Análise de Dados

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# **Estudo do Preço do combustível automotivo no Brasil em 2025**

## **Fonte de Dados:**

### 1- ANP: Dados do primeiro semestre do ano de 2025

### 2- IBGE: Dados de localização dos Municípios.

# OBJETIVOS DA ANÁLISE

## Importações:

### Instalar e importar pacotes relevantes para análise

* ##Instalar pacotes utilizando a função install.packages().  
    
  #install.packages("readr")  
  #install.packages("dplyr")  
  #install.packages("tidyverse")  
  #install.packages("naniar")  
  #install.packages("readxl")  
  #install.packages("leaflet")  
  #grafico de geolocalização  
  #install.packages("geobr")  
  #install.packages("sf")
* #Importar pacotes utilizando a função library().  
    
  library(naniar)  
  library(readr)  
  library(readxl)  
  library(dplyr)
* ##   
  ## Anexando pacote: 'dplyr'
* ## Os seguintes objetos são mascarados por 'package:stats':  
  ##   
  ## filter, lag
* ## Os seguintes objetos são mascarados por 'package:base':  
  ##   
  ## intersect, setdiff, setequal, union
* library(ggplot2)  
  library(plotly)
* ##   
  ## Anexando pacote: 'plotly'
* ## O seguinte objeto é mascarado por 'package:ggplot2':  
  ##   
  ## last\_plot
* ## O seguinte objeto é mascarado por 'package:stats':  
  ##   
  ## filter
* ## O seguinte objeto é mascarado por 'package:graphics':  
  ##   
  ## layout
* library(httr)
* ##   
  ## Anexando pacote: 'httr'
* ## O seguinte objeto é mascarado por 'package:plotly':  
  ##   
  ## config
* library(jsonlite)  
  library(tidyverse)
* ## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──  
  ## ✔ forcats 1.0.1 ✔ stringr 1.5.2  
  ## ✔ lubridate 1.9.4 ✔ tibble 3.3.0  
  ## ✔ purrr 1.1.0 ✔ tidyr 1.3.1
* ## ── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
  ## ✖ httr::config() masks plotly::config()  
  ## ✖ plotly::filter() masks dplyr::filter(), stats::filter()  
  ## ✖ purrr::flatten() masks jsonlite::flatten()  
  ## ✖ dplyr::lag() masks stats::lag()  
  ## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
* library(leaflet)  
  library(geobr)
* ## Carregando namespace exigido: sf
* library(sf)
* ## Linking to GEOS 3.13.1, GDAL 3.11.0, PROJ 9.6.0; sf\_use\_s2() is TRUE
* library(stringi)

## Carregar o conjunto de dados em um DataFrame

### O 1º conjunto de dados fornecido está no formato de um arquivo Excel .

### Carregar os dados em um DataFrame e salvar em uma variável chamada (dados.anp).

Preços\_semestrais\_AUTOMOTIVOS\_2025\_01 <- read\_excel("Preços semestrais - AUTOMOTIVOS\_2025.01.xlsx")  
  
#salvar em uma variável chamada (dados.anp)  
dados.anp<-Preços\_semestrais\_AUTOMOTIVOS\_2025\_01  
  
#A função str(), exibe informações básica dos dados importados,como o tipo de objeto (ex: data frame, vetor, lista), número de elementos ou dimensões, nomes das variáveis e seus tipos de dados e uma amostra dos dados.  
str(dados.anp)

