Noah Brackenbury, Abha Laddha, Aman Panda

CS 257 Software Design Project Proposal

A brief description of the data set you plan to use. This description should include links to the source of the data, something that indicates that you are allowed to use this data for academic purposes, and information on how you will acquire the data.

Our dataset is climate change data from the World Development Indicators and Climate Change Knowledge Portal on climate systems, exposure to climate impacts, resilience, greenhouse gas emissions, and energy use. We are using a subset of this data: CO_2 emissions of most countries in the world over the period of 1990 - 2008. The data is presented in the following three forms, all of which will be used: CO_2 emissions in total, CO_2 emissions per capita, and CO_2 emissions per units of GDP.

Data has been sourced and downloaded from: http://data.worldbank.org/data-catalog/climate-change

Given that this belongs to the World Bank, they provide an open license. The website states that one is free to copy, distribute, adapt, display or include the data in other products for commercial and noncommercial purposes at no cost subject to certain limitations summarized below[1].

A brief description of the intended audience for your application. In other words, who might be interested in this data, and what might they be interested in understanding about this data?

Given the impact of climate change, every human being should be interested in understanding how their country has contributed to this apocalyptic phenomenon. This data puts into perspective how the emissions have increased over time, emissions per person in the country, and as per a country's GDP.

Some specific user cases:

- Classroom environment:
    - A teacher/professor would use our website to illustrate to students in a compelling visual manner the change of time of CO_2 emissions around the world. Particularly, make note of its increase very clear.
    - Students may use the website to better understand climate change and learn about the contributions of different countries with regards to CO_2 emissions
- For research of climate change, particularly in terms of CO_2 emissions in the world categorized by country.
    - Policy makers: May be more interested in per capita and per GDP unit numbers to drive changes in policy.

[1] http://data.worldbank.org/summary-terms-of-use

    - Politicians: Similar as above and to reach out to their constituencies to better inform people's opinions. Also, convince other politicians who may think climate change is a farce, that these emissions are increasing at an unprecedented rate.
- NGOs, student organizations, and other groups working on climate change awareness:
    - Better drive their point across by showing illustrative visuals

A list of the key functional (and, if applicable, non-functional) requirements of the system. These should come out of the use cases you've developed with your audience in mind. This does not have to be an exhaustive list---just give me the highlights as to what the system must do and of whatever other parameters (usability, etc) are important.

Functional requirements:

- Rendition of a world map such that it can clearly show the colors
- A time slider: to allow users to view changes across 1990-2008
- Options to choose between:
    - Total CO_2 emissions
    - CO_2 emissions per capita
    - CO_2 emissions per GDP unit
- Search button: Allow users to look up one specific country

