Final Project Report

Katrina Ramirez-Meyers

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1 Project Summary

In this project, global electrification trends from 1990 to 2014 are visualized in an interactive website created using R Shiny.

CLICK HERE!

https://k-ram-mey.shinyapps.io/electricity-access-repo/

(or scroll to end to see screenshots)

Site visitors can:

1. View and/or download a gif showing the world map shaded to depict percentage of population with electricity access, by country, over time.

2. Select a year for a map of electricity access to be generated.

3. Select a country to generate the following information:

   - National (average) electricity access rate
   - Rural electricity access (by year)
   - Urban electricity access (by year)

2 Project Implementation

The submission folder is divided into four subfolders containined code and data corresponding to each project implementation task. The following sections explain what was done in each task.

2.1 Data Scraping

Electricity access data for each country were scraped from the Global Tracking Framework website: http://gtf.esmap.org/countries. Data were unavailable for some island regions and Antarctica. In summary, the scraping process involved getting a complete list of countries, downloading data in .pdf format for each country, then filtering out desired lines of data. More detail is provided in the code comments. The final dataframe contained rural, urban, and national electricity access rates for each country, each year.
Note, the website has since been updated and downloading the pdf's is no longer an options. :(
The PDFs are included in this folder.
Tools used: R Packages 'pdftools','xml2','rvest'

2.2 Data Cleaning

The data were then compared to the country map data available in the `ggplot2` package in R. The country names in the dataframe generated from the GTF website were edited to match the `ggplot2` world map data. A function was written to merge the two dataframes given an input year. The function also takes an optional input "$MaxPerc$," which filters out countries with electricity access above a maximum percentage.
Tools used: R Package 'ggplot2'

2.3 Data Visualization

The cleaned and merged data were then used to map out electricity access for each year, which was then exported to .jpg's. The jpegs were converted to a gif using ImageMagick from the Command line. This was done by placing all the jpg's in a folder and running the following command in Terminal:

```
convert -delay 20 -loop 0 *.jpg gif50.gif
                    or
convert -delay 20 -loop 0 *.jpg gif100.gif
```

The numbers in the output gif title indicate the maximum electricity access percentage. **Tools used**: R Packages 'ggplot2', ImageMagick

2.4 R Shiny and GitHub

Using the same data visualization methods, an RShiny app was coded into a single 'app.R' file. This file can be run in R in its current directory "../Electricity-Access-Repo/" or can be found on line at https://k-ram-mey.shinyapps.io/electricity-access-repo/. The `shinydashboard` package was used to organize the app into tabs with interactive content. The `markdown` package was used to embed the Readme.md file in a Welcome section of the app. The `magick` package enabled the Shiny app to read, render, and display the pre-made gifs.The `Cairo` package was used to improved graphics quality in shinyapps.io online version.
GitHub was used for version control. The repository is available at:

https://github.com/krammey/Electricity-Access-Repo

Tools used: R Packages 'shiny','shinydashboard','ggplot2','magick','markdown','Cairo'

Screenshots of app:

Global Electricity Access

Select a country:

USA - Continental ▼

Choose a region:

◉ National
○ Urban
○ Rural

Select a year:

1990 — 2014

Electricity Access in Continental USA in 2014

Global Electricity Access

- ℹ ReadMe
- 🌐 Global Access By Year
- ◐ Rural Versus Urban Access By Country
- ▶ Gifs ‹
  - › All Countries
  - › High Impact Countries

History of Global Electricity Access

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History of Electricity Access in High Impact Countries

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