The Business Advisor

Jaebin Park, Pooja Karla, Janit Modi, Sandeep Kumar Moparthy

Abstract

Deciding a place for one's new start up or establishing a new unit of an existent business can be a difficult task. A significant number of factors have to be considered in making such an important decision. This project gives an ability, for decision makers, to arrive at an informed decision on which industry yields the best in which state, in which county and in which city.

Introduction

Business Patterns Overview

County Business Patterns (CBP), ZIP Code Business Patterns (ZBP) are an annual series that provide sub-national economic data by industry. These programs cover most of the U.S. economy and feature industry and geographic statistics which supplement those published in the Economic Census. Data are published at the U.S. level and by State, County, Metropolitan area, ZIP code, and Congressional District. All data are classified by an industry code (NAICS) and can be viewed with employment-size class breakouts by establishment, and by legal form of organization at some geographic levels. See the County Business Patterns Web site >>

Scope

The CBP annual series provides information that is critical for understanding the Nation's changing economic structure and performance. The series is used to study the economic activity of small areas, analyze economic changes over time; and as a benchmark for statistical series, surveys, and databases between economic censuses. Businesses use the data for analyzing market potential, measuring the effectiveness of sales and advertising programs, setting sales quotas, and developing budgets. Government agencies use the data for administration and planning. Statistics from these surveys are widely used by policy officials, economic analysts, business decision-makers, and the news media.

Data Analytics Problem

To build a data analytics model solution based on the County Business Patterns data that can help decision makers in arriving at potential business locations. The solution gives a high, medium and low potential location for a business based on its industry, the annual payroll specific to employee count in the establishment. Feature creation of the target variable for this approach is necessary. 'Average annual payroll' for a specific business industry would be the determinant.

Given a county or a state,
Formula 1:
Avg annual Payroll of an industry = Annual Payroll for the industry / No. of establishments in the industry

Given a county or a state and the employee size of a business organization,
Formula 2:
Avg annual Payroll of an industry = Annual Payroll for the industry / (No. of establishments in the industry)

The **dependent variable** would categorize the created feature,
Avg Payroll of an Industry into high, medium and low avg annual payrolls.

Data Set

Since 1998, County Business Patterns has been tabulated based on the North American Industry Classification System (NAICS). For more information on NAICS, see the NAICS information page. Data were tabulated according to the Standard Industrial Classification (SIC) System for prior periods. For more information on the SIC system, see the SIC Information Page.

- 2012 to 2016 data use NAICS 2012
- 2008 to 2011 data use NAICS 2007
- 2003 to 2007 data use NAICS 2002
- 1998 to 2002 data use NAICS 1997
- 1988 to 1997 data use 1987 SIC
- 1974 to 1987 data use 1972 SIC

Prior to 2012, County Business Patterns lagged by one year in the adoption of the classification system employed in the Economic Census. Starting in 2012, the classification system was changed in the same year.

There are eight different datasets that considered for this project. These datasets, when integrated and work with intellectually can yield in interesting insights.

Datasets

Complete Congressional District File [<1.0 MB]
Complete County File [15.6 MB]
Complete Metropolitan Area File [7.5 MB]
Complete State File [10.9 MB]
Complete U.S. File [<1.0 MB]
Complete ZIP Code Industry Detail File [28.2 MB]
Complete ZIP Code Totals File [<1.0 MB]
CBP and NES Combined Report [14.3 MB]

The CBP and NES Combined Report is CSV file with 822289 rows and 19 variables.
The Complete County File is a CSV file with 2124893 rows and 26 variables.
The complete metropolitan area file is a CSV file with 936105 rows and 23 variables
The complete state file is a csv file with 448310 rows and 84 variables
The complete US file is a csv file with 13002 rows and 83 variables
The complete ZIP code industry Detail file is a csv with 8418283 rows and 12 variables
The Complete Zipcode totals File is a csv with 38722 rows and 13 variables

The variables and the description of the variables can be found in the below links