## tibble [420,409 × 16] (S3: tbl\_df/tbl/data.frame)  
## $ Regiao - Sigla : chr [1:420409] "NE" "NE" "NE" "NE" ...  
## $ Estado - Sigla : chr [1:420409] "CE" "CE" "CE" "CE" ...  
## $ Municipio : chr [1:420409] "SOBRAL" "SOBRAL" "SOBRAL" "SOBRAL" ...  
## $ Revenda : chr [1:420409] "ECONOGÁS DO BRASIL DIST. DERIV. DE PET. BIOC. E GÁS NAT" "ECONOGÁS DO BRASIL DIST. DERIV. DE PET. BIOC. E GÁS NAT" "ECONOGÁS DO BRASIL DIST. DERIV. DE PET. BIOC. E GÁS NAT" "ECONOGÁS DO BRASIL DIST. DERIV. DE PET. BIOC. E GÁS NAT" ...  
## $ CNPJ da Revenda : chr [1:420409] "08.775.979/0002-62" "08.775.979/0002-62" "08.775.979/0002-62" "08.775.979/0002-62" ...  
## $ Nome da Rua : chr [1:420409] "RUA TABELIÃO IDELFONSO CAVALCANTI" "RUA TABELIÃO IDELFONSO CAVALCANTI" "RUA TABELIÃO IDELFONSO CAVALCANTI" "RUA TABELIÃO IDELFONSO CAVALCANTI" ...  
## $ Numero Rua : chr [1:420409] "455" "455" "455" "455" ...  
## $ Complemento : chr [1:420409] NA NA NA NA ...  
## $ Bairro : chr [1:420409] "CENTRO" "CENTRO" "CENTRO" "CENTRO" ...  
## $ Cep : chr [1:420409] "62010-000" "62010-000" "62010-000" "62010-000" ...  
## $ Produto : chr [1:420409] "GASOLINA" "GASOLINA ADITIVADA" "DIESEL S10" "ETANOL" ...  
## $ Data da Coleta : POSIXct[1:420409], format: "2025-01-01" "2025-01-01" ...  
## $ Valor de Venda : num [1:420409] 6.29 6.49 6.19 5.19 6.53 6.83 6.38 5.29 6.69 6.79 ...  
## $ Valor de Compra : logi [1:420409] NA NA NA NA NA NA ...  
## $ Unidade de Medida: chr [1:420409] "R$ / litro" "R$ / litro" "R$ / litro" "R$ / litro" ...  
## $ Bandeira : chr [1:420409] "RAIZEN" "RAIZEN" "RAIZEN" "RAIZEN" ...

#### 💡Ao importar os dados

#IMPORTAR 2º CONJUNTO DE DADOS (DADOS IBGE DOS ESTADOS/MUNICIPIOS)-PARA MAPAS INTERATIVOS   
####################################################################################  
#falar sobre os banco de dados.  
  
  
# Carregar os dados dos municípios   
municipio <- read\_municipality(year = 2024)

## Using year/date 2024

head(municipio,10)

## Simple feature collection with 10 features and 7 fields  
## Geometry type: MULTIPOLYGON  
## Dimension: XY  
## Bounding box: xmin: -65.42964 ymin: -13.6937 xmax: -60.33317 ymax: -9.66916  
## Geodetic CRS: SIRGAS 2000  
## code\_muni name\_muni code\_state abbrev\_state name\_state  
## 1 1100015 Alta Floresta D'oeste 11 RO Rondônia  
## 2 1100023 Ariquemes 11 RO Rondônia  
## 3 1100031 Cabixi 11 RO Rondônia  
## 4 1100049 Cacoal 11 RO Rondônia  
## 5 1100056 Cerejeiras 11 RO Rondônia  
## 6 1100064 Colorado do Oeste 11 RO Rondônia  
## 7 1100072 Corumbiara 11 RO Rondônia  
## 8 1100080 Costa Marques 11 RO Rondônia  
## 9 1100098 Espigão D'oeste 11 RO Rondônia  
## 10 1100106 Guajará-Mirim 11 RO Rondônia  
## code\_region name\_region geom  
## 1 1 Norte MULTIPOLYGON (((-61.93004 -...  
## 2 1 Norte MULTIPOLYGON (((-63.18118 -...  
## 3 1 Norte MULTIPOLYGON (((-60.56184 -...  
## 4 1 Norte MULTIPOLYGON (((-61.00075 -...  
## 5 1 Norte MULTIPOLYGON (((-60.82135 -...  
## 6 1 Norte MULTIPOLYGON (((-60.41521 -...  
## 7 1 Norte MULTIPOLYGON (((-60.99651 -...  
## 8 1 Norte MULTIPOLYGON (((-64.14167 -...  
## 9 1 Norte MULTIPOLYGON (((-60.92521 -...  
## 10 1 Norte MULTIPOLYGON (((-64.73786 -...

dim(municipio)

