

INTRODUCTION

- The Military Family Research Institution (MFRI) at Purdue University conducts research on issues that affect military and veteran families.
- MFRI works to shape policies, programs, and practices to improve military and veteran families' wellbeing by creating a diverse support community that understands the most pressing needs of military and veteran families
- To achieve this, MFRI collaborates to create meaningful solutions for them, and our team was formed to help them as a part of their collaboration with The Data Mine Corporate Partners at Purdue.
- MFRI needed our help to create an interactive, comprehensive web application that displayed graphics and visualizations displaying critical data about military and veteran families to people all around the United States.
- We were tasked with using our understanding of data cleaning, analysis, and visualization to do the above in a way that could be beneficial to anyone who visited the website, such as veterans hoping to gain more information about various aspects about their life across the state and country, policymakers collecting data to implement changes that would benefit the veteran community, etc.

Marriage Indicator

data source American Community Survey 5-Year Data (2009-2019).

MAR
Marital status
1. Married
2. Widowed
3. Divorced
4. Separated
5. Never married or under 15 years old

MIL
Military service
b. N/A (less than 17 years old)
1. Now on active duty
2. On active duty in the past, but not now
3. Only on active duty for training in Reserves/National Guard
4. Never served in the military

HHT
Household/family type
b. N/A (GQ/vacant)
1. Married couple household
2. Other family household: Male householder, no spouse present
3. Other family household: Female householder, no spouse present
4. Nonfamily household: Male householder: Living alone
5. Nonfamily household: Male householder: Not living alone
6. Nonfamily household: Female householder: Living alone
7. Nonfamily household: Female householder: Not living alone

FPARC
Family presence and age of related children
b. N/A (GQ/vacant/not a family)
1. With related children under 5 years only
2. With related children 5 to 17 years only
3. With related children under 5 years and 5 to 17 years

OBSERVATIONS AND RESULTS

- Educational Attainment:
 - Generated bar chart to visualize the relationship between educational attainment of different military status.
 - For those on active duty in the past but not now, most of them got a high school degree.
 - For Reserves or National Guard, most of them get a college degree.
 - For those in active duty, most of them get an associate's degree
- Poverty and Race:
 - Sorted the POVPIP(income-to-poverty ratio recode) and RACIP(recoded detailed race code with three military status(active duty, active duty in past but not now, and Reserves or National Guard)
 - Arranged those data into the csv documents by Python. Analyzed and visualized data by using Shiny app in R-Studio, which the Shiny app will create histograms toward the counts of each type codes for the three different military status.
- Employment Status:
 - For each age group, most employment status is concentrated in "Civilian employed, at work" and "Not in labor force".
 - For each age group, most people's class of workers focus on "Employee of a private for-profit company or business, or of an individual, for wages, or commissions generated".
- Marriage Status:
 - In regard to veteran's family type, the most common type is the married couple household.
 - Next comes to the female householder with no spouse present and the third is Female householder: Living alone.
 - Among veterans who are 35-54 years old, with related children 5 to 17 years only or no children are two prominent trends. Possible subsidies are recommended for their late childbirth.

METHODS

- Analysis on 2015-2019 ACS PUMS Data Dictionary and individual task distribution
 - Assigned topics include but not limited to marriage, insurance, education, income, poverty, Internet accessibility, unemployment, etc.
- API query on American Community Survey 5-Year Data (2015-2019)
 - <https://www.census.gov/data/developers/data-sets/acs-5year.html>
 - Accessed key to the survey data base of Census Bureau.
 - Inquired data variables from the data base based on index as state flip code, public area zip code, etc.
- Cleaned and exported data for further analysis on Python
- Data visualization and feature analysis
- Data Analysis extension to whole states across US
- Building user-oriented interactive R Shiny app
 - Learned R Shiny from open-source webs, e.g. shiny gallery, shiny tutorial, mastering-shiny, etc.
 - Built Shiny app template based on basic PUMS data, e.g. marriage status of veterans in Lafayette, IN.
 - Tested the operation of Shiny app template, presented to the corporate partners, and team leader, then improved according to feedback.
 - Added grids into Shiny app template rearranged format, and included map to boost readability and interactivity.
 - Also displayed all variables by what they meant for users' understanding.
 - Combine team's work across different datasets together into the Shiny app template, and adjusted parameters.
 - Solved data overload issue and reaction disconnection issue in Shiny app server.
 - Further optimized the Shiny app after receiving more feedback..

The screenshot shows the 'My Veteran Marriage Status Info App' interface. It features a data table with columns for marital status (MAR), military service (MIL), household type (HHT), and family presence (FPARC). Below the table is a map of the United States with a search bar and a 'DOWNLOAD' button.

The screenshot shows the 'My Veteran Marriage Status Info App' interface with a bar chart and a data table. The bar chart displays the number of households (HHT) for different marital status categories. The data table below it provides detailed counts for each category.

MAR	MIL	HHT	FPARC
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7

CONCLUSION

- Initial data analysis for the Veterans Profile Project has been completed.
- The census data were sorted out by csv and xlsx documents primarily using python.
- Members visualized data by using python and ggplot in R-Studio.
- The visualization was then translated into an interactive app using the Shiny package in R-Studio.
- Able to see clear relationships between various domains related to veterans .
- Specific website shown while running the R-shiny web application.
- Another team who takes on our project can access all the code and data in R-studio in the OnDemand cluster stored in /depot/tm-mfri folder.
- The main future goals are to:
 - Improve the integration of the separate applications for each domain into a master application combining all of them.
 - Include analysis for more veteran profiling domains that were not included.
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