

Report

2025-11-13

```
df = read.csv("./Datasets/MiWay_Bus_Stops_-4490514804018385747.csv")
head(df)
```

```
## OBJECTID Stop_Number Stop_Description Shelter
## 1 1 1 ERIN MILLS PKY north of LINCOLN GREEN WAY 0
## 2 2 2 ERIN MILLS PKY at PAULA CRT WALKWAY 0
## 3 3 4 EGLINTON AVE west of EAST MILL RD 0
## 4 4 9 THE COLLEGEWAY east of GLEN ERIN DR 1
## 5 5 10 EXPLORER DR at 5875 EXPLORER DR 0
## 6 6 11 MCLAUGHLIN RD at SOUTH CEREMONIAL DR 1
## Boarding_Allowed Debarking_Allowed Express_Stop Accessible Routes_Service
## 1 1 1 0 1 13
## 2 1 1 0 1 13
## 3 1 1 0 1 35
## 4 1 1 0 1 29/36
## 5 1 1 0 0 74
## 6 1 1 0 1 66
## District Zone Latitude Longitude Effective_Date
## 1 SHERIDAN TRAFFIC ZONE 51 43.53525 -79.66364 2025/09/01
## 2 SHERIDAN TRAFFIC ZONE 50 43.53453 -79.66312 2025/09/01
## 3 EAST CREDIT TRAFFIC ZONE 88 43.57937 -79.68393 2025/09/01
## 4 ERIN MILLS TRAFFIC ZONE 213 43.53722 -79.68434 2025/09/01
## 5 AIRPORT CORPORATE TRAFFIC ZONE 5 43.65462 -79.61673 2025/09/01
## 6 HURONTARIO TRAFFIC ZONE 89 43.59985 -79.66698 2025/09/01
## x y
## 1 -79.66364 43.53525
## 2 -79.66312 43.53453
## 3 -79.68393 43.57937
## 4 -79.68434 43.53722
## 5 -79.61673 43.65462
## 6 -79.66698 43.59985
```

```
df$District[df$District == ""] <- "UNKNOWN"
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
## filter, lag
```

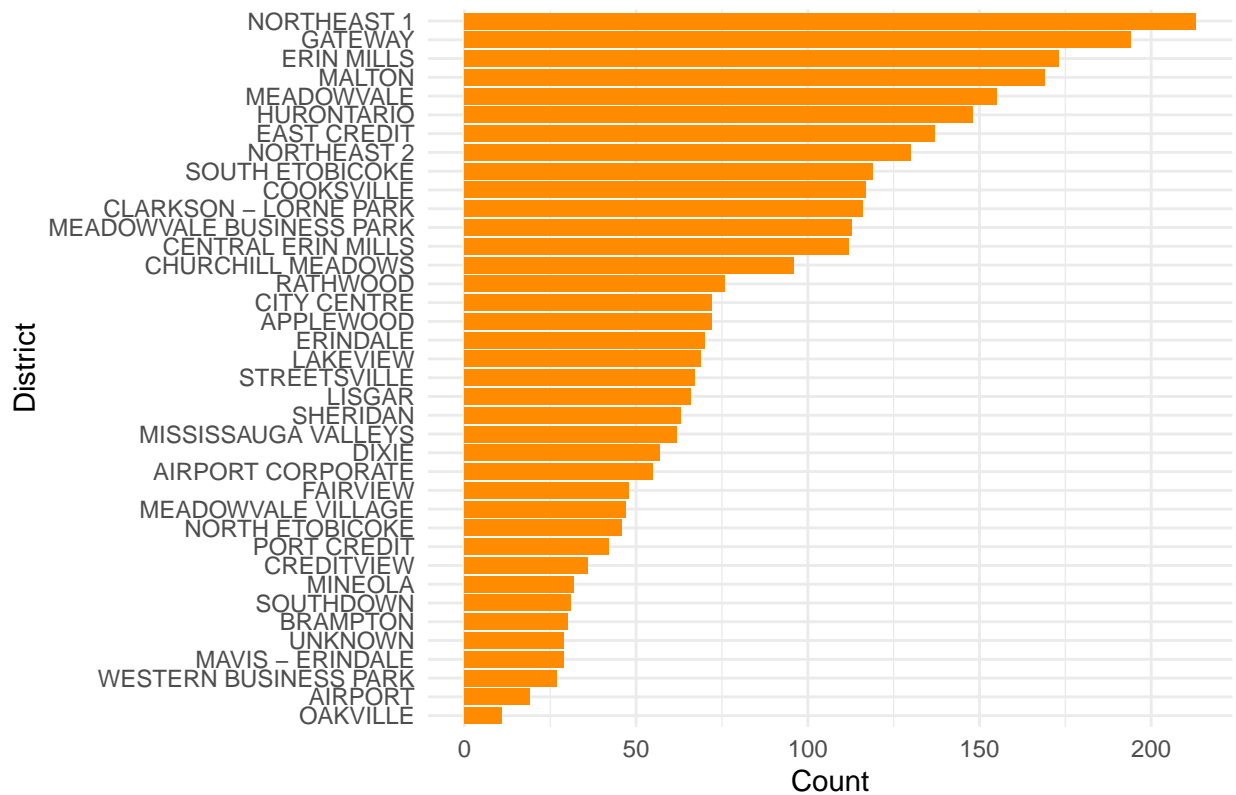
```
## The following objects are masked from 'package:base':
##
## intersect, setdiff, setequal, union
```

```
library(ggplot2)
# install.packages("dplyr")
# install.packages("ggplot2")
counts <- df %>%
  group_by(District) %>%
  summarise(n = n()) %>%
  arrange(desc(n))
head(counts)
```

```
## # A tibble: 6 x 2
##   District      n
##   <chr>      <int>
## 1 NORTHEAST 1    213
## 2 GATEWAY      194
## 3 ERIN MILLS   173
## 4 MALTON       169
## 5 MEADOWVALE   155
## 6 HURONTARIO   148
```

```
ggplot(counts, aes(x = n, y = reorder(District, n))) +
  geom_col(fill = "darkorange") +
  labs(
    title = "Number of Stops by District",
    x = "Count",
    y = "District"
  ) +
  theme_minimal()
```