## [1] 5571 8

#verificando tipo e classes de dados  
str(municipio)

## Classes 'sf' and 'data.frame': 5571 obs. of 8 variables:  
## $ code\_muni : num 1100015 1100023 1100031 1100049 1100056 ...  
## $ name\_muni : chr "Alta Floresta D'oeste" "Ariquemes" "Cabixi" "Cacoal" ...  
## $ code\_state : num 11 11 11 11 11 11 11 11 11 11 ...  
## $ abbrev\_state: chr "RO" "RO" "RO" "RO" ...  
## $ name\_state : chr "Rondônia" "Rondônia" "Rondônia" "Rondônia" ...  
## $ code\_region : num 1 1 1 1 1 1 1 1 1 1 ...  
## $ name\_region : chr "Norte" "Norte" "Norte" "Norte" ...  
## $ geom :sfc\_MULTIPOLYGON of length 5571; first list element: List of 1  
## ..$ :List of 1  
## .. ..$ : num [1:789, 1:2] -61.9 -61.9 -61.9 -61.9 -61.9 ...  
## ..- attr(\*, "class")= chr [1:3] "XY" "MULTIPOLYGON" "sfg"  
## - attr(\*, "sf\_column")= chr "geom"  
## - attr(\*, "agr")= Factor w/ 3 levels "constant","aggregate",..: NA NA NA NA NA NA NA  
## ..- attr(\*, "names")= chr [1:7] "code\_muni" "name\_muni" "code\_state" "abbrev\_state" ...

#alteração de dados do tipos numericos para caracteres.  
#is.character(municipio$`codigo do Municipio`)#então  
#municipio$`codigo do Municipio`<-as.character(municipio$`codigo do Municipio`)  
  
#is.character(municipio$`Estado - Codigo`);#então  
#municipio$`Estado - Codigo`<-as.character(municipio$`Estado - Codigo`)  
  
#is.character(municipio$`Regiao - Codigo`);#então  
#municipio$`Regiao - Codigo`<-as.character(municipio$`Regiao - Codigo`)  
  
#verificar alterações   
sapply(municipio, class)

## $code\_muni  
## [1] "numeric"  
##   
## $name\_muni  
## [1] "character"  
##   
## $code\_state  
## [1] "numeric"  
##   
## $abbrev\_state  
## [1] "character"  
##   
## $name\_state  
## [1] "character"  
##   
## $code\_region  
## [1] "numeric"  
##   
## $name\_region  
## [1] "character"  
##   
## $geom  
## [1] "sfc\_MULTIPOLYGON" "sfc"

sapply(municipio, typeof)

## code\_muni name\_muni code\_state abbrev\_state name\_state code\_region   
## "double" "character" "double" "character" "character" "double"   
## name\_region geom   
## "character" "list"

#Para extraimos as coordenadas a latitude e longitude devenis calcular os centroides  
  
