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Project Proposal

Gender Wage Gap in USA and other OECD countries

Team Details

Project Repository: https://github.com/sarathkrishna/gender-wage-gap

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Background and Motivation

It's a fact that even in 2014, women working full time in a capitalist country like the United States typically were paid just 79 percent of what men were paid, a gap of whopping 21 percent! The gap has narrowed since the 1970s, due largely to women's progress in education and workforce participation but quite slower when compared to men's wages. The progress has diminished lately and looks like it's going to stay for a while.

This wage gap affects women from all backgrounds, at all ages, ethnicities and of all levels of educational achievement, although earnings and the gap vary depending on a woman's individual situation. Recently this issue came to the limelight, thanks to the comments by Oscar winner Jennifer Lawrence about on low pay received by her for her acting in American Hustle. Selecting this topic and the aforesaid news outbreak was a coincidence, which further fueled our passion to work on this.

In this project, we plan to visualize the available data on the wage gap over the past many years and show the current state of US. In addition to this, we will be comparing the state of US with that of other OECD countries to provide an idea on where US stands with respect to other nations.

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Project Objectives

Through visualizing the data on gender wage gap, we are trying to answer these questions:

- How is the gender wage gap varied in United States for past several years?
- Which states in United States have high and low gender wage gaps?
- Are there any changes in gender wage gap across states for past few years?
- Which sectors in United States have high and low gender wage gaps?
- Are there any changes in gender wage gap in different sectors for past few years?
- How does United States perform against other OECD countries on gender wage gap?
- Which OECD countries have high and low gender wage gaps?
- How is the gender wage gap varied in different OECD for past several years?

By answering these questions, we will be able to get a big picture of trends in gender wage gap. Whether it's improving, getting worse or is saturating to a stable value. And by learning about the sectors, states or OECD countries with lower and higher gender wage gaps, we might be able to get some intuitions about the reasons behind the gender wage gap and will be able to propose some directions to reduce the wage gap.

Data

Data for different states, sectors, ethnicities, United States and OECD countries are available online. These are the data sources:

- Wage gap in OECD countries:
  - http://www.oecd.org/els/emp/Gender-wage-gaps-time-series.xlsx
- Median usual weekly earnings in US (1979-2015)
  - http://www.bls.gov/webapps/legacy/cpswktab1.htm
- Sector-wise (Median weekly earnings of full-time wage and salary workers by detailed occupation and sex)
  - 2014 - http://www.bls.gov/cps/cpsaat39.htm
  - 2013 - http://www.bls.gov/opub/reports/cps/highlights-of-womens-earnings-in-2013.pdf (page 8)
  - 2012 - http://www.bls.gov/cps/cpswom2012.pdf (pages 8 and 9)
  - 2011 - http://www.bls.gov/cps/cpswom2011.pdf (pages 12 and 13)
- State-wise overall data for 2011-2014
  - 2011 - 2013: http://www.aauw.org/resource/archive-data-gender-wage-gap-by-state-and-congressional-district/

    - 2014: http://www.aauw.org/resource/gender-pay-gap-by-state-and-congressional-district/
- Women's Earnings (includes earnings for men and earnings by education, age, race, and Hispanic ethnicity) for 1998 to 2013
    - http://www.bls.gov/cps/earnings.htm

Data Processing

In the OECD data, for some early years, the data for most countries are missing. We are planning to skip some early years which doesn't have data for most countries.

We are not expecting to do any other substantial data cleanup.

All these data sources provide data in terms of men's wage and woman's wage. We will convert all such data to earnings ratio.

Earnings ratio = Women's earning * 100 / Men's earning

The comparison among different visualization will be easy by using similar metric across all data.

