taipei_passerby_buying_power

October 11, 2020

1 Taipei Passerby Buying Power

In order to know more about the total buyer / market size, we would use passerby buying power as one of the factor (later combined with number of passerby / buyer). In determining the buying power, the data we would use are:

- **Taiwan 2014 Tax data from cicadata.** We would derive people income from the tax data.
- **Taipei budget data from Taipei news.** The information of how much portion people are spending their income for dining out.
- **Taipei MRT traffic data from gov public data site.** The number of people that use MRT from and to which station.

Then we would use the data with:

- **Get average dining out budget of people based on living area.** We would use the data later and make it into the passerby buying power.
- **Passerby buying power, based on the activities area.** We would simulate people activities and get the buying power based on the activities area.

1.1 Get average monthly based on living area

We would use the tax data to geth monthly income for each passenger (based on living area). From the income, we would make dining out budget based on income.

here is the example of the table:

	village_code	township_chinese_ name	taxpayer	total_comprehensive_ income
0	63000010027	松山區	1443	2057192
1	63000010021	松山區	3128	4331423
2	63000010020	松山區	1893	2469616
3	63000010003	松山區	3002	5869047
4	63000010009	松山區	1589	2697501

1.1.1 Compute dining out budget

This is based on: - Taipei news that said in 2018, on average Taiwanese income breakdown are: 15.6% for dining out.

Therefore, to compute the passerby we use:

$$possible\ food\ budget\ percentage = dining\ out\ budget\ percentage \tag{1}$$
$$= 15.6\% \tag{2}$$

1.2 Translate buying power from living area into activities area

As we would use the passerby buying power based on activities area, therefore we would try to translate the buying power that based on living area into activities area.

1.2.1 Demonstrate method

We would use the MRT info data to the buying power translation process. We would simulate where does the passerby coming from portion from the MRT data, then later on we would also use the simulation of people walking data. Here how it kinda looks like (we use township level for visualization, but the real computation would be in village level detail)

We would compute the buying power of each area based on the source below is one of the example of the destination-source breakdown

Passerby percentage of Zhongzheng District come from
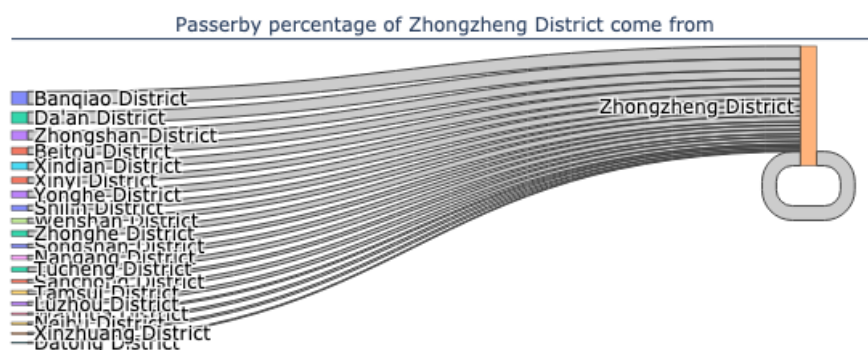
1.2.2 Get first simulation, based on MRT station out

This is the first simulation, where we get the buying power for the passenger on each station (when coming outo).

1.2.3 Simulate the walking distribution

This is the second translation, on each station we would simulate the walking point.
Noted on distribution formula, based on passerby simulation formula, which are:

- previous maximum determined radius, 2 km distribution function:

$$f(x) = \frac{3x^2}{10} - \frac{17x}{6} + 1 \tag{3}$$

  with result no more than 1 or less than 0

- from that, compute the passerby average weekly dining out budget proportionate to the final distributed portion of the value