# Calcular os centroides (ponto central de cada município)  
mun\_centroids <- st\_centroid(municipio)

## Warning: st\_centroid assumes attributes are constant over geometries

# Extrair coordenadas de latitude e longitude  
coords <- st\_coordinates(mun\_centroids)  
coords

## X Y  
## [1,] -62.27447 -12.46963215  
## [2,] -62.95727 -9.95197243  
## [3,] -60.63981 -13.47489925  
## [4,] -61.32462 -11.30121797  
## [5,] -61.26094 -13.20366195  
## [6,] -60.55024 -13.15908383  
## [7,] -61.09167 -12.92669053  
## [8,] -64.05860 -12.14708062  
## [9,] -60.78476 -11.35114226  
## [10,] -64.53775 -11.30549098  
## [11,] -62.58463 -10.59223935  
## [12,] -61.75718 -10.46186145  
## [13,] -62.01023 -9.20394015  
## [14,] -62.28020 -11.64316418  
## [15,] -62.17253 -10.61043189  
## [16,] -60.83052 -11.89454897  
## [17,] -64.30427 -9.15415980  
## [18,] -61.87798 -11.16625636  
## [19,] -62.79008 -9.64518553  
## [20,] -61.77153 -11.73256552  
## [21,] -61.70097 -12.02714707  
## [22,] -60.24854 -12.09487769  
## [23,] -62.98832 -11.61186425  
## [24,] -64.62941 -10.38226702  
## [25,] -62.54500 -11.31151367  
## [26,] -61.88063 -12.59336005  
## [27,] -63.39418 -9.64949575  
## [28,] -63.94123 -10.05209145  
## [29,] -62.08319 -11.68099173  
## [30,] -62.98724 -10.33175206  
## [31,] -63.79980 -10.48488274  
## [32,] -63.32543 -8.88708499  
## [33,] -61.88008 -11.47078992  
## [34,] -60.89924 -12.53718872  
## [35,] -62.56527 -9.17098637  
## [36,] -63.18390 -10.74799156  
## [37,] -63.04496 -9.17019186  
## [38,] -61.56897 -11.16022427  
## [39,] -62.84793 -11.07680549  
## [40,] -63.37241 -10.21094776  
## [41,] -62.53242 -10.88942381  
## [42,] -61.41523 -12.26227453  
## [43,] -61.54555 -13.17370069  
## [44,] -61.31535 -11.87874092  
## [45,] -61.46702 -11.90468894  
## [46,] -63.12270 -12.36854039  
## [47,] -63.18653 -11.78246810  
## [48,] -62.27987 -10.94364156  
## [49,] -62.34237 -10.12174130  
## [50,] -62.42456 -11.10406012  
## [51,] -61.93903 -9.73245112  
## [52,] -62.09398 -10.38413923  
## [53,] -66.95016 -9.93388851  
## [54,] -70.00364 -10.77977431  
## [55,] -69.20758 -10.74738116  
## [56,] -68.17368 -9.61398594  
## [57,] -67.83590 -10.47430998  
## [58,] -72.75532 -7.97234607  
## [59,] -68.61831 -10.88914177  
## [60,] -70.74240 -8.92315210  
## [61,] -71.90524 -9.24149497  
## [62,] -73.43593 -7.50498853  
## [63,] -69.84876 -9.37627190  
## [64,] -72.55881 -9.09609001  
## [65,] -67.34021 -10.24905683  
## [66,] -72.73402 -8.49216823  
## [67,] -68.37083 -10.06617698  
## [68,] -73.22435 -7.84409994  
## [69,] -70.39720 -9.41209255  
## [70,] -67.42758 -9.99728641  
## [71,] -69.37934 -9.77023340  
## [72,] -71.44495 -8.23956594  
## [73,] -68.50494 -10.57557853  
## [74,] -67.69857 -9.62954584  
## [75,] -65.32428 -3.69466018  
## [76,] -68.28654 -3.41840197  
## [77,] -61.71809 -3.50189882  
## [78,] -62.09519 -4.19875719  
## [79,] -59.43211 -7.75953133  
## [80,] -71.73997 -5.71077422  
## [81,] -59.52526 -3.78718806  
## [82,] -63.43463 -0.46535094  
## [83,] -57.17243 -3.12900435  
## [84,] -70.27544 -5.42594807  
## [85,] -61.80394 -4.60622429  
## [86,] -57.67008 -3.13782947  
## [87,] -68.04813 -8.77330405  
## [88,] -59.53489 -4.95735102  
## [89,] -61.87777 -3.08207023  
## [90,] -64.06194 -7.29996447  
## [91,] -67.33698 -5.11847573  
## [92,] -60.18322 -3.77044755  
## [93,] -59.59866 -3.28606822  
## [94,] -64.12453 -4.43602535  
## [95,] -62.97377 -3.28900090  
## [96,] -70.21777 -7.02202436  
## [97,] -70.05512 -7.57341707  
## [98,] -66.35766 -2.49102114  
## [99,] -72.84504 -7.23001183  
## [100,] -62.48634 -7.36066612  
## [101,] -71.41268 -7.18052019  
## [102,] -60.47975 -3.09527970  
## [103,] -58.77544 -3.17408863  
## [104,] -68.11279 -6.68314952  
## [105,] -58.61332 -2.49729056  
## [106,] -68.31983 -1.69828727  
## [107,] -66.30775 -3.52457832  
## [108,] -68.40389 -4.71425270  
## [109,] -65.81087 -8.37517351  
## [110,] -60.95879 -3.29144988  
## [111,] -60.69717 -3.77903256  
## [112,] -60.25964 -2.62596323  
