

# International Event

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## 1. Introduction

Tunghai University is planning to host a major international event, welcoming university presidents from around the world. As one of the largest universities in Taiwan, Tunghai regularly accommodates a high volume of vehicles. Many faculty members and staff drive their own vehicles to campus, and visitors also contribute to the number of vehicles entering daily. However, with this increase in vehicle traffic, the risk of accidents on campus rises. To ensure the safety of attendees during the event, I, as a data analyst, aim to identify the optimal time for hosting the event by analyzing vehicle entry data. The goal is to select a date when vehicle traffic on campus is at its lowest, thereby minimizing the risk of accidents during the event.

## 2. Data

To conduct this analysis, I require data on all the vehicles that entered Tunghai University over the course of a week. This will help determine the best day to hold the event with minimal traffic. I obtained the data from Tunghai University's website, which provides information about campus traffic. The dataset includes the number of cars and motorcycles entering the university from October 10, 2020 (109 年) to October 16, 2020 (109 年).

Source: <https://general.thu.edu.tw/web/course/detail.php?cid=13&id=17>

大門				第二教學區門			
星期	汽車數量	機車數量	合計	星期	汽車數量	機車數量	合計
星期日	1149	220	1369	星期日	247	35	282
星期一	1741	1125	2866	星期一	1628	303	1931
星期二	1989	1356	3345	星期二	1728	329	2057
星期三	1506	936	2442	星期三	391	141	532
星期四	1866	1494	3360	星期四	1819	306	2125
星期五	2093	1369	3462	星期五	1767	361	2128
星期六	805	169	974	星期六	440	54	494
合計	11144	6609	17813	合計	8020	1529	9549
平均數	1592	953	2545	平均數	1146	218	1364
汽車合計平均數		2738		機車合計平均數		1171	
註：統計日期自109年10月10日至109年10月16日							

### 3. Result

Code:

```
main_gate <- read.csv('David_Vehicle_data_main_gate.csv')

main_gate_longer <- main_gate %>% pivot_longer(cols = c('Car', 'Motorcycle', 'Sum'),
names_to = 'Vehicle', values_to = 'Count')

ggplot(main_gate_longer, aes(x = as.factor(Day), y = Count, fill = Vehicle)) +

  labs(title = "Tunghai University Vehicles Main Gate 2020",

        x = "Day",

        y = "Numbers",

        caption = "By David, Data Visualization Course, Tunghai University, 2024")

+

theme(plot.title = element_text(hjust = 0.5, size = 20)) +

geom_bar(position = 'dodge', stat = 'identity')
```

```

second_gate <- read.csv('David_Vehicle_data_second_gate.csv')

second_gate_longer <- second_gate %>% pivot_longer(cols = c('Car', 'Motorcycle',
'Sum'), names_to = 'Vehicle', values_to = 'Count')

ggplot(second_gate_longer, aes(x = as.factor(Day), y = Count, fill = Vehicle)) +

  labs(title = "Tunghai University Vehicles Second Gate 2020",

        x = "Day",

        y = "Numbers",

        caption = "By David, Data Visualization Course, Tunghai University, 2024")
+

  theme(plot.title = element_text(hjust = 0.5, size = 20)) +

  geom_bar(position = 'dodge', stat = 'identity')

all_gate <- read.csv('David_Vehicle_all_data.csv')

all_gate_longer <- all_gate %>% pivot_longer(cols = c('Car', 'Motorcycle', 'Sum'),
names_to = 'Vehicle', values_to = 'Count')

ggplot(all_gate_longer, aes(x = as.factor(Day), y = Count, fill = Vehicle)) +

  labs(title = "Tunghai University All Vehicles 2020",

        x = "Day",

        y = "Numbers",

        caption = "By David, Data Visualization Course, Tunghai University, 2024")
+

  theme(plot.title = element_text(hjust = 0.5, size = 20)) +

  geom_bar(position = 'dodge', stat = 'identity')

```

Source code photo:

```
main_gate <- read.csv('David_Vehicle_data_main_gate.csv')

main_gate_longer <- main_gate %>% pivot_longer(cols = c('Car', 'Motorcycle', 'Sum'),
                                              names_to = 'Vehicle',
                                              values_to = 'Count')

ggplot(main_gate_longer, aes(x = as.factor(Day), y = Count, fill = Vehicle)) +
  labs(title = "Tunghai University Vehicle Main Gate 2020",
       x = "Day",
       y = "Numbers",
       caption = "By David, Data Visualization Course, Tunghai University, 2024") +
  theme(plot.title = element_text(hjust = 0.5, size = 20)) +
  geom_bar(position = 'dodge', stat = 'identity')

second_gate <- read.csv('David_Vehicle_data_second_gate.csv')

second_gate_longer <- second_gate %>% pivot_longer(cols = c('Car', 'Motorcycle', 'Sum'),
                                                  names_to = 'Vehicle',
                                                  values_to = 'Count')

ggplot(second_gate_longer, aes(x = as.factor(Day), y = Count, fill = Vehicle)) +
  labs(title = "Tunghai University Vehicle Second Gate 2020",
       x = "Day",
       y = "Numbers",
       caption = "By David, Data Visualization Course, Tunghai University, 2024") +
  theme(plot.title = element_text(hjust = 0.5, size = 20)) +
  geom_bar(position = 'dodge', stat = 'identity')

all_gate <- read.csv('David_Vehicle_all_data.csv')

all_gate_longer <- all_gate %>% pivot_longer(cols = c('Car', 'Motorcycle', 'Sum'),
                                             names_to = 'Vehicle',
                                             values_to = 'Count')

ggplot(all_gate_longer, aes(x = as.factor(Day), y = Count, fill = Vehicle)) +
  labs(title = "All Vehicle enter Tunghai University 2020",
       x = "Day",
       y = "Numbers",
       caption = "By David, Data Visualization Course, Tunghai University, 2024") +
  theme(plot.title = element_text(hjust = 0.5, size = 20)) +
  geom_bar(position = 'dodge', stat = 'identity')
```

