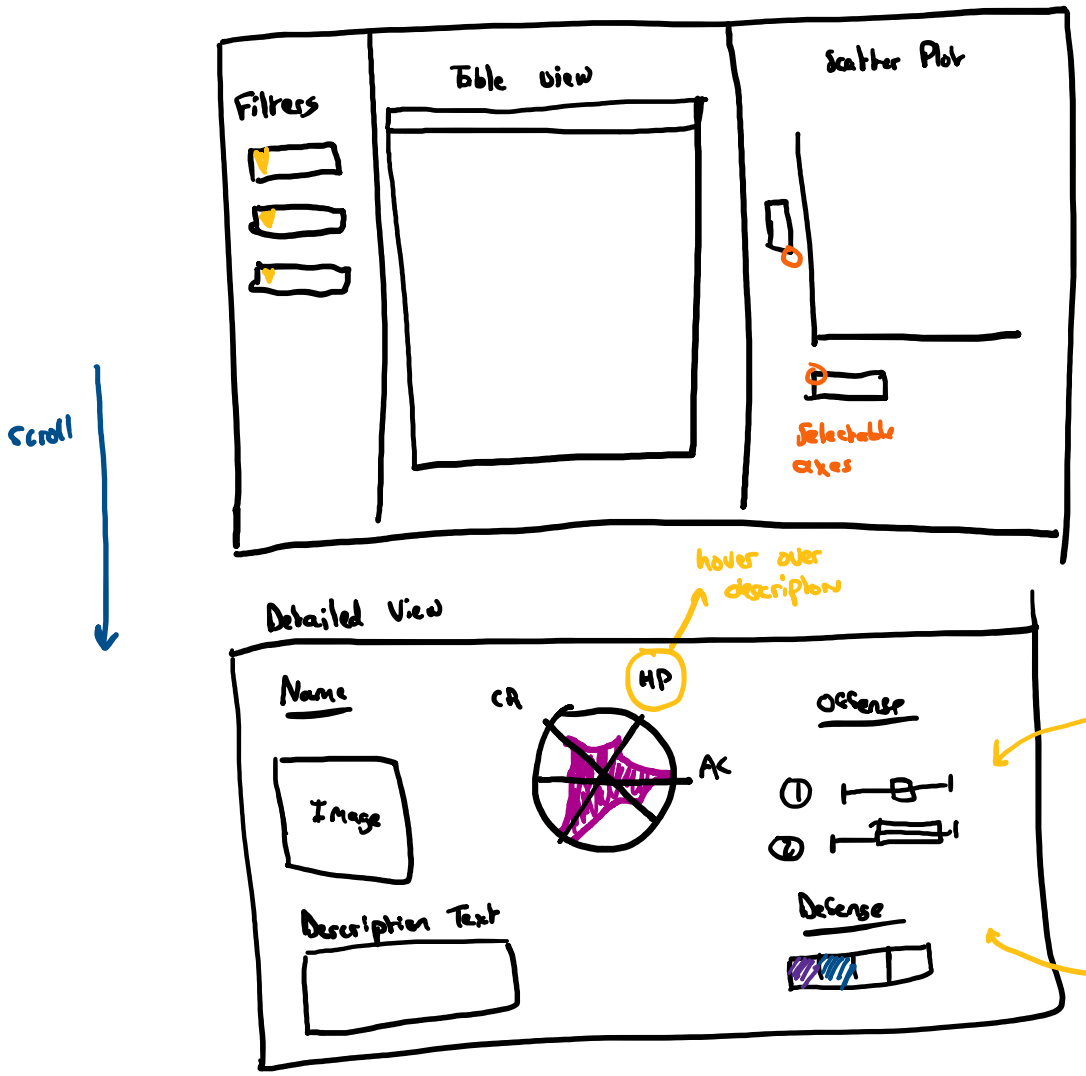


Damage Potential
- requires calculation + assignment
- condense to "offence" stat?