## [113,] -61.44647 -6.45821634  
## [114,] -65.03998 -2.42666826  
## [115,] -58.05990 -4.98318305  
## [116,] -57.65638 -1.68061871  
## [117,] -58.59978 -3.98947246  
## [118,] -61.70299 -2.04817591  
## [119,] -60.47525 -6.82119835  
## [120,] -56.85461 -2.68795404  
## [121,] -68.19727 -7.75839595  
## [122,] -59.98965 -1.37089742  
## [123,] -59.63841 -2.52978240  
## [124,] -65.52143 -0.31830708  
## [125,] -69.09012 -3.05294668  
## [126,] -67.99936 0.36824114  
## [127,] -69.45020 -4.50062487  
## [128,] -58.70542 -1.94174948  
## [129,] -58.53706 -2.82056749  
## [130,] -69.67756 -4.02821592  
## [131,] -64.95423 -6.09530866  
## [132,] -65.53050 -4.46995107  
## [133,] -67.82605 -2.69187771  
## [134,] -65.41064 -3.16556099  
## [135,] -59.02868 -0.89560250  
## [136,] -57.77341 -2.81539257  
## [137,] -62.43237 3.73297125  
## [138,] -62.74068 3.07202817  
## [139,] -60.71799 3.11783953  
## [140,] -60.10063 2.78740623  
## [141,] -60.54224 2.27278227  
## [142,] -61.47154 0.99083098  
## [143,] -59.33815 0.91459828  
## [144,] -62.40204 2.18207354  
## [145,] -61.99687 2.51110827  
## [146,] -60.06541 3.87886674  
## [147,] -60.83904 4.16816281  
## [148,] -61.01112 0.03807786  
## [149,] -59.84498 0.63577985  
## [150,] -60.15184 0.88452820  
## [151,] -60.27858 4.68468729  
## [152,] -48.88303 -1.73026789  
## [153,] -48.42463 -4.95727962  
## [154,] -48.41141 -2.03531342  
## [155,] -50.72593 -0.26286548  
## [156,] -50.43029 -6.77300163  
## [157,] -55.03923 -0.60424962  
## [158,] -53.89357 0.28474527  
## [159,] -53.88526 -6.48108240  
## [160,] -49.96132 -0.82708552  
## [161,] -48.38349 -1.33413043  
## [162,] -51.30151 -3.99660863  
## [163,] -46.50750 -1.10481098  
## [164,] -47.72632 -2.23113580  
## [165,] -56.01632 -3.66730131  
## [166,] -50.18183 -2.37308699  
## [167,] -49.69902 -3.12996225  
## [168,] -50.63442 -7.48634995  
## [169,] -48.63424 -1.49846411  
## [170,] -48.45986 -1.24070758  
## [171,] -54.99285 -3.19107784  
## [172,] -48.27564 -1.33959312  
## [173,] -48.76355 -5.05432546  
## [174,] -47.30232 -1.38743770  
## [175,] -46.76358 -1.19318291  
## [176,] -52.68533 -3.29206892  
## [177,] -48.43186 -5.73560361  
## [178,] -49.37116 -3.73329401  
## [179,] -50.62810 -1.12091653  
## [180,] -48.08980 -1.63299472  
## [181,] -46.44318 -1.98870211  
## [182,] -48.87732 -0.86930745  
## [183,] -49.51352 -2.25289432  
## [184,] -50.08593 -6.42409948  
## [185,] -47.11790 -1.14209460  
## [186,] -47.23340 -2.04216920  
## [187,] -47.87707 -1.26854324  
## [188,] -49.83804 -0.03239631  
## [189,] -48.27378 -0.93580205  
## [190,] -49.51266 -8.18236703  
## [191,] -47.97464 -1.88168678  
## [192,] -51.22066 -8.45756278  
## [193,] -49.62462 -6.22890097  
## [194,] -49.98814 -1.58350395  
## [195,] -55.11324 -1.84604910  
## [196,] -47.86385 -0.74286087  
## [197,] -47.89818 -4.18656131  
## [198,] -49.24544 -6.06956824  
## [199,] -57.80619 -1.15909225  
## [200,] -49.57602 -7.54832406  
## [201,] -47.07596 -2.16826538  
## [202,] -49.00563 -4.02720327  
## [203,] -51.55385 -1.14938274  
## [204,] -47.56591 -1.14490959  
## [205,] -49.13070 -2.06255756  
## [206,] -47.92281 -1.46466338  
## [207,] -47.92139 -2.80580031  
## [208,] -47.39987 -1.81155742  
## [209,] -56.49697 -5.86894298  
## [210,] -49.86967 -5.11491493  
## [211,] -57.30425 -7.44307764  
## [212,] -49.18116 -4.59853562  
## [213,] -56.22128 -2.62299672  
## [214,] -49.46918 -1.86419084  
## [215,] -47.51276 -1.99095664  
## [216,] -47.63520 -0.80989967  
## [217,] -50.01689 -5.63012362  
## [218,] -47.49744 -0.80997270  
## [219,] -47.70988 -0.83761364  
## [220,] -48.31980 -1.39743368  
## [221,] -53.19501 -3.16017670  
## [222,] -51.10393 -1.60760284  
## [223,] -49.46645 -2.57672015  
## [224,] -49.07392 -2.68378172  
## [225,] -54.57520 -3.07038425  
## [226,] -54.35310 -1.07421063  
## [227,] -49.30928 -1.35568958  
## [228,] -46.90004 -2.39267259  
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## [5570,] -48.81346 -15.26964283  
## [5571,] -47.79681 -15.78132780

