Team Project

The Big Picture

- Objectives
  - Building up skills in developing web-based visualization tools
  - Enhancing the understanding of theories related to visual perception and visual analytics
- Goal
  - Developing visual analytic tools to support data analysis in a scenario
    - To support data analysis, not to conduct data analysis!
- Final delivery
  - A web-site with a set of visualization tools for specific analytical tasks
  - A final project report
- Other deliveries: four progress reports
  - Project description, data pre-processing, visualization design, implementation

What Are You Expected to Do?

- Clearly define the analytical tasks
- Prepare data for your tasks
- Build up several visualization tools to support the tasks.
  - A functional web site to support an analytical process.

Data

- You choose a dataset for your project.
- Some ideas:
  - From the research project you are involved in
    - Tasks may be clearly defined by your research team.
  - From open data sets you can find online
    - Tasks may be unclear and can be defined by you.
      - E.g., Analysis of spatial and temporal patterns of reported crimes in Penn State.
  - From VAST challenges.
    - Tasks are given.

Work as A Group

- Programming work may not be handled by one single person.
- Group size: 4

Use VAST Challenge 2014 as An Example

Background of VAST Challenge

- A contest event in the IEEE Visual Analytics Science and Technology Conference
  - Understanding the use of VAST tools
  - Benchmarking VAST designs
  - Offering useful datasets for VAST education
- Artificial data sets with a ground truth
- Different topics each year

VAST Challenge in 2014

- Story
  - Some people in a company were missing.
  - An organization was suspected to be involved.
  - A visual analytics specialist was brought in to help the investigation.
- Three Mini Challenges (MC)
  - Focusing on different types of data and issues
- One Grand Challenge
  - Putting pieces together to tell who were involved, and what the police could do.

MC 1

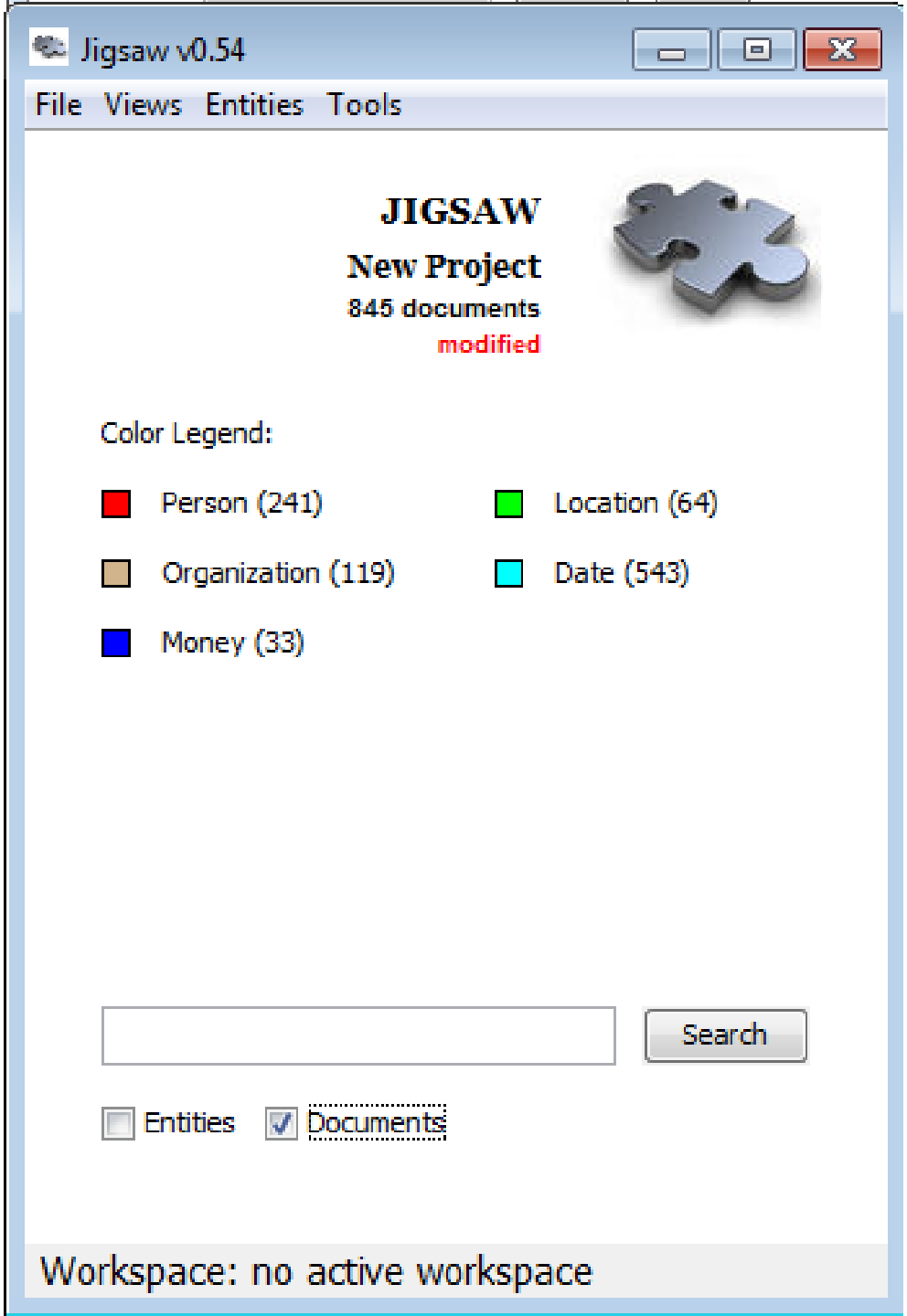
- On the suspected organization.
  - Text data
- Goals:
  - To understand the structure of the organization
    - Leaders, networks, change of the organization over time, connection between the organization and the company
  - To create an event timeline
  - To build up explanations for people disappearance
- Data
  - Text documents.

Data

- A map of the place
- A chart describing the company (PDF)
- A spreadsheet of company