

## Assignment 2: Patterns at GASTech

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**Analytic Tools Used:** D3.js, Python, Excel

**Approximately how many hours were spent working on this submission in total:** 12 hours per person

**GitHub link:** [https://ksarullo.github.io/cse557\\_assignment2/](https://ksarullo.github.io/cse557_assignment2/)

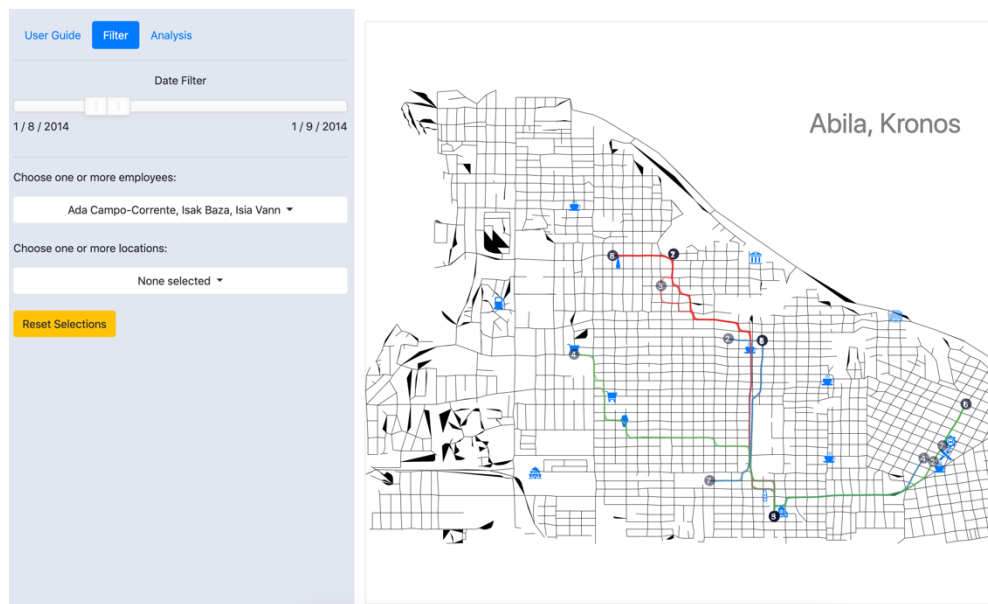
**Video link:** <https://www.youtube.com/watch?v=cQYBnBtuh1U&feature=youtu.be>

### Questions:

1. Describe common daily routines for GASTech employees. What does a day in the life of a typical GASTech employee look like? Please limit your response to no more than five images and 300 words.

An average employee routine on the weekdays includes driving from home possibly to a coffee shop or café before heading to work. When lunchtime hits, an average employee will either eat at work, head to a restaurant or pick up something from the grocery store and then head back into work. It is possible for an employee to go for a snack or gelato around 1pm-2pm then head back to work. After a long day of work, an average employee may grab dinner at a restaurant and go home. Finally, after eating or relaxing at home employees may go shopping whether it be for clothes or auto supplies.

Below is an image of three employee's GPS data from a single day. As you can see, by following along with the numbered circles, they're destinations follow the general routine suggested above.



2. Identify up to three unusual events or patterns that you see in the data.

Possible patterns:

- 1) Brand Tempestad and Isande Borrasca meet at the Chostus Hotel during lunch time on January 8, 10, 14 and 17 for secret meetings of some sort (Fig. 1).

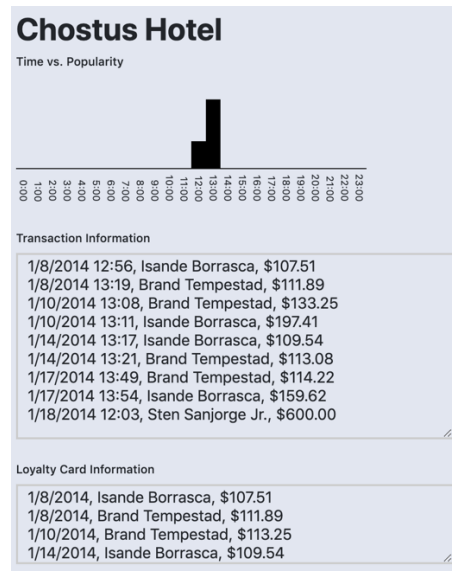


Figure 1. Transaction information at the Chostus Hotel

As an example, Fig. 2 shows the routes intersections between Brand Tempestad and Isande Borrasca at the Chostus Hotel on January 10, 2014