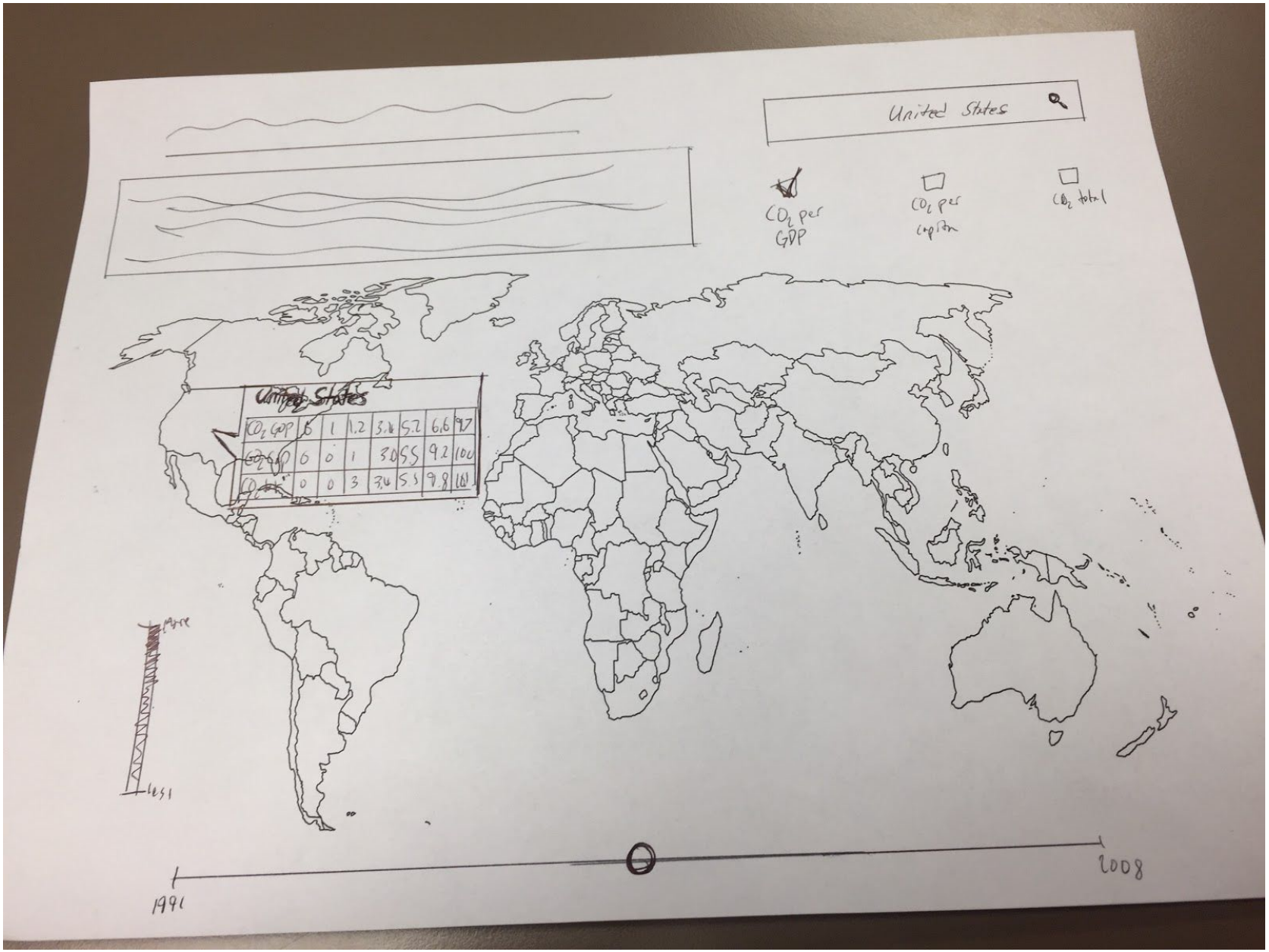
Non-functional requirements:

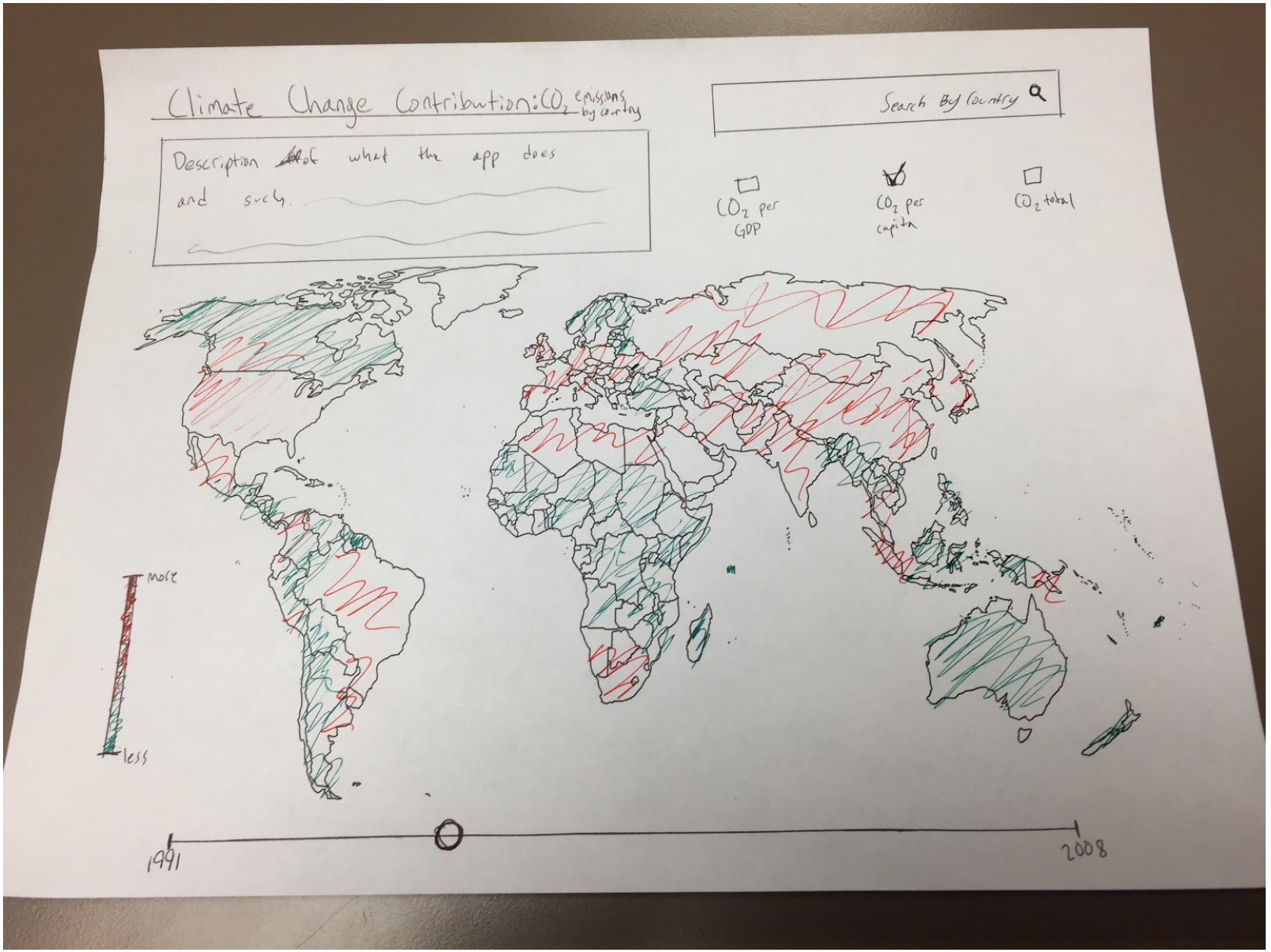
- Performance
    - To have minimal response time to queries.
    - Our slider to show change over time should be extremely responsive - particularly, the slider should feel snappy, while the change in color in the picture should be as smooth as possible.
    - The images that are used should be of high quality.
- Usability:
    - Make use of conventions, easy to use and understand interface design.
    - Account for color blindness with color choices. We will do more research on this do figure out what works best with regards to this.
- Reliability:
    - Show consistent results in terms of the colors assigned to each country depending on their levels of CO_2 emissions.
- Supportability:
    - Support different web browsers such as Chrome, Mozilla Firefox, Safari etc

    - Possible compatibility with mobile phones.

A list of the key features your system will include, based off the functional requirements. These should be prioritized.

- Be able to look at the change over time in CO_2 emissions (1990 - 2008) across all countries of the world for the following three criteria:
    - CO_2 emissions in relation to a country's GDP
    - CO_2 emissions per capita
    - CO_2 emissions in total
- Have a graphical representation of this data. Particularly, an image of a world map with a user controlled slider in the bottom that will select the year for which the user would like to see the state of CO_2 emissions in the world. Once a year is selected, the image will rerender to illustrate CO_2 emissions with different colors. There will be a legend in the bottom left of the screen that will show the amount of CO_2 emissions with relation to each color. On the top right of the screen, there will be radio buttons so that the user can select between the three aforementioned data subsets: (CO_2 emissions in relation to GDP, CO_2 emissions per capita, CO_2 emissions in total).
- Have search functionality in the top right corner of the page. A user should be able to search for a country and that will result with a popup that will contain exact numbers for each country for each statistic (illustrated in our mockup). We will also attempt for user clicks on countries to activate this popup, but this will be a secondary goal.


United States
CO_2 per GDP
CO_2 per capita
CO_2 total
United States
1991
2008


Climate Change Contribution: CO_2 emissions by country
Search By Country
Description of what the app does and such.
CO_2 per GDP
CO_2 per capita
CO_2 total
more
less
1991
2008