\+ More interesting to focus on the detailed view

\- more derived data - more processing, somewhat arbitrary assignment

Design Prototype:



- Encoded stats in:
  - Numerical: position
  - Categorical: shape / color

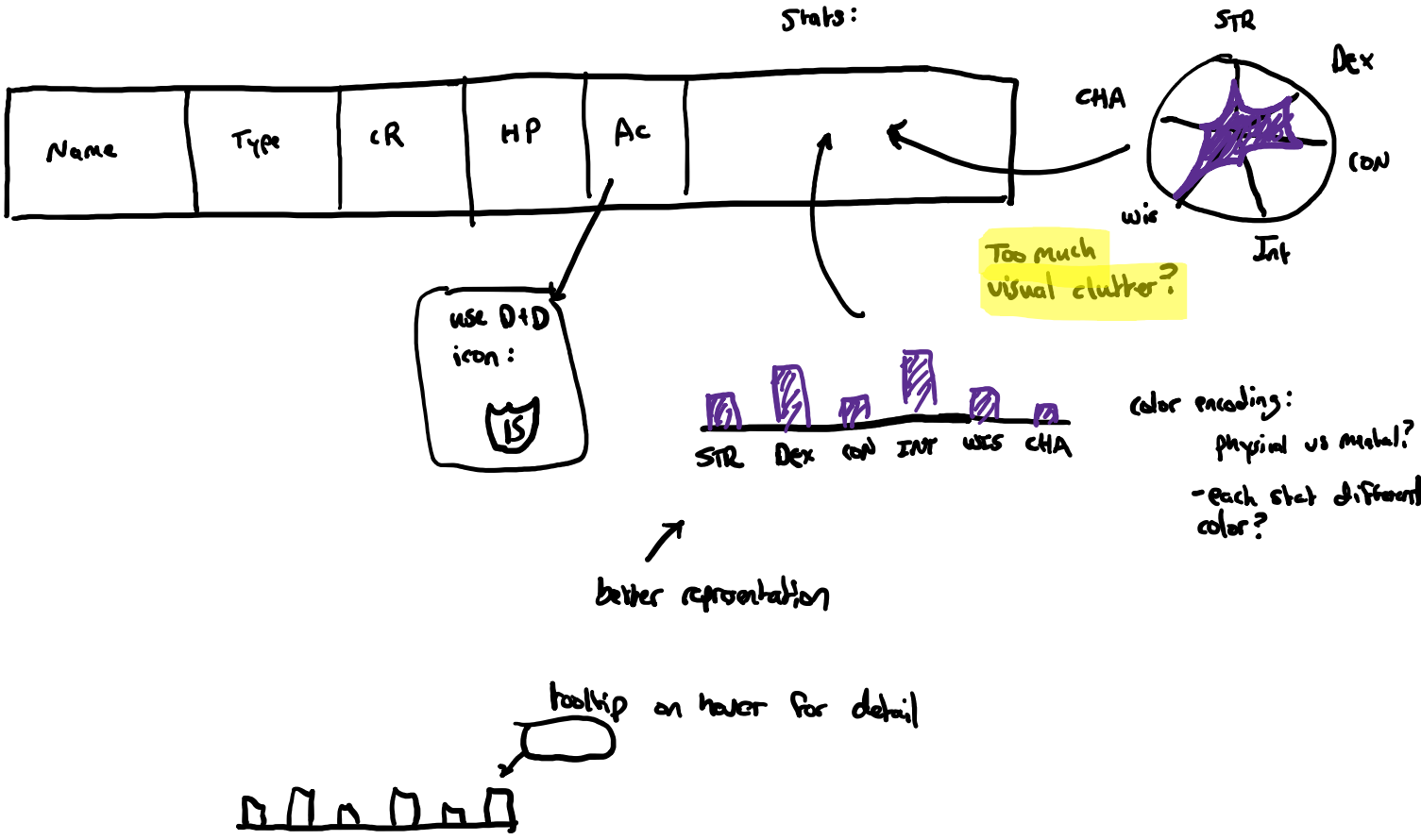
- Encoded detailed statistics in
  - Radial area chart:
    - shows areas of strength and weakness
  - Bar chart:
    - shows predicted distribution of damage output
  - Heat Map
    - Easily digestible - at a glance see what immunities / vuln / resistances

Design Evolution

Table View

After implementing the rough initial design, I explored different ways to visualize the 'statistics' section of the table view.