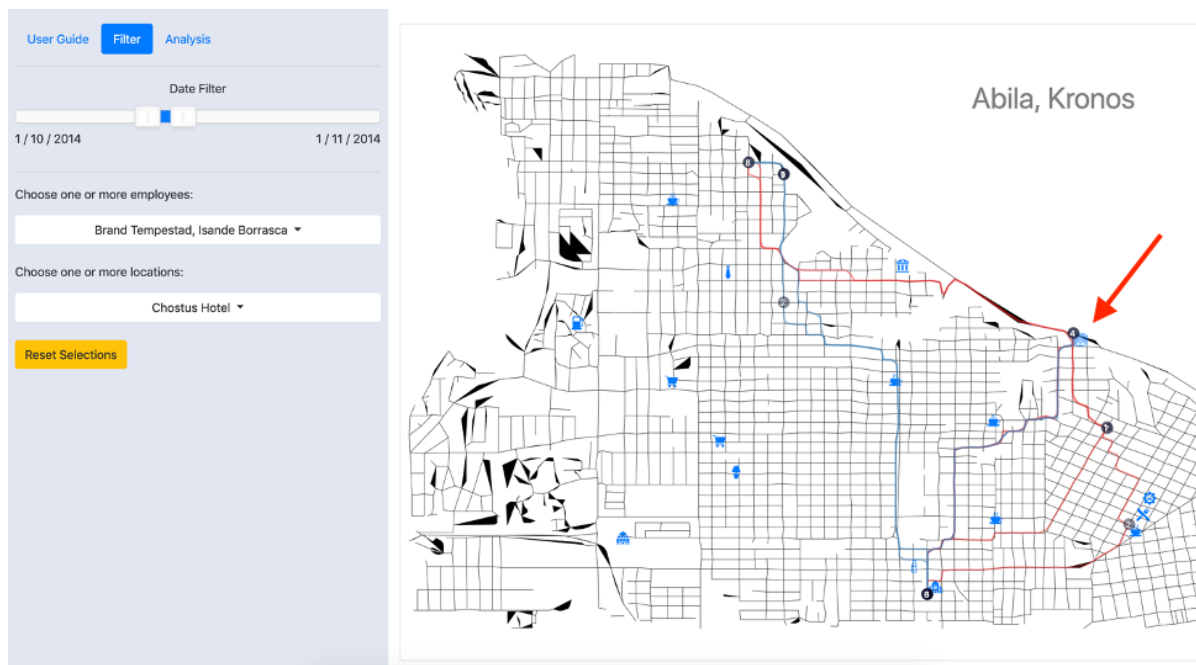


Figure 2. Routes intersections between Brand Tempestad and Isande Borrasca

The image below displays the confirmation of the credit card transactions at Chostus Hotel