Number of Stops by District



```
unique(df$District)
```

```
## [1] "SHERIDAN" "EAST CREDIT"
## [3] "ERIN MILLS" "AIRPORT CORPORATE"
## [5] "HURONTARIO" "NORTHEAST 1"
## [7] "MEADOWVALE" "GATEWAY"
## [9] "LISGAR" "STREETSVILLE"
## [11] "CENTRAL ERIN MILLS" "MISSISSAUGA VALLEYS"
## [13] "MEADOWVALE BUSINESS PARK" "FAIRVIEW"
## [15] "CITY CENTRE" "COOKSVILLE"
## [17] "MEADOWVALE VILLAGE" "UNKNOWN"
## [19] "CLARKSON - LORNE PARK" "OAKVILLE"
## [21] "SOUTHDOWN" "PORT CREDIT"
## [23] "RATHWOOD" "MINEOLA"
## [25] "NORTHEAST 2" "SOUTH ETOBICOKE"
## [27] "AIRPORT" "LAKEVIEW"
## [29] "NORTH ETOBICOKE" "CHURCHILL MEADOWS"
## [31] "DIXIE" "ERINDALE"
## [33] "MAVIS - ERINDALE" "CREDITVIEW"
## [35] "APPLEWOOD" "MALTON"
## [37] "WESTERN BUSINESS PARK" "BRAMPTON"
```

```
access_summary <- df %>%
  group_by(District) %>%
  summarise(
```

```

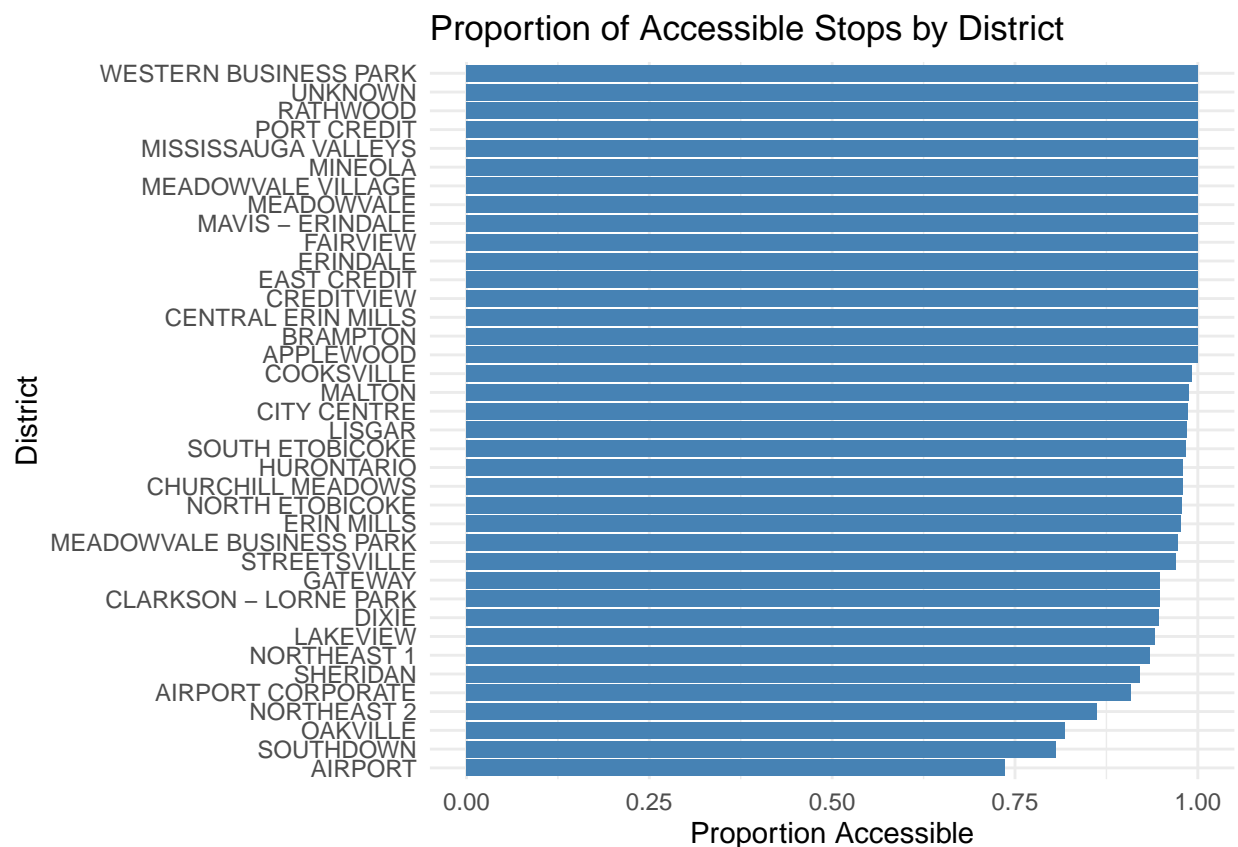
    accessible = sum(Accessible),
    total = n(),
    proportion = accessible / total
  ) %>%
  arrange(desc(proportion))