# Adicionar as coordenadas ao dataframe original  
municipio <- municipio %>%  
 mutate(longitude = coords[,1],  
 latitude = coords[,2])  
  
# Visualizar os dados  
print(municipio)

## Simple feature collection with 5571 features and 9 fields  
## Geometry type: MULTIPOLYGON  
## Dimension: XY  
## Bounding box: xmin: -73.98681 ymin: -33.75108 xmax: -28.84778 ymax: 5.26962  
## Geodetic CRS: SIRGAS 2000  
## First 10 features:  
## code\_muni name\_muni code\_state abbrev\_state name\_state  
## 1 1100015 Alta Floresta D'oeste 11 RO Rondônia  
## 2 1100023 Ariquemes 11 RO Rondônia  
## 3 1100031 Cabixi 11 RO Rondônia  
## 4 1100049 Cacoal 11 RO Rondônia  
## 5 1100056 Cerejeiras 11 RO Rondônia  
## 6 1100064 Colorado do Oeste 11 RO Rondônia  
## 7 1100072 Corumbiara 11 RO Rondônia  
## 8 1100080 Costa Marques 11 RO Rondônia  
## 9 1100098 Espigão D'oeste 11 RO Rondônia  
## 10 1100106 Guajará-Mirim 11 RO Rondônia  
## code\_region name\_region geom longitude latitude  
## 1 1 Norte MULTIPOLYGON (((-61.93004 -... -62.27447 -12.469632  
## 2 1 Norte MULTIPOLYGON (((-63.18118 -... -62.95727 -9.951972  
## 3 1 Norte MULTIPOLYGON (((-60.56184 -... -60.63981 -13.474899  
## 4 1 Norte MULTIPOLYGON (((-61.00075 -... -61.32462 -11.301218  
## 5 1 Norte MULTIPOLYGON (((-60.82135 -... -61.26094 -13.203662  
## 6 1 Norte MULTIPOLYGON (((-60.41521 -... -60.55024 -13.159084  
## 7 1 Norte MULTIPOLYGON (((-60.99651 -... -61.09167 -12.926691  
## 8 1 Norte MULTIPOLYGON (((-64.14167 -... -64.05860 -12.147081  
## 9 1 Norte MULTIPOLYGON (((-60.92521 -... -60.78476 -11.351142  
## 10 1 Norte MULTIPOLYGON (((-64.73786 -... -64.53775 -11.305491

#head(mun\_coords %>% select(code\_muni, name\_muni, latitude, longitude))