

Help GASTech to manage company.

GASTech

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Introduction

In the roughly twenty years that Tethys-based GASTech has been operating a natural gas production site in the island country of Kronos, it has produced remarkable profits and developed strong relationships with the government of Kronos.

During the celebration of the result of the initial public offering of their very successful company, several employees of GASTech go missing. An organization known as the Protectors of Kronos (POK) is suspected in the disappearances. We try to find and help those workers by understanding the complex relationships among them and peering into those stuff's personal communication, social activities information.

Objectives

- 1. Visualize the relationship between each department.
- 2. Track cars' routine distribution.
- 3. Analysis information in communication emails.

Methods

In this poster, all data extraction and wrangling are done in R using the tidyverse suite of packages. Basing on several data files the official site provided, we will use different functions to visualize data and find the invisible information under the numbers.

Vast Challenge 1

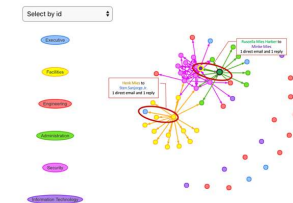


Diagram
Description automatically generated

From the background information, we know that the founding leaders of POK are Henk Bodrogi, Jeron Karel, Carmine Osvaldo and the current leaders are Elian Karel, Silvia Marek, Mandor Vann, Isla Vann, Lucio Jakab, Lorenzo Di Stefano, Valentine Mies, Yanick Cato and Joreto Katell. There are 7 employees with the same last name of middle name as the POK leaders. 5 of them are in securities and 1 of them is the truck driver. The

combination enables them to conveniently bring in suspected people or bring out people sneakily.

By inspecting their email exchanges among these people, it was found out Ruscella Mies Haber, assistant to the engineering group manager, has sent emails to Minke Mies who is outside of the department about "FW: ARISE - Inspiration for Defenders of Kronos." The title contains defenders of Kronos, which highly resembles Protectors of Kronos. Checking the people involved in the email, surprisingly most of them, Ruscella Mies Haber, Loreto Bodrogi, Isla Vann, Hennie Osvaldo, Minke Mies are having the same sir names as the POK leaders. There is potentially a small POK branch in GASTech. Rachel Pantanal and Inga Ferro, though not directly related to the POK leaders, potentially are in the group too. Especially considering that Rachel Pantanal was the one initiating the email.

"Arise" in the email title, is also a magazine that APA sought to build brand through. There might be a link between the email and the Arise magazine. "In recent years the APA has sought to build their brand through websites and the publication of a professional, high-quality magazine called 'Arise'" (from International Times)

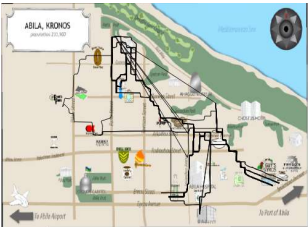
Vast Challenge 2

In the above section, we find anomalies in Loreto Bodrogi(id:16), Isla Vann(id:17), Hennie Osvaldo(id:22) and Minke Mies(id:25). Next we will visualize their cars' track to find invisible information.

By filtering the records during the early morning (2am to 4am), I find some anomalies during this special time. Car id: 4, 10, 35, 32 and 21 arrived to place Car id: 16's home at 03:30, Jan 11, 2014. Car id: 21 and 24 arrived to place car id: 17's home at 03:40, Jan 9, 2014.



We also find that destinations of workers are located in car id: 2's home. By observing the time, they all happened at the night, Jan 10, 2014. The involved employees are: 19, 3, 11, 28, 26, 5, 8, 1 and so on. I guess that a party or some kind of meeting happened.



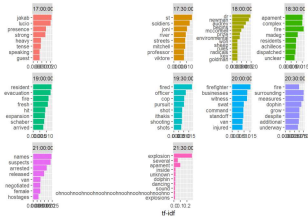
By changing hours and car id in the codes, we could find useful patterns:

1. Between 6am and 10am in all workdays. Besides staying in homes and the company, employees usually appear in the cafeteria. It indicates that they often eat breakfast or buy the food on the way to the company.
2. All the cars during the period between 4pm and 6pm in all working days. Instead of stopping by the restaurants for dinner, employees usually drive back home directly.
3. GASTech workers rarely have activities during the nights from Monday to Friday.

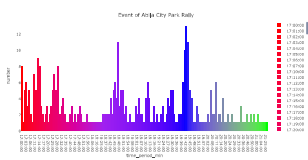
Vast Challenge 3

In the Mini-challenge 3, It's give a collection of a collection of microblogs and emergency calls from the days surrounding the disappearance. In order to visualize the occurrence and duration of important events, the time can be divided into different groups every half an hour, and the number of words related to related events in each time period can be counted. The number of words will reflect the impact of the event. Using the interactive bar chart to visualize changes in important events over time.

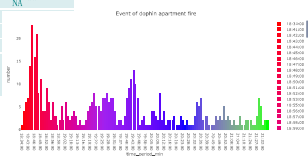
```
## # A tibble: 4,063 x 8
##   type      date, yyyyMMddHhMmSs author      message      latitude longitude
##   <chr>      <dbl> <chr>      <chr>      <dbl>
## 1 nbddata  2.01e13 "pok" follow us @pok NA
## 2 nbddata  2.01e13 "mha_" don't miss a w NA
## 3 nbddata  2.01e13 "rikto" come join us i NA
## 4 nbddata  2.01e13 "krono" pok rally to s NA
## 5 nbddata  2.01e13 "shila" pok rally set NA
## 6 nbddata  2.01e13 "suroo" pok rally in t NA
## 7 nbddata  2.01e13 "roogi" great day for NA
## 8 nbddata  2.01e13 "mindo" ugh, these pok NA
## 9 nbddata  2.01e13 "frien" massive rally NA
## 10 codata  2.01e13 "" keep the peace NA
## # ... with 1,053 more rows, and 1 more variable: time <dim>
```



Combining the word cloud image and TF-IDF, we can infer the following important events that happened in Abila on 2014-1-23 night. 1.The organization of POK(Protectors of Kronos) held a rally in Abila city park from 17:00 on and 'Sylvia Marek' is their leader. 2.Dancing dolphin apartment got fired at 18:30. After 21:30, there was an explosion in the building. 3.After 20:00:00, the firefighters arrived at the apartment and started to put out the fire. The police caught the suspect in a van after 21:00. 4.The police were dispatched at 18:30 and caught the suspect in a van after 21:00. But we not only want to know the time of each event but also want to visualize the development of the impact of the event over time which was the level of the risk to the public evolves throughout the evening. To know the start and duration of these three events, use the filter function and the keywords of the corresponding event to extract the messages of the corresponding event, and group by 30 every minute to count their numbers.



According to the above picture, POK rally mainly occurs from 17:00 to 17:30 early that night and from 18:40 to 18:50, from 19:40 to 19:50 afterwards.To a lesser degree between 17:30 and 18:30.



According to the above picture ,apartment fires and evacuation mainly occurred between 18:30 and 20:00.