```

```

ggplot(access_summary, aes(x = proportion, y = reorder(District, proportion))) +
  geom_col(fill = "steelblue") +
  labs(
    title = "Proportion of Accessible Stops by District",
    x = "Proportion Accessible",
    y = "District"
  ) +
  theme_minimal()

```

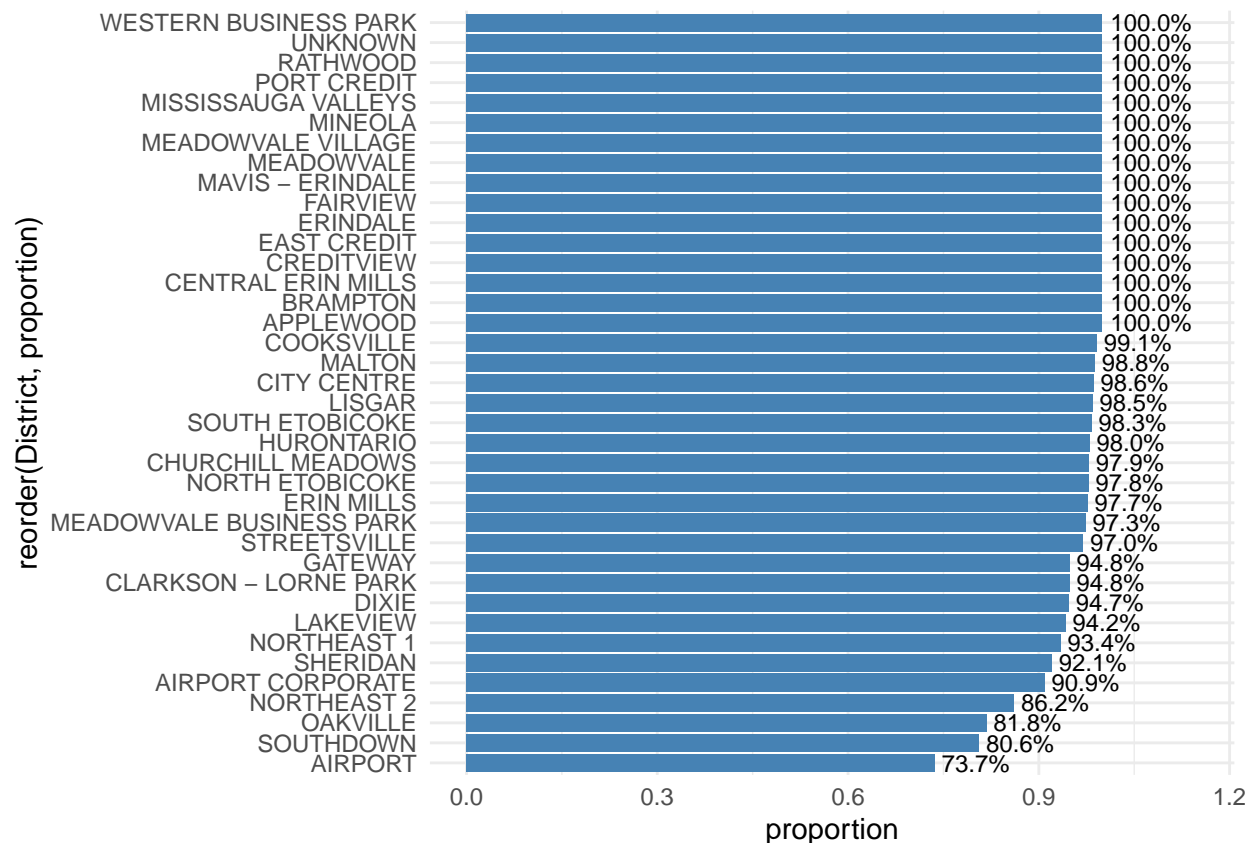


AODA (Accessibility for Ontarians with Disabilities Act) Requirements

```

ggplot(access_summary, aes(x = proportion, y = reorder(District, proportion))) +
  geom_col(fill = "steelblue") +
  geom_text(aes(label = sprintf("%.1f%%", proportion * 100)),
    hjust = -0.1, size = 3) +
  xlim(0, 1.15) +
  theme_minimal()

```



Shelter

```
shelter_summary <- df %>%
  group_by(District) %>%
  summarise(
    shelters = sum(Shelter),
    total = n(),
    proportion_sheltered = shelters / total
  ) %>%