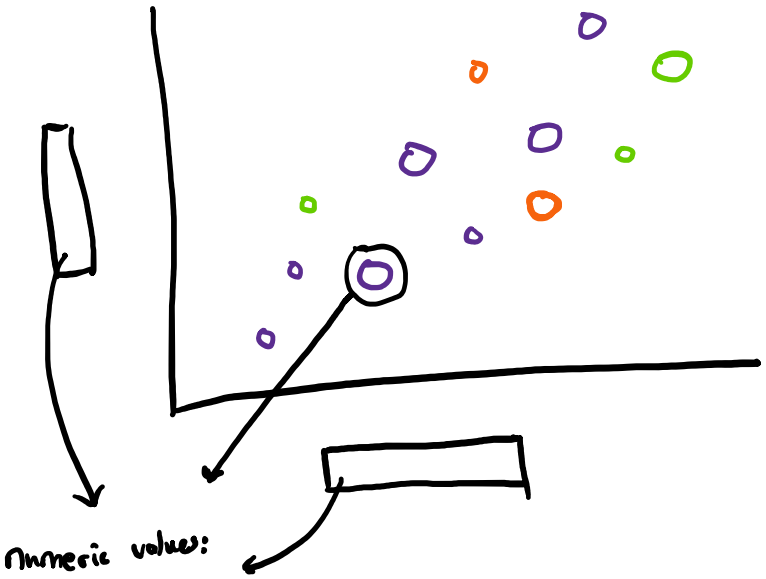
The data in this case consists of six different stats: Strength, Dexterity, Constitution, Intelligence, Wisdom, and Charisma. I'm currently experimenting with a radar chart view, although I'm not sure if this will take up too much room in the table. It may be more suited for the detailed monster view after selection.

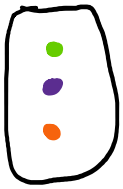


Design Evolution

Overview (scatterplot)

Encoding should consist of numeric values for X, Y and size dimensions, and categorical values for color or shape.





Categorical values:

- Type
- Legendary
- Alignment
- Size (small, med, large)

Numeric values:

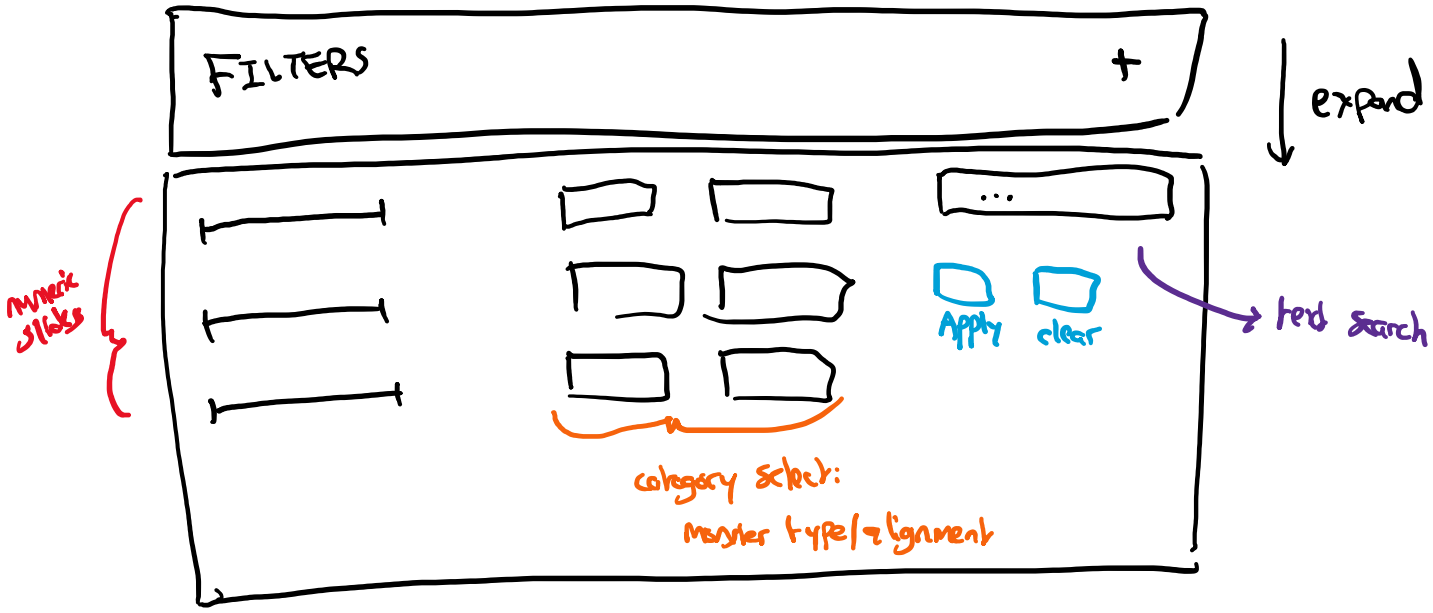
- HP
- CR
- AC
- Stats: (STR DEX CON INT WIS CHA)
  - Grouping in Filter?