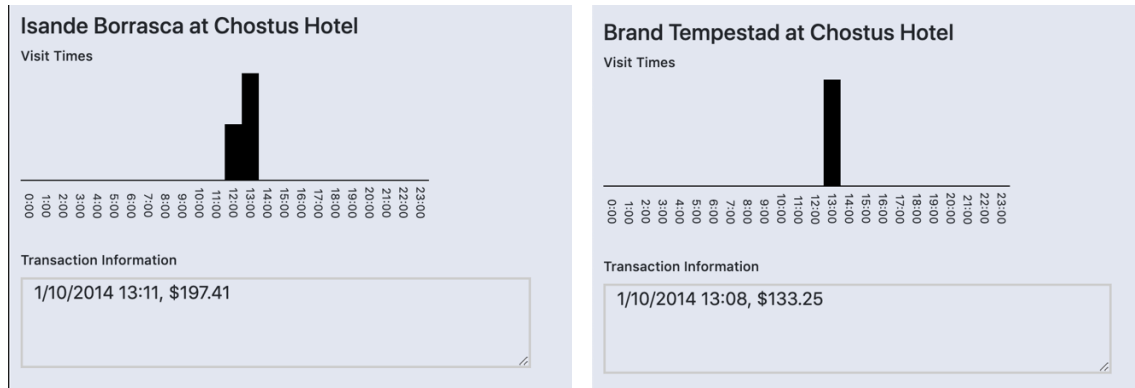


Figure 3. Credit card transaction at Chostus Hotel on January 10

- 2) Henk Mies has made 15 transactions in 10 days to Abila Airport. This could be plane tickets for him and/or other employees at GASTech.

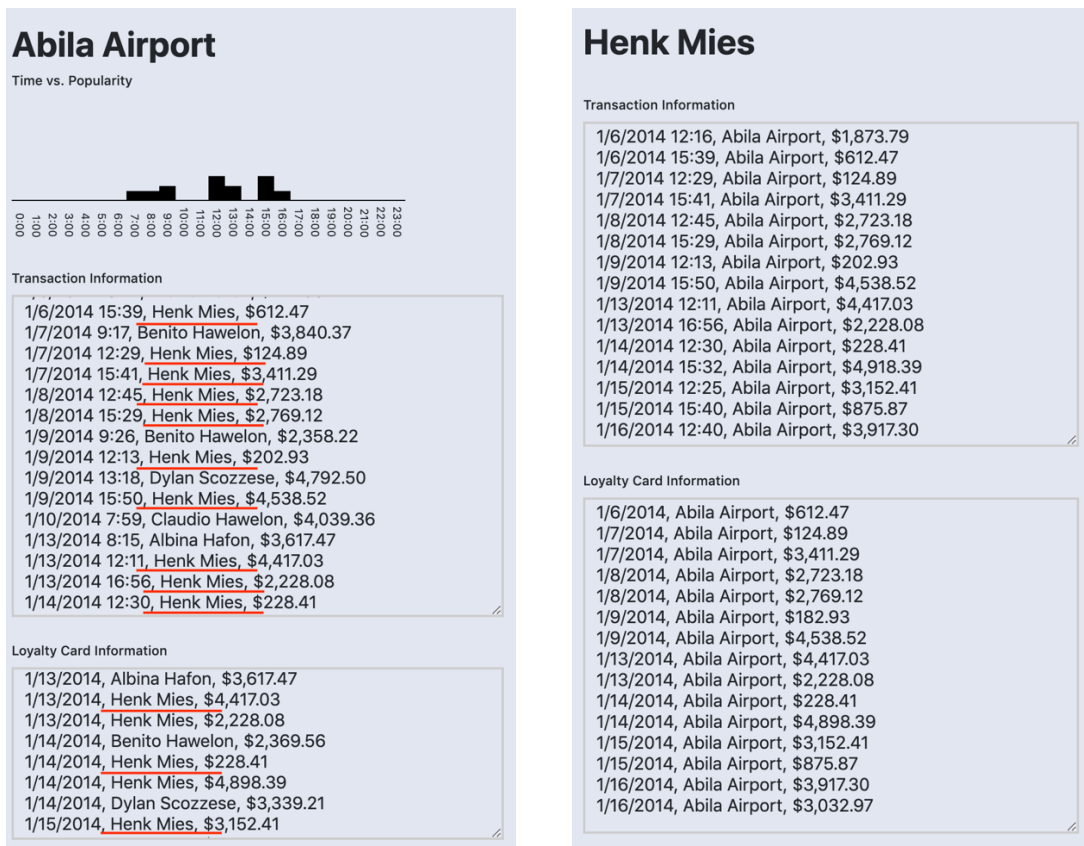


Figure 4. Abila Airport and Henk Mies credit card information

- 3) Lucas Alcazar spent \$10,000 at Frydos Autosupply n'More, which is an unusual amount in general. According to his history transactions, a large amount of money he spent except at Frydos Autosupply n'More was only \$276.90 at Albert's Fine Clothing, then suddenly he spent \$10,000 at Frydos Autosupply n'More, which could be considered as suspicious activity. He also didn't use the loyalty card which he usually does at other places.

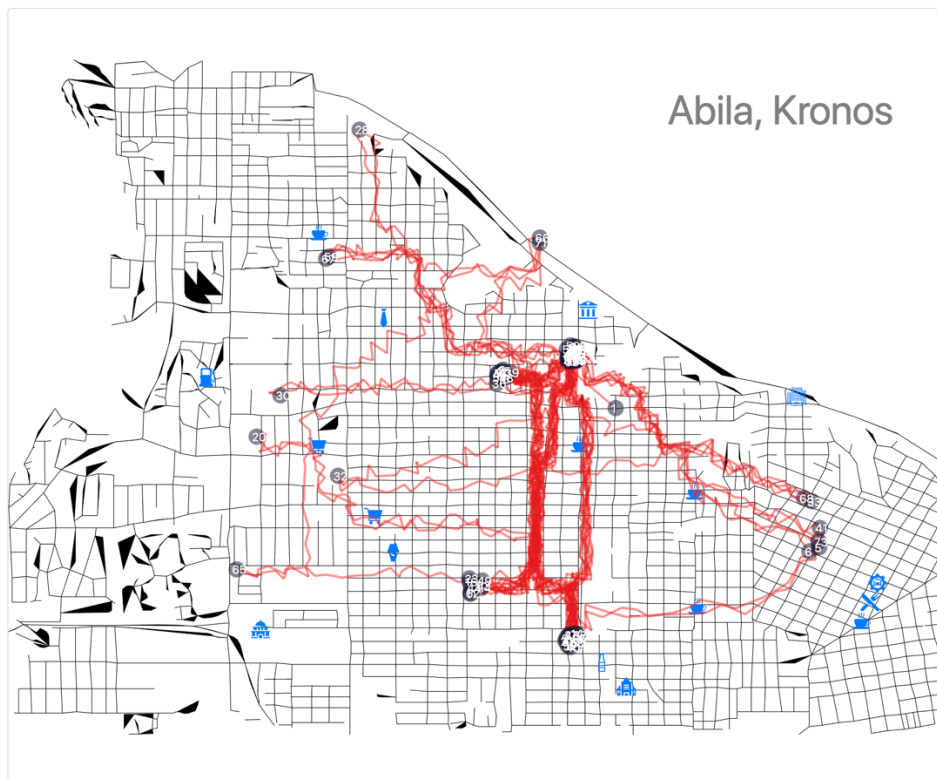
Lucas Alcazar	Lucas Alcazar
Transaction Information	Transaction Information
1/6/2014 7:55, Hallowed Grounds, \$8.05	1/6/2014 7:55, Hallowed Grounds, \$8.05
1/6/2014 13:21, Hippokampos, \$28.23	1/6/2014 13:21, Hippokampos, \$28.23
1/6/2014 20:26, Albert's Fine Clothing, \$276.90	1/6/2014 20:26, Albert's Fine Clothing, \$276.90
1/7/2014 7:46, Hallowed Grounds, \$84.44	1/7/2014 7:46, Hallowed Grounds, \$84.44
1/7/2014 13:37, Gelatogalore, \$21.52	
1/8/2014 7:56, Hallowed Grounds, \$12.86	
1/8/2014 13:43, Hippokampos, \$39.80	
1/8/2014 21:16, Ouzeri Elian, \$30.81	
1/9/2014 7:50, Hallowed Grounds, \$34.45	
1/9/2014 13:41, Abila Zacharo, \$89.41	
1/10/2014 13:16, Ouzeri Elian, \$30.71	
1/11/2014 13:37, Hippokampos, \$75.62	
1/11/2014 19:44, Shoppers' Delight, \$149.20	
1/12/2014 14:06, Hippokampos, \$71.99	
1/13/2014 6:04, Daily Dealz, \$2.01	
1/13/2014 13:18, U-Pump, \$55.25	
1/13/2014 13:28, Hippokampos, \$30.51	
1/13/2014 19:20, Frydos Autosupply n' More, \$10,000.00	
1/13/2014 19:30, Ouzeri Elian, \$28.75	
1/16/2014 8:05, Hallowed Grounds, \$12.19	
1/16/2014 13:28, Guy's Gyros, \$10.27	
1/16/2014 20:28, Ouzeri Elian, \$9.91	
1/17/2014 8:04, Hallowed Grounds, \$9.40	
1/17/2014 20:28, Ouzeri Elian, \$35.81	
1/18/2014 13:32, Abila Zacharo, \$16.59	
1/18/2014 19:26, Ouzeri Elian, \$61.56	
1/19/2014 3:45, Kronos Mart, \$194.51	
1/19/2014 19:49, Ouzeri Elian, \$32.77	