County Record Layout [<1.0 MB] 2015-2016
Metro Area Record Layout [<1.0 MB] 2015-2016
State Record Layout for Puerto Rico & Island Areas [<1.0 MB] 2015-2016
State Record Layout [<1.0 MB] 2015-2016
U.S. Record Layout [<1.0 MB] 2007-2016
ZIP Code Industry Detail Record Layout [<1.0 MB] 2015-2016
ZIP Code Totals Record Layout [<1.0 MB] 2015-2016
CBP and NES Combined Report Record Layout [<1.0 MB]

Related Data Products
CBP covers most of the country's economic activity. The series excludes data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees. For information on businesses with no paid employees, see Nonemployer Statistics. See a complete list of economic surveys >>

Methods and Models
Designing the model is divided into five phases,

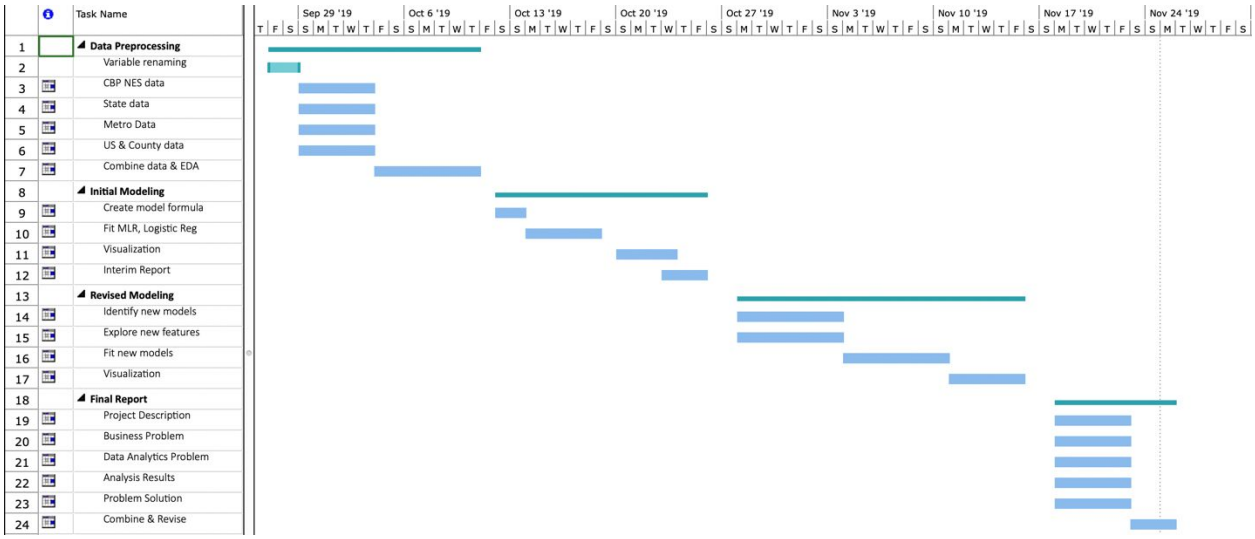
1) Exploratory phase
2) Preprocessing phase
3) Exploratory and visualizations
4) Modelling phase
5) Improvisation and insight phase

Useful features

ST - State FIPS Code
SDSCR - State Description
CTYDSCR - County Description
NAICS - Industry Code: 2- through 4-digit NAICS code
EMP - CBP Employment, including March 12th
AP - CBP Annual Payroll (in thousands)
FIPSTATE - FIPS State Code
FIPSCTY - FIPS County Code
NAICS - Industry Code - 6-digit NAICS code.
EST - Total Number of Establishments
N1_4 - Number of Establishments: 1-4 Employee Size Class *to*
N1000_4 - Employment Size Class: 5,000 or More Employees
CENSTATE - Census State Code
CENCTY - Census County Code
MSA - Metropolitan or Micropolitan Area Code
ZIP - ZIP Code
EST - Total Number of Establishments
CITY - ZIP City Name
STABBR - ZIP State Abbreviation
CTY_NAME - ZIP County Name