CSV file:

These are the CSV file about vehicles that enter campus from the main gate and the second gate.

Day	Car	Motorcycle	Sum
1	1741	1125	2866
2	1989	1356	3345
3	1506	936	2442
4	1866	1494	3360
5	2093	1369	3462
6	805	169	974
7	1149	220	1369

Day	Car	Motorcycle	Sum
1	1628	303	1931
2	1728	329	2057
3	391	141	532
4	1819	306	2125
5	1767	361	2128
6	440	54	494
7	247	35	282

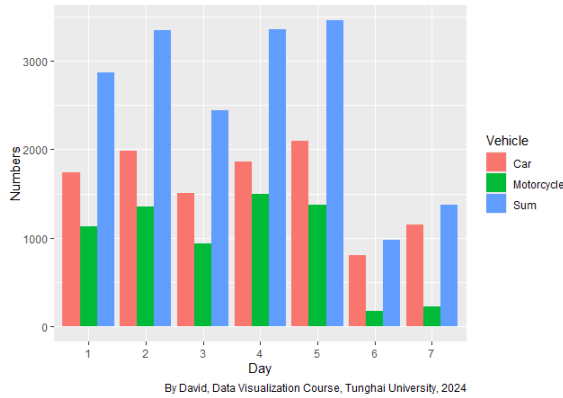
This is the CSV file for the sum all the vehicles that enter Tunghai in one week

WPS Office interface showing a spreadsheet with data for vehicle counts over 7 days. The spreadsheet has columns for Day, Car, Motorcycle, and Sum.

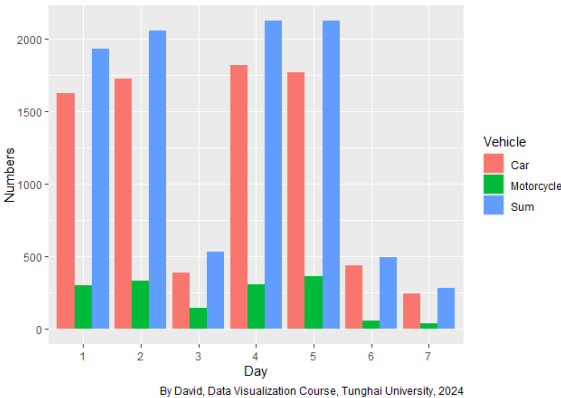
Day	Car	Motorcycle	Sum
1	3369	1428	4797
2	3717	1685	5402
3	1897	1077	2974
4	3685	1800	5485
5	3860	1730	5590
6	1245	223	1468
7	1396	255	1651

Result:

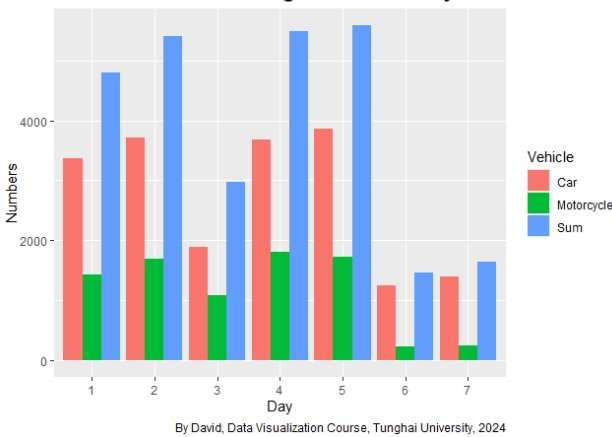
Tunghai University Vehicle Main Gate 2020



Tunghai University Vehicle Second Gate 2020



All Vehicle enter Tunghai University 2020



#### 4. Conclusion:

From the data and the graph generated in RStudio, we can observe that the fewest vehicles enter the campus is on Saturday. This is evident can be taken from the graph, where the blue bar representing sum of the vehicle and Saturday blue bar is the shortest compared to the other days. The second-lowest vehicle count is on Sunday, as shown by the second-shortest blue bar. Based on this, we can conclude that Saturday has the lowest number of vehicles entering the campus. Therefore, holding the international event on Saturday will help minimize the risk of accidents caused by campus traffic.