  arrange(desc(proportion_sheltered))
head(shelter_summary)
```

```
## # A tibble: 6 x 4
##   District      shelters total proportion_sheltered
##   <chr>          <int> <int>          <dbl>
## 1 APPLEWOOD         59    72           0.819
## 2 DIXIE             45    57           0.789
## 3 MISSISSAUGA VALLEYS 47    62           0.758
## 4 RATHWOOD          53    76           0.697
## 5 MEADOWVALE VILLAGE  32    47           0.681
## 6 CITY CENTRE       47    72           0.653
```

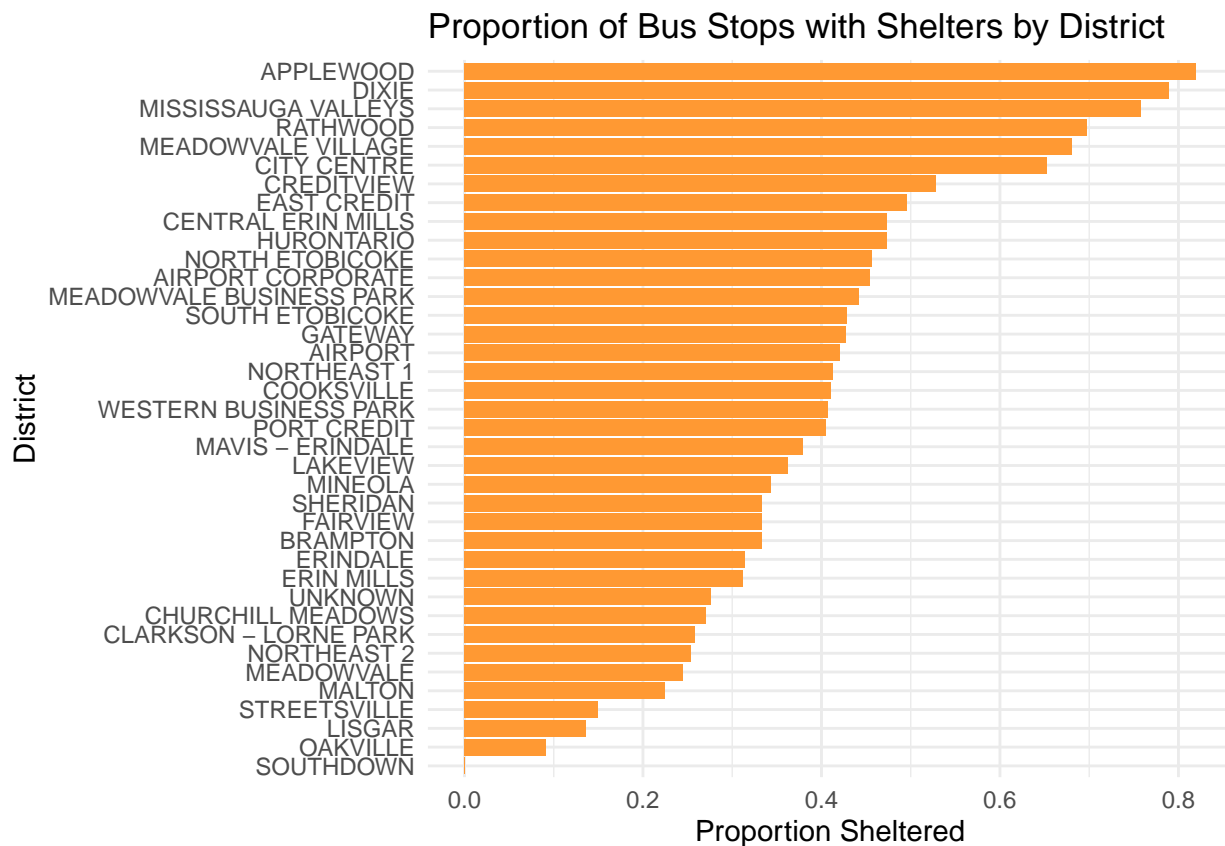
```
library(ggplot2)

ggplot(shelter_summary, aes(x = proportion_sheltered,
```

```

y = reorder(District, proportion_sheltered))) +
geom_col(fill = "#FF9933") +
labs(
  title = "Proportion of Bus Stops with Shelters by District",
  x = "Proportion Sheltered",
  y = "District"
) +
theme_minimal()