$$passerby\ weekly\ dining\ out\ budget_{final} = \sum_{n=1}^{\infty} f_2(f(x)) * passerby\ weekly\ dining\ out\ budget_{village\ in} \tag{4}$$
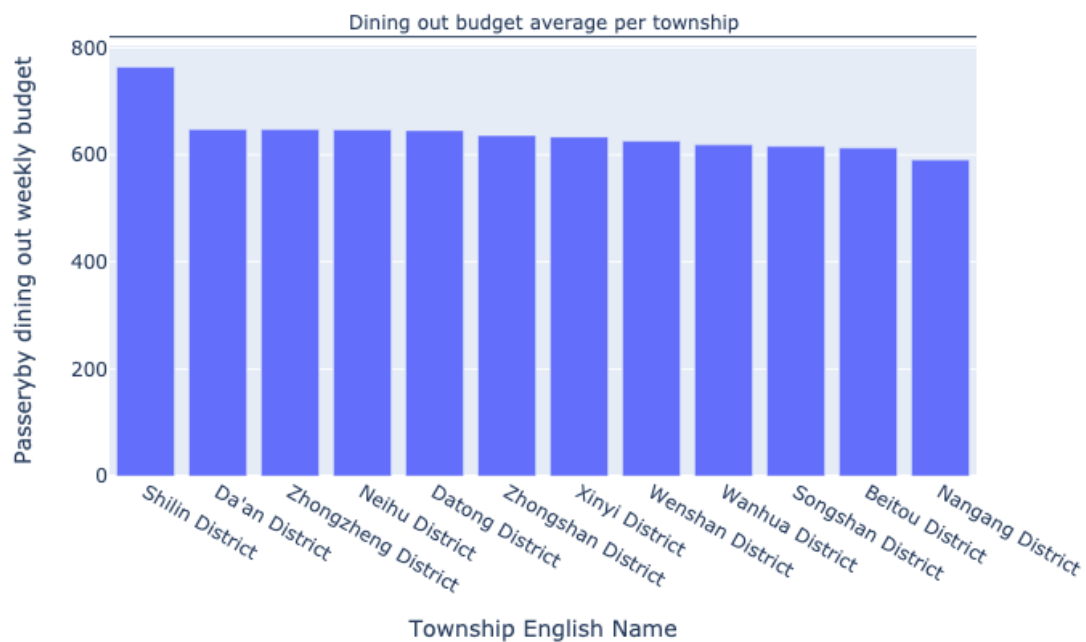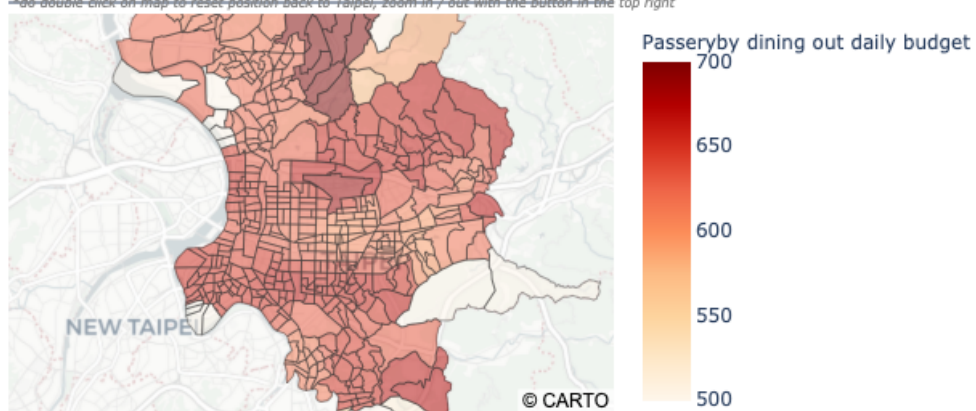
  with:
  $f_2(f(x)) = \frac{f(x)}{\sum_{n=1}^{\infty} f(x)_n}$ if $passerby_{village\ out}$ exist
  $f_2(f(x)) = \frac{f(x)}{\sum_{n=1}^{\infty} f(x)_n - 1}$ if $passerby_{village\ out}$ not exist

1.2.4 Data visualization

The final data looks like this

Most weekly dining out budget for passerby is 600

Taipei color scale map based on simulated passerby average dining out budget
do double click on map to reset position back to Taipei, zoom in / out with the button in the top right

Passeryby dining out daily budget

700
650
600
550
500

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NEW TAIPEI

Dining out budget average per township

Passeryby dining out weekly budget

Township English Name

1.3 Analysis

Analysis from the information are:

- **The buying power around Taipei are kinda the same.** It might have 5-15% difference among them.
- **People in Taipei mid-east area have higher buying power.** Compare to other, it lead by some amount.