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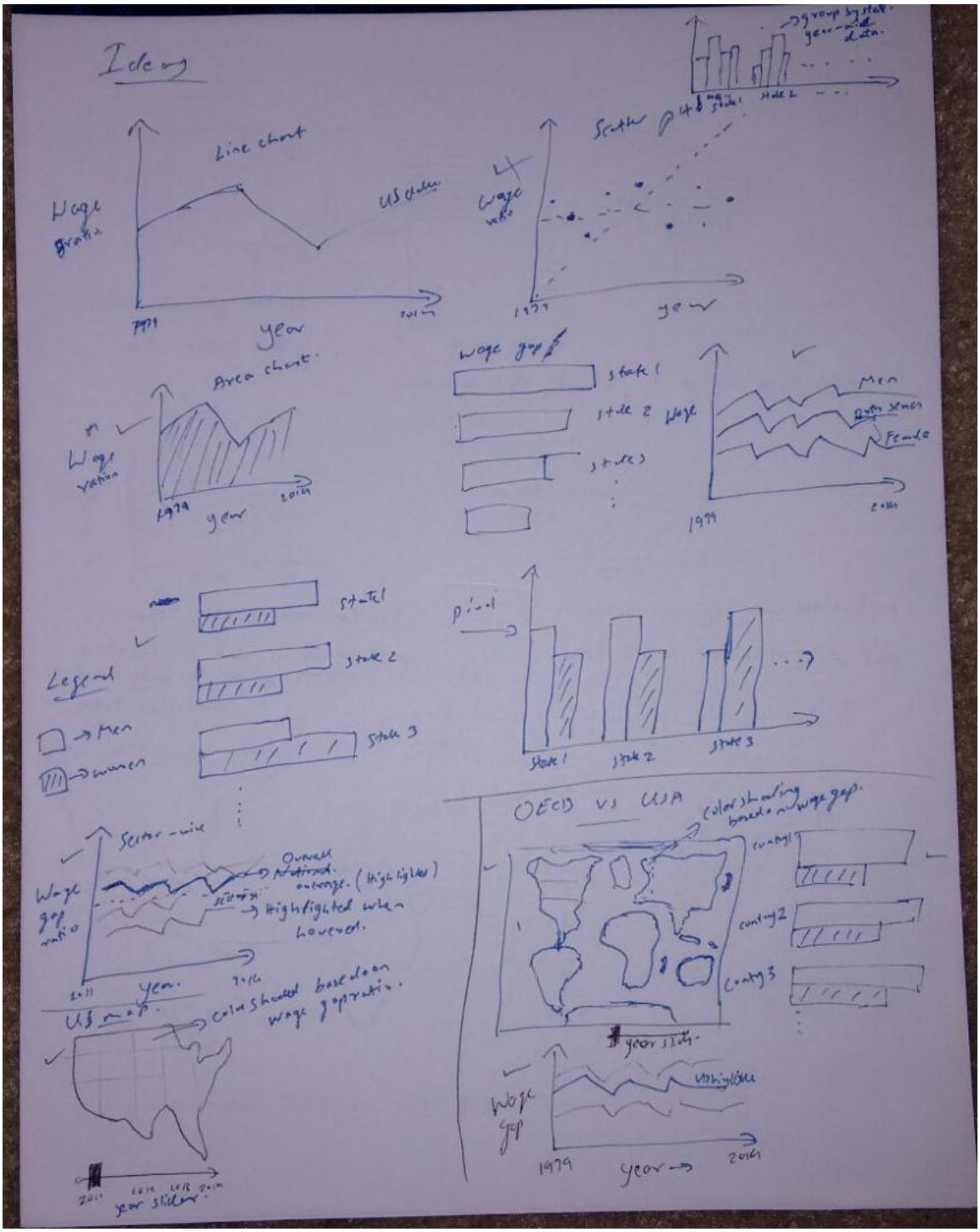
Visualization Design

We have made use of the five design sheet methodology for our design.

Sheet 1:



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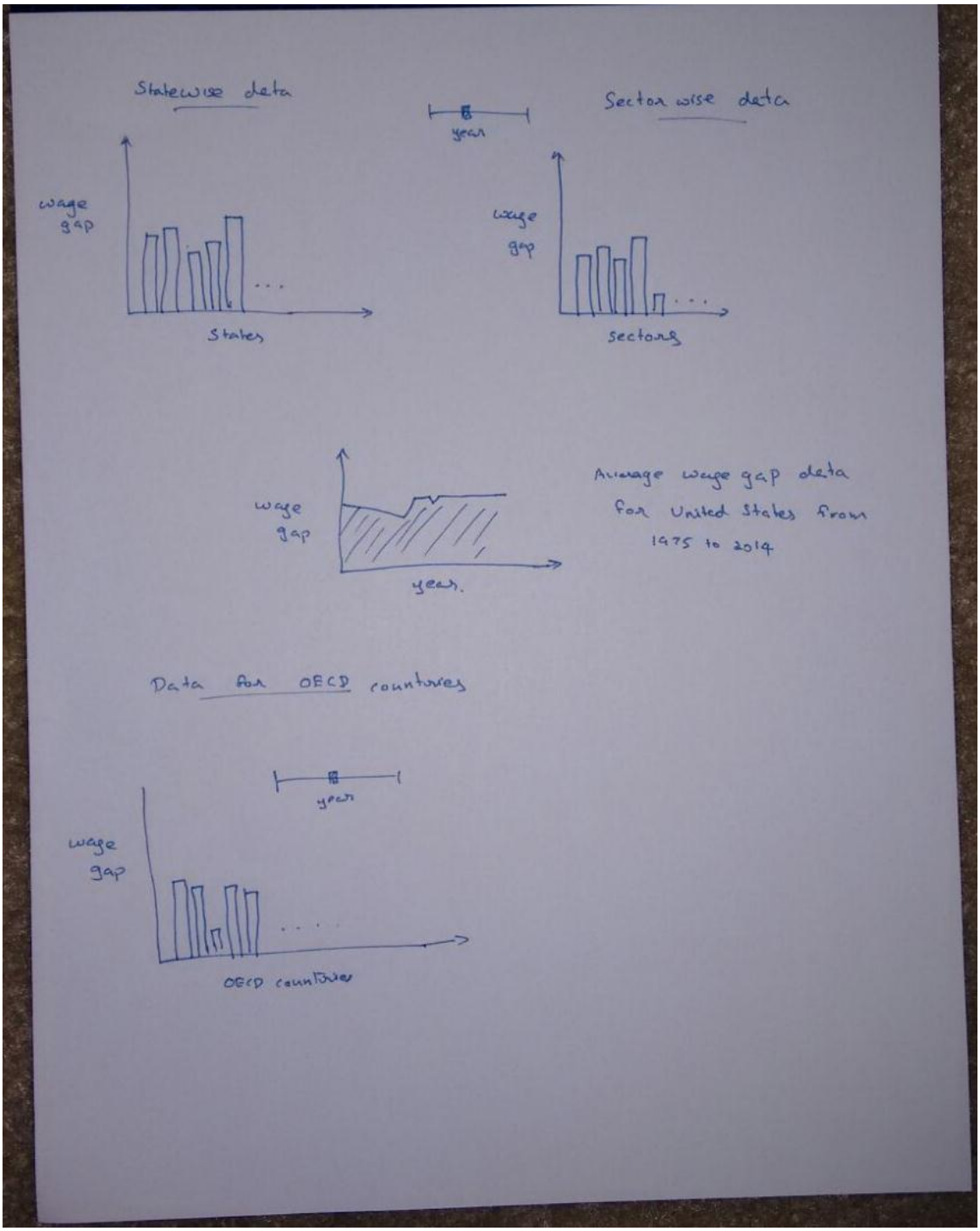
Sheet 2:



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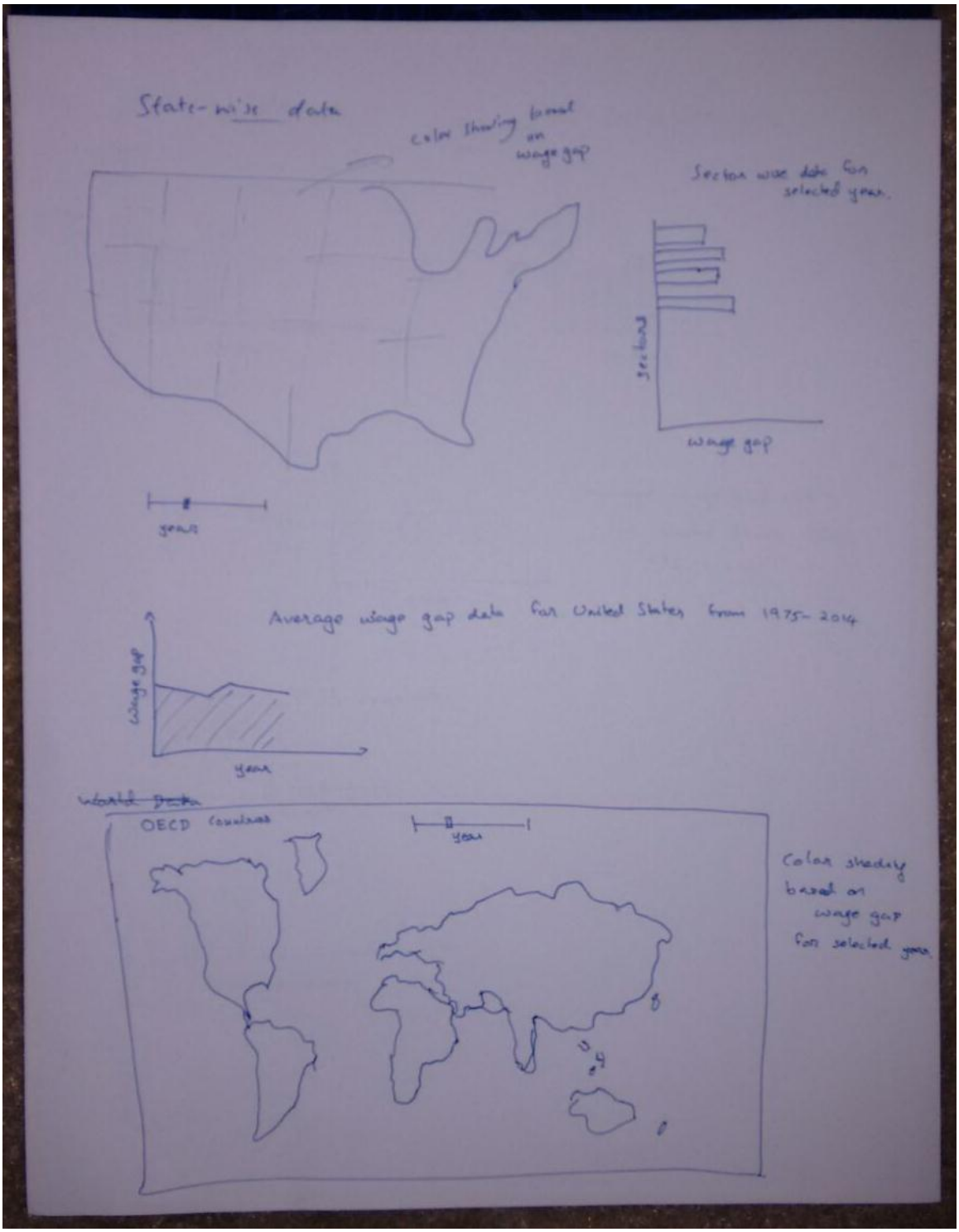
Sheet 3:



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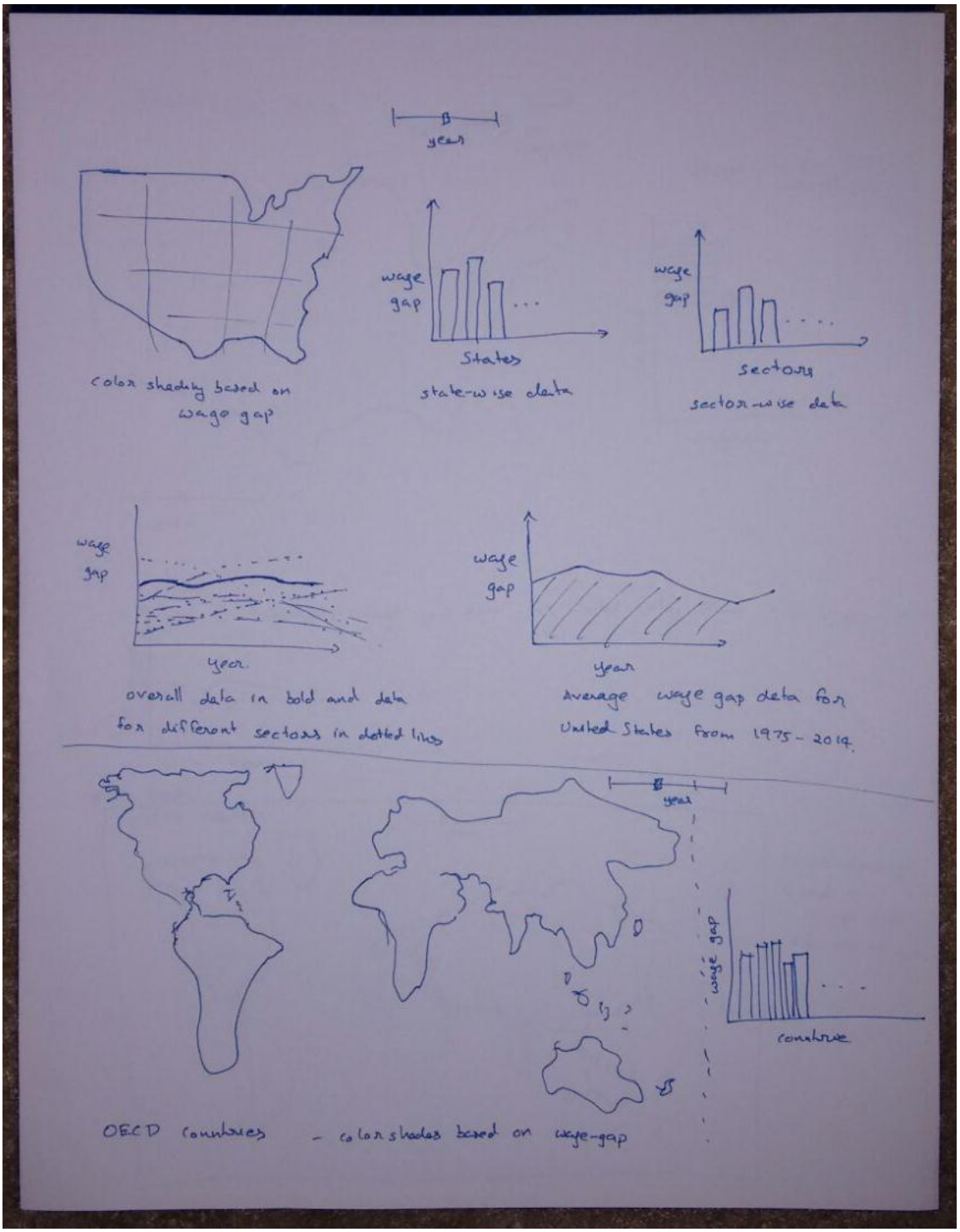
Sheet 4:



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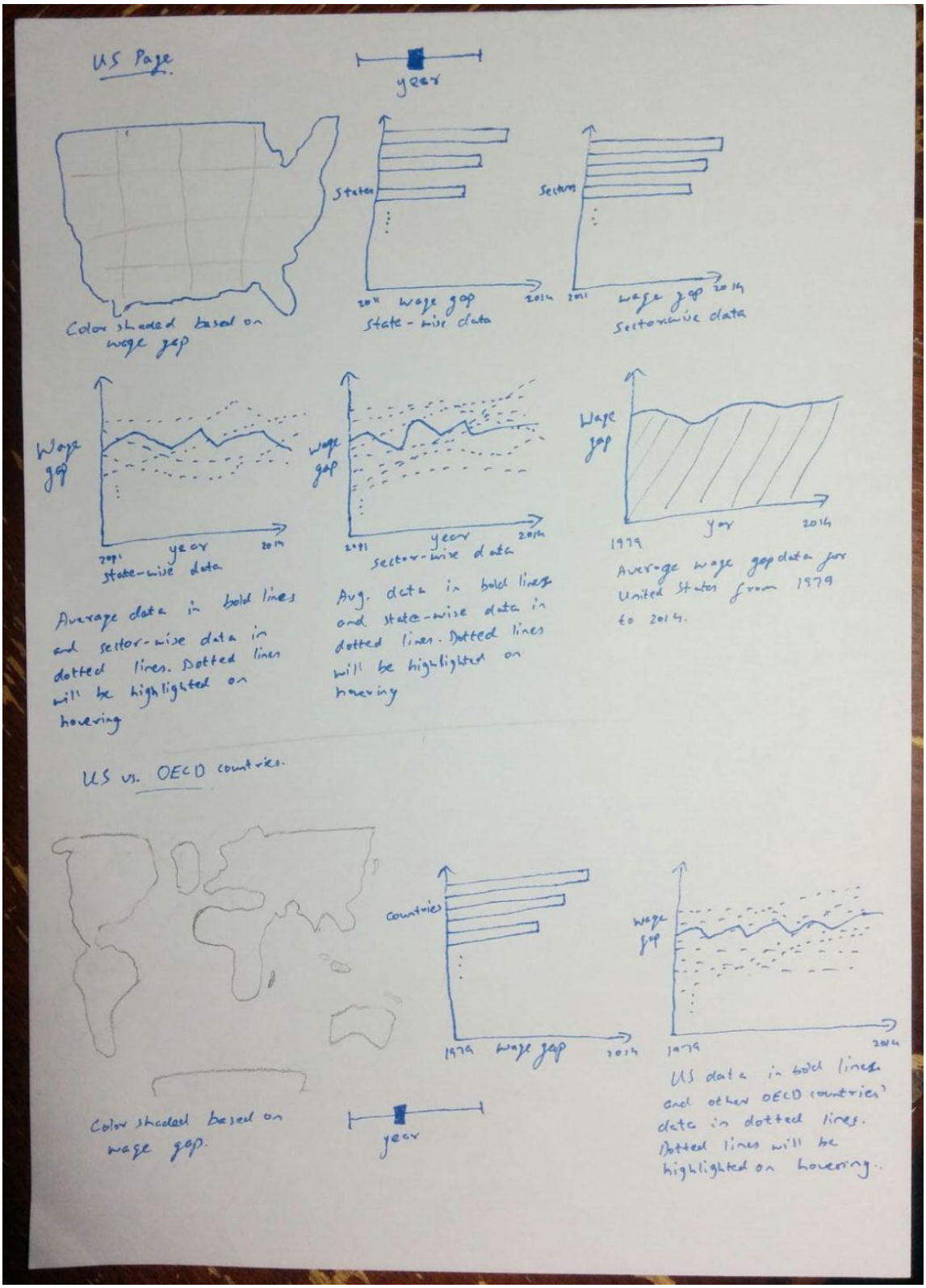
Sheet 5 (Final Design):



