Revisiting Du Bois

A Data Visualization Project

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Introduction

Prolific and prominent Black writer, historian, professor, political activist, W.E.B. Du Bois has left a legend in many ways. One profound way as been in developing and articulating data visualizations many years before canonical pioneers of visualization like Edward Tufte, Jacques Bertin, or Stephen Few. My project seeks to explore his work with a critical and quantitative lens. I hope to bring to Du Bois' portraits the worlds of modern statistics, computing resources, and interactive visualization, but also to these fields bring Du Bois' humanist lens and the goal of visualizing data to create a better world.

To do so, my project will focus on two questions:

1. **How does Du Bois' approach to data visualization depart from canonical views of data and information?**

In addition to being a sociologist who meticulously drew and recorded social statistics for over fifty years, Du Bois was also a Black theorist of knowledge, an educator, a novel writer, and a historian. Some of these perspectives are visible in his approach to data visualization. While other data visualization pioneers like Edward Tufte try to objectively gauge the value of a dataset as the proportion to which it represents

"truth," Du Bois recognizes visualization as a creative endeavor alongside (quite literally, in the case of the Paris Exposition) photography and historical analysis. In extending Du Bois' data visualization through practical tools, I hope to also convey his artistic perspective on data visualization.

2. **How have the subjects of Du Bois' works in the 1900 Paris Exposition evolved over time?**

Du Bois was concerned with the "afterlives" of slavery and prospects of Black people in the American South after emancipation in 1865, and he provided answers by studing land ownership, occupations, income, and geographic concentration. How does the same topic of the afterlife of slavery in land ownership, occupations, income, and geographic dispersion look like in the contemporary age?

Background

Data visualization through the centuries

Modern data visualization began with modernity itself. In the 1600s, as writers

The map as a medium was developed alongside modern notions of states and borders throughout the fifteenth and sixteenth centuries.[1] Other forms of data visualization, like bar and line charts, were developed over time to similarly convey graphically what language itself could not express. The earliest known use of these graphics to convey statistical information appeared in 1644, when a Flemish astronomer named Michael Florent was tasked with representing many different distances. A table might have sufficed to convey the raw denotation of these [2].

The next three hundred years brought much change to what is known as data visualization, but the fundamental idea of translating statistical concepts in graphical ideas remained the same. Technological advancements in reproducible printing and color usage

[1]

[2] As an example, see the discussion fo Michael Florent's 1644 graphic in Friendly, "Milestones in the History of Data Visualization."

Today, the accepted canon of data visualization pioneers has coalesced around Edward Tufte, Jacques Bertin, and John W. Tukey.

Demography and sociology since Du Bois

- similar trends in empiricism and

Methods

Extending ggplot2

The first contribution of my project is to create an R package extending W. E. B. Du Bois' data visualizations to present day. These include

R is a programming language widely used in statistics and data visualization. Its features of being open-sourced (and thus free and extensible), easier to learn and write compared to some oth er languages, and having many native data structures and functions for computing models have made it popular today.

One especially important extension in R is the ggplot2 library and the ecosystem of user-contributed software packages it has spawned. The ggplot2 package is popular for providing many utility functions for graphics in R, for example a function called `geom_smooth` for smoothed conditional means. These functions can often abstract away complex logic from users, so that (in the case of `geom_smooth`) a potentially complicated choice between loess and general aggression models can be hidden from the user that simply sees a best fit line.

But the library is far more influential for contributing its eponymous *grammar of graphics*, or an extendable logic for how to make plots. While plots in R and many other programming languages are syntactically

In this grammar, every plot can be decomposed into a few ingredients: a dataset, one or more layers of geometric objects, a scale to determine how data should be mapped to positions or aesthetics, a coordinate

```
library(ggplot2)

ggplot(iris, aes(x =  Sepal.Length, y = Petal.Length, color = Species)) +

  geom_point() +

  geom_smooth() +

  theme_classic()
```

In other words, this grammar takes a chaotic array of plots and consolidates them into a few recognizable forms. In both the "vocabulary," or available geometries , and the "grammar,"

But this feature is also a limitation of ggplot2. Extending ggplot2 to fit new geometries is difficult, and users are left with the (albeit large) selection of features that the ggplot2 library maintainers have already created.

Bayesian analysis

Data sources

Links

`ggdubois`

Analysis

Conclusion

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