Axis selection:

Design Evolution

Filters

After going through several iterations, I landed on an effective design for the filters section:

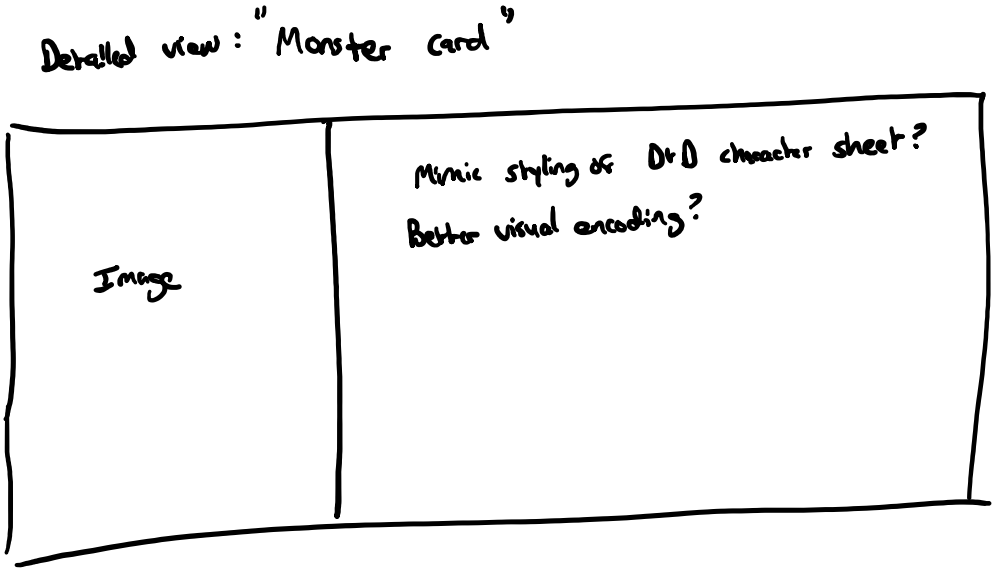


- effective use of vertical space
- doesn't interfere with viewscreen sizes
- Bootstrap fluid containers

Design Evolution

Detailed View (single selection)

The API provides a link to .png artwork for many of the monsters in the dataset, I'll investigate linking to see how it performs. Global filter location: should it be a top navigation section or a sidebar?



Implementation

Table View

The table view is sortable (switches between ascending and descending) by clicking on the table headers. Individual rows can be selected, and selections are represented in the detailed view and the scatterplot.

The bar charts embedded in the table view include tooltips showing the numeric value the statistic represented by each bar.

Scatterplot

The scatterplot X- and Y- axes are selectable by the dropdown menus below, with options for the numeric columns from the dataset. The color dimension can represent several different categorical variables. Tooltips appear with the monster's name on hovering over each point in the plot, and selections can be made which are represented in the table and detailed views.

Filters

The filter section can be expanded or collapsed by clicking on its header. Sliders represent ranges of values that can be filtered on numeric data types. Monster types can be excluded by clicking on them individually or control-clicking multiple choices. Free-text entry can be used to filter by monster name (including substrings).

The filter can be applied or cleared by clicking the respective buttons.

Detailed View

The framework for the detailed view is in place, and for monsters with an image available, it is displayed in the body of the detailed section. Code exists for the framework of the radar chart, but wasn't fully implemented.

Evaluation

The visualizations I designed work well for visualizing the data. The biggest thing I learned throughout the process was the importance of a good understanding of the data source. The API I used isn't officially maintained – rather, it is a community project with many missing pieces. I needed to rework several ideas after beginning implementation due to limitations of the dataset.

In addition, the radar chart design for the detailed "Monster card" view proved more challenging than I anticipated and I ran out of time. Approaching the problem again, I would focus more on implementing basic functionality before spending time going back and forth over styling and design decisions.