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Comments on Sheet 5 (Final Design)

- **US data page** – This tab will visualize the data for US. This is to be made up of the following three logical parts.
    1. National data – The average wage gap will be plotted as an area chart. This chart will be able to convey the changes in average wage gap from 1979 to 2015.
    2. State-wise data – The data available from 2011 to 2014 is to be plotted here. Following three visuals are used for this data. With these three visuals, the states with highest and lowest wage gap can be easily represented. And the states data can be compared against national average.
        a) US map – Each state will be color shaded based on wage gap ratio.
        b) Hierarchical bar chart – Uses the same data that the US Map used. Both visuals will be controlled by a year slider.
        c) Line chart – Each dotted or low-intensity line will represent a different state. There will be a darker line for representing US data over the 4 years. Whenever a low-intensity line is hovered upon information about it will be shown as tool-tips.
    3. Sector-wise data – The data available from 2011 to 2014 is to be plotted here. This will contain two visuals:
        a) Hierarchical bar chart - Based on the wage gap ratio itself. This too will be controlled by the year slider mentioned in section (2.a and 2.b).
        b) Line chart – Similar to the line chart for state-wise data, each dotted or low-intensity line will represent a different sector over the 4 years. Darker line will represent US data. Whenever a low-intensity line is hovered upon, it will be highlighted. Information about a line will be shown as tool-tips. This chart is suitable to compare the gender wage gap among sectors and with national average.
- **US vs OECD countries data page** – This tab will be visualizing the comparison between US and other OECD countries. It will contain the following visuals:
    1. World map – Similar to the US map in US data page, each OECD will be color shaded based on the wage gap ratio.
    2. Hierarchical bar chart – Uses the same data that the World Map used. Both visuals will be controlled by a year slider.
    3. Line chart - Each dotted or low-intensity line will represent a different OECD country. There will be a darker line for representing U. Whenever a low-intensity line is hovered upon it will be highlighted, information about it will be shown as tool-tips. With this line chart the user can compare the data among different OECD countries**.**

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Must-Have features

In addition to the details mentioned in the design details in sheet 5, the following finer points have to be considered:

- The hierarchical bar charts for state-wise, sector-wise and country-wise gender wage gap data should be always in sorted order.
- The year slider for 2.a, 2.b and 3.a in US data page must change the corresponding graphs with data for corresponding year.
- The line chart in 2.c of US data page should be able to compare data for different states with the national data.
- The year slider for 1 and 2 in US vs OECD countries data page must change the corresponding graphs with data for corresponding year.
- The line chart in 3 of US vs OECD countries data page should be able to compare data for different states with the national data.

Optional features

- Have really nifty transitions for each of the visuals.
- Have a clean overall outlook with minimal clutter and minimal chart junk.
- Have the visual data for National data as a Holmes chart.
- Find more data related to the planned visuals and have more complete visuals.
- Find data on non-OECD countries and have them as well in the comparison with US data.

Project Schedule

Week 1: Data Processing:

- Architecture design and finalization - Everyone
- Clean up and process available data - Rony
- Search for more data sources - Rubin and Sarath

Week 2: US Data Page:

- National Data - Rony
- State-wise Data - Rubin
- Sector-wise Data - Sarath

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Week 3: US vs OECD countries data page:

- World Map - Rony
- Hierarchical Bar Chart - Rubin
- Line Chart - Sarath

Week 4:

- Addressing review comments - Rony, Rubin, Sarath

Week 5 and 6:

- Developing website, report and screencast - Rony, Rubin, Sarath