Roles and Schedule

	Task Name	Duration	Start	Finish	Contact
1	**Data Preprocessing**				
2	Variable renaming	2 days	Fri 9/27/19 8:00 AM	Sat 9/28/19 5:00 PM	Jaebin
3	CBP NES data	5 days	Sun 9/29/19 8:00 AM	Thu 10/3/19 5:00 PM	Sandeep
4	State data	5 days	Sun 9/29/19 8:00 AM	Thu 10/3/19 5:00 PM	Janit
5	Metro Data	5 days	Sun 9/29/19 8:00 AM	Thu 10/3/19 5:00 PM	Pooja
6	US & County data	5 days	Sun 9/29/19 8:00 AM	Thu 10/3/19 5:00 PM	Jaebin
7	Combine data & EDA	7 days	Fri 10/4/19 8:00 AM	Thu 10/10/19 5:00 PM	Everyone
8	**Initial Modeling**				
9	Create model formula	2 days	Sat 10/12/19 8:00 AM	Sun 10/13/19 5:00 PM	Sandeep, Jaebin
10	Fit MLR, Logistic Reg	5 days	Mon 10/14/19 8:00 AM	Fri 10/18/19 5:00 PM	Everyone
11	Visualization	4 days	Sun 10/20/19 8:00 AM	Wed 10/23/19 5:00 PM	Everyone
12	Interim Report	3 days	Wed 10/23/19 8:00 AM	Fri 10/25/19 5:00 PM	Everyone
13	**Revised Modeling**				
14	Identify new models	7 days	Mon 10/28/19 8:00 AM	Sun 11/3/19 5:00 PM	Sandeep, Pooja
15	Explore new features	7 days	Mon 10/28/19 8:00 AM	Sun 11/3/19 5:00 PM	Jaebin, Janit
16	Fit new models	7 days	Mon 11/4/19 8:00 AM	Sun 11/10/19 5:00 PM	Everyone
17	Visualization	5 days	Mon 11/11/19 8:00 AM	Fri 11/15/19 5:00 PM	Everyone
18	**Final Report**				
19	Project Description	5 days	Mon 11/18/19 8:00 AM	Fri 11/22/19 5:00 PM	Pooja
20	Business Problem	5 days	Mon 11/18/19 8:00 AM	Fri 11/22/19 5:00 PM	Pooja, Janit
21	Data Analytics Problem	5 days	Mon 11/18/19 8:00 AM	Fri 11/22/19 5:00 PM	Sandeep, Jaebin
22	Analysis Results	5 days	Mon 11/18/19 8:00 AM	Fri 11/22/19 5:00 PM	Sandeep, Jaebin
23	Problem Solution	5 days	Mon 11/18/19 8:00 AM	Fri 11/22/19 5:00 PM	Janit
24	Combine & Revise	3 days	Sat 11/23/19 8:00 AM	Mon 11/25/19 5:00 PM	Everyone



Bibliography

1) https://www.census.gov/programs-surveys/cbp/technical-documentation/methodology.html#par_textimage_379462313
2) https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=program&id=program.en.BP
3) https://www.census.gov/data/datasets/2016/econ/cbp/2016-cbp.html
4) https://www.census.gov/programs-surveys/economic-census.html
5) https://www.census.gov/eos/www/naics/
6) https://www.census.gov/programs-surveys/cbp.html
7) https://www.census.gov/programs-surveys/nonemployer-statistics.html
8) https://www.census.gov/econ/survey.html
9) https://www.census.gov/programs-surveys/cbp/data/datasets.html
10) https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t
11) https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=survey&id=survey.en.BP_CBP
12) https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=survey&id=survey.en.BP_ZBP
13) North American Industry Classification System (NAICS) Descriptions [<1.0MB]2012-2016
14) State and County Geography Reference [<1.0 MB]2012-2016
15) Metro Area Geography Reference [<1.0 MB]2008-2014
16) CBP and NES Combined Report Reference [<1.0 MB]