Loyalty Card Information	Loyalty Card Information
1/6/2014, Albert's Fine Clothing, \$276.90	1/6/2014, Albert's Fine Clothing, \$276.90
1/6/2014, Hallowed Grounds, \$8.05	1/6/2014, Hallowed Grounds, \$8.05
1/7/2014, Gelatogalore, \$21.52	1/7/2014, Gelatogalore, \$21.52
1/7/2014, Hallowed Grounds, \$4.44	1/7/2014, Hallowed Grounds, \$4.44
1/7/2014, Ouzeri Elian, \$25.27	1/7/2014, Ouzeri Elian, \$25.27
1/8/2014, Hippokampos, \$39.80	1/8/2014, Hippokampos, \$39.80
1/8/2014, Ouzeri Elian, \$10.81	1/8/2014, Ouzeri Elian, \$10.81
1/9/2014, Abila Zacharo, \$29.41	1/9/2014, Abila Zacharo, \$29.41
1/9/2014, Hallowed Grounds, \$14.45	1/9/2014, Hallowed Grounds, \$14.45
1/10/2014, Hallowed Grounds, \$6.87	1/10/2014, Hallowed Grounds, \$6.87
1/12/2014, Hippokampos, \$31.99	1/12/2014, Hippokampos, \$31.99
1/13/2014, Hallowed Grounds, \$14.11	1/13/2014, Hallowed Grounds, \$14.11
1/13/2014, Hippokampos, \$30.51	1/13/2014, Hippokampos, \$30.51
1/13/2014, Ouzeri Elian, \$28.75	1/13/2014, Ouzeri Elian, \$28.75
1/14/2014, Kalami Kafention, \$16.84	1/14/2014, Kalami Kafention, \$16.84
1/14/2014, Ouzeri Elian, \$15.94	1/14/2014, Ouzeri Elian, \$15.94
1/15/2014, Hallowed Grounds, \$15.86	1/15/2014, Hallowed Grounds, \$15.86
1/15/2014, Ouzeri Elian, \$24.81	1/15/2014, Ouzeri Elian, \$24.81
1/15/2014, Ouzeri Elian, \$32.95	1/15/2014, Ouzeri Elian, \$32.95
1/16/2014, Guy's Gyros, \$10.27	1/16/2014, Guy's Gyros, \$10.27
1/16/2014, Hallowed Grounds, \$12.19	1/16/2014, Hallowed Grounds, \$12.19
1/16/2014, Ouzeri Elian, \$9.91	1/16/2014, Ouzeri Elian, \$9.91
1/17/2014, Hallowed Grounds, \$9.40	1/17/2014, Hallowed Grounds, \$9.40
1/17/2014, Ouzeri Elian, \$35.81	1/17/2014, Ouzeri Elian, \$35.81
1/18/2014, Abila Zacharo, \$16.59	1/18/2014, Abila Zacharo, \$16.59
1/18/2014, Kronos Mart, \$194.51	1/18/2014, Kronos Mart, \$194.51
1/18/2014, Ouzeri Elian, \$21.56	1/18/2014, Ouzeri Elian, \$21.56

- 4) Axel Cazas (1) and Elsa Orilla (2) may have been aware of tracking software in their vehicles. It is suspicious that 33 employees of out 35 have very clear and complete GPS data except for Axel Cazas and Elsa Orilla. As stated in the instructions, GASTech employees were not aware of tracking software in their vehicles. Still, it is equally possible that Axel Cazas and Elsa Orilla knew about it and used some device to block/change GPS tracking software.



Geo data for Axel Cazas



Geo data for Elsa Orilla