```

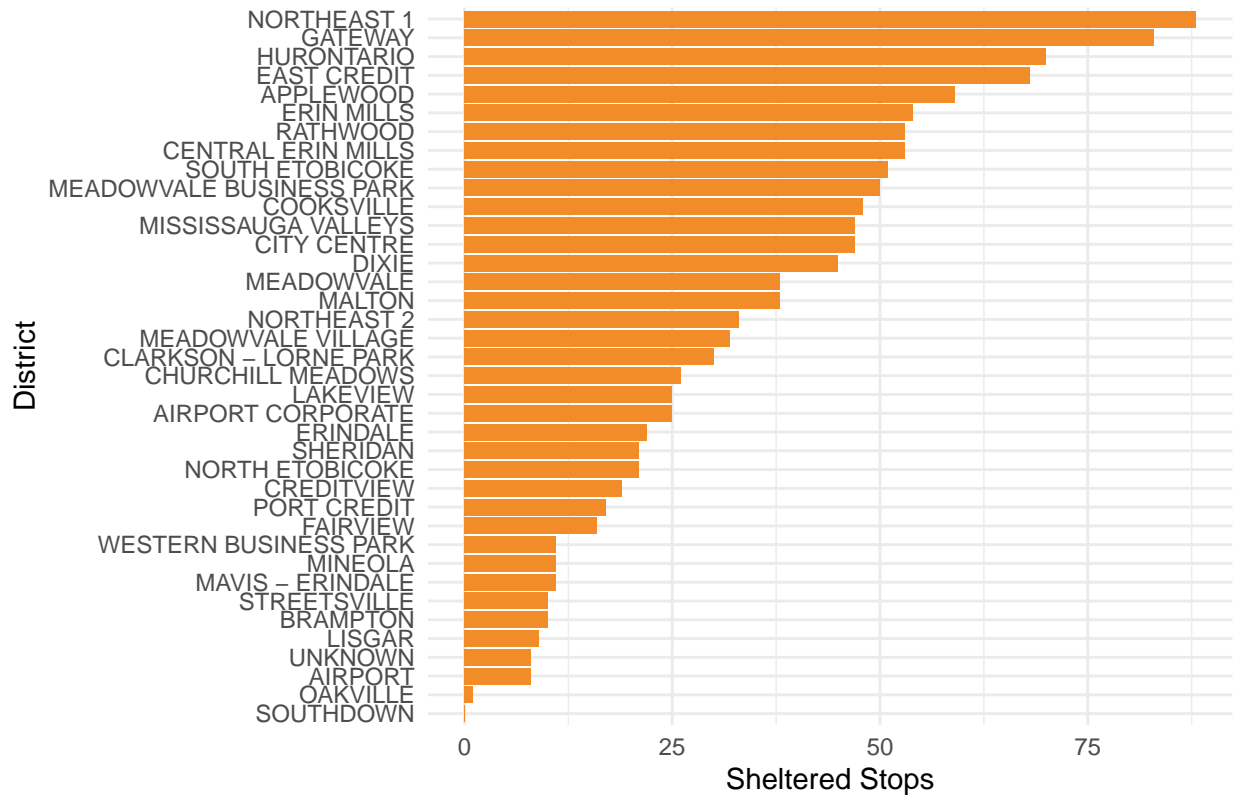


```

ggplot(shelter_summary, aes(x = shelters, y = reorder(District, shelters))) +
geom_col(fill = "#F28C28") +
labs(
  title = "Number of Sheltered Stops by District",
  x = "Sheltered Stops",
  y = "District"
) +
theme_minimal()

```

Number of Sheltered Stops by District



```
library(dplyr)
library(tidyr)

routes_long <- df %>%
  separate_rows(Routes_Service, sep = "/") %>%
  mutate(Routes_Service = trimws(Routes_Service)) %>%
  filter(Routes_Service != "")

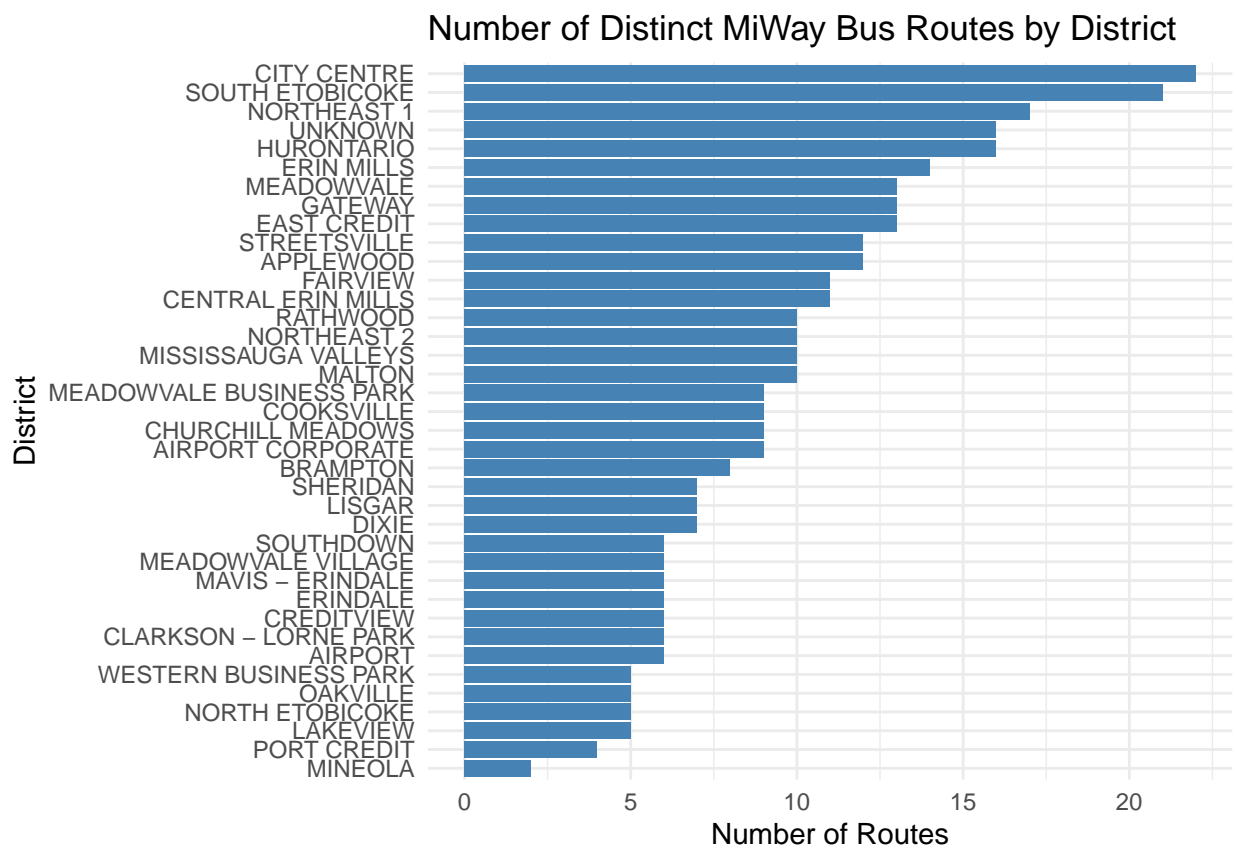
routes_by_district <- routes_long %>%
  group_by(District) %>%
  summarise(n_routes = n_distinct(Routes_Service)) %>%
  arrange(desc(n_routes))
routes_by_district
```

```
## # A tibble: 38 x 2
##   District      n_routes
##   <chr>         <int>
## 1 CITY CENTRE         22
## 2 SOUTH ETOBICOKE     21
## 3 NORTHEAST 1         17
## 4 HURONTARIO          16
## 5 UNKNOWN             16
## 6 ERIN MILLS          14
## 7 EAST CREDIT         13
## 8 GATEWAY              13
```

```
## 9 MEADOWVALE          13
## 10 APPLEWOOD           12
## # i 28 more rows
```

```
library(ggplot2)

ggplot(routes_by_district, aes(x = n_routes, y = reorder(District, n_routes))) +
  geom_col(fill = "steelblue") +
  labs(
    title = "Number of Distinct MiWay Bus Routes by District",
    x = "Number of Routes",
    y = "District"
  ) +
  theme_minimal()
```



```
utm_routes <- c("1", "44", "101", "110", "126")
unique(df$Routes_Service)
```

```
## [1] "13"
## [2] "35"
## [3] "29/36"
## [4] "74"
## [5] "66"
## [6] "7/74"
## [7] "7/39/43"
```



```

## [8] "10/313"
## [9] "43"
## [10] "39/43"
## [11] "107/109"
## [12] "39/43/73"
## [13] "25/43"
## [14] "39"
## [15] "10/39/43/306"
## [16] "9/48"
## [17] "9/13/48"
## [18] "3/53"
## [19] "108"
## [20] "25/70"
## [21] "3/8"
## [22] "28"
## [23] "3"
## [24] "26/110"
## [25] "61"
## [26] "39/90"
## [27] "38/39/43/90"
## [28] "17"
## [29] "17/103"
## [30] "110"
## [31] "13/29/45"
## [32] "13/14/45/110"
## [33] "13/14/45"
## [34] "13/14/29/45/110"
## [35] "29"
## [36] "29/45"
## [37] "23"
## [38] "1/38"
## [39] "53"
## [40] "39/53"
## [41] "14/29"
## [42] "14/23"
## [43] "14"
## [44] "51/302"
## [45] "7"
## [46] "48"
## [47] "2"
## [48] "15"
## [49] "5"
## [50] "26"
## [51] "2/8/14/23"
## [52] "13/46/49"
## [53] "45"
## [54] "7/35"
## [55] "2/8"
## [56] "18/42"
## [57] "8"
## [58] "10/45/313"
## [59] "13/29"
## [60] "6"
## [61] "11/30"

```

[62] "46"
 ## [63] "4"
 ## [64] "23/31"
 ## [65] "31"
 ## [66] "4/5/31"
 ## [67] "4/5"
 ## [68] "5/23/31"
 ## [69] "5/23"
 ## [70] "4/31"
 ## [71] "61/312"
 ## [72] "68/314"
 ## [73] "2/3/7/10/17/20/26/68/315"
 ## [74] "2/3/10/26"
 ## [75] "45/71"
 ## [76] "44/126"
 ## [77] "68/315"
 ## [78] "1/29/101"
 ## [79] "13/71"
 ## [80] "1"
 ## [81] "13/110"
 ## [82] "36"
 ## [83] "1/101/110"
 ## [84] "1/101"
 ## [85] "29/71"
 ## [86] "13/29/110"
 ## [87] "73"
 ## [88] "24/107"
 ## [89] "6/8/26/312"
 ## [90] "6/8/26/126/312"
 ## [91] "8/26/126/302/312"
 ## [92] "8/26/312"
 ## [93] "26/302/312"
 ## [94] "10"
 ## [95] "8/9/10"
 ## [96] "35/48"
 ## [97] "1/38/101"
 ## [98] "70"
 ## [99] "6/38"
 ## [100] "38"
 ## [101] "9/35"
 ## [102] "2/103"
 ## [103] "2/4"
 ## [104] "2/4/103"
 ## [105] "4/28"
 ## [106] "7/20/315"
 ## [107] "2/53/103"
 ## [108] "45/109"
 ## [109] "45/49/109"
 ## [110] "24/43/57/74"
 ## [111] "13/48"
 ## [112] "44"
 ## [113] "10/39/43"
 ## [114] "315"
 ## [115] "51"

[116] "1/3/26/307"
[117] "3/26"
[118] "314/315"
[119] "1/11/20/35/70/101/108/109/126"
[120] "5/31"
[121] "9"
[122] "9/61"
[123] "42/90"
[124] "49"
[125] "38/306/314"
[126] "16"
[127] "43/46"
[128] "24"
[129] "1/36"
[130] "26/126"
[131] "20"
[132] "13/26/29"
[133] "1/13/36/48"
[134] "13/101"
[135] "1/45"
[136] "1/36/48"
[137] "7/39/107/109"
[138] "2/53"
[139] "6/26"
[140] "57/61"
[141] "68/306/314"
[142] "68/306/315"
[143] "6/26/126"
[144] "1/6"
[145] "2/302"
[146] "2/103/302"
[147] "304"
[148] "8/53"
[149] "8/53/304"
[150] "8/304"
[151] "39/43/314"
[152] "3/302/304"
[153] "302/304"
[154] "26/126/312"
[155] "26/312"
[156] "90"
[157] "1/3/307"
[158] "3/307"
[159] "51/307"
[160] "20/26"
[161] "51/302/307"
[162] "3/302"
[163] "42"
[164] "20/26/126"
[165] "2/17"
[166] "68/107/109"
[167] "107"
[168] "26/109"
[169] "9/38"

[170] "6/8/26/302/312"
[171] "38/108"
[172] "6/8/9/26/28/61/66/302/312"
[173] "10/38/39/43/45/46/90/313"
[174] "38/43"
[175] "10/53"
[176] "28/38"
[177] "71"
[178] "9/46/48"
[179] "39/46"
[180] "48/110"
[181] "68"
[182] "48/313"
[183] "10/45/109/313"
[184] "46/48"
[185] "25/43/70"
[186] "25"
[187] "2/10"
[188] "17/70"
[189] "9/28/61/66"
[190] "10/306"
[191] "10/39"
[192] "103"
[193] "17/70/103"
[194] "35/68"
[195] "5/73"
[196] "5/73/74"
[197] "7/35/74"
[198] "7/43/74"
[199] "57"
[200] "38/313"
[201] "38/314"
[202] "17/53"
[203] "44/90"
[204] "44/48/90"
[205] "10/109"
[206] "3/8/302"
[207] "38/44/108"
[208] "38/43/44/108"
[209] "7/30"
[210] "38/68"
[211] "14/45"
[212] "38/43/108"
[213] "44/306"
[214] "43/44"
[215] "49/313"
[216] "313"
[217] "5/15"
[218] "42/108"
[219] "15/18/42"
[220] "15/51"
[221] "25/39/53"
[222] "38/39/43/46/90"
[223] "4/28/103"

[224] "39/57"
 ## [225] "23/29"
 ## [226] "15/30"
 ## [227] "22"
 ## [228] "24/30"
 ## [229] "11/18/42"
 ## [230] "18/30/42"
 ## [231] "30"
 ## [232] "7/15/30"
 ## [233] "11/18/24/42"
 ## [234] "11/18/42/107"
 ## [235] "11"
 ## [236] "15/24"
 ## [237] "16/22"
 ## [238] "39/43/68/314"
 ## [239] "7/24/107"
 ## [240] "7/24"
 ## [241] "39/43/306"
 ## [242] "39/70"
 ## [243] "66/70"
 ## [244] "4/28/38"
 ## [245] "9/61/66"
 ## [246] "49/321"
 ## [247] "73/74/107/109"
 ## [248] "306/313"
 ## [249] "7/39/43/74"
 ## [250] "18/42/107"
 ## [251] "43/68/314"
 ## [252] "321"
 ## [253] "46/49"
 ## [254] "9/13/46/49"
 ## [255] "109/110"
 ## [256] "45/49"
 ## [257] "35/321"
 ## [258] "14/29/45"
 ## [259] "9/321"
 ## [260] "101"
 ## [261] "36/45"
 ## [262] "109"
 ## [263] "9/49"
 ## [264] "49/306"
 ## [265] "46/321"
 ## [266] "3/6/7/8/9/20/28/66/68/107/302/312/315"
 ## [267] "10/13/38/39/42/43/44/45/46/48/90/109/313"
 ## [268] "18/66"
 ## [269] "61/66"
 ## [270] "18/57"
 ## [271] "18"
 ## [272] "1/11/20/35/70"
 ## [273] "1/3/26/71/307"
 ## [274] "26/71"
 ## [275] "70/71/108/307"
 ## [276] "126"

```

library(dplyr)
library(tidyr)

routes_long <- df %>%
  separate_rows(Routes_Service, sep = "/") %>%
  mutate(Routes_Service = trimws(Routes_Service))

utm_long <- routes_long %>%
  filter(Routes_Service %in% utm_routes)

district_utm <- utm_long %>%
  group_by(District) %>%
  summarise(
    utm_stops = n_distinct(Stop_Number),      # stops with a direct UTM bus
    utm_bus_occurrences = n(),               # total appearances of UTM routes
    utm_distinct_routes = n_distinct(Routes_Service) # how many of the 5 show up here
  ) %>%
  arrange(desc(utm_stops))

library(ggplot2)

ggplot(district_utm, aes(x = utm_stops, y = reorder(District, utm_stops))) +
  geom_col(fill = "#2C7BB6") +
  labs(
    title = "Direct UTM Bus Access by District",
    x = "Stops with a Direct UTM Bus",
    y = "District"
  ) +
  theme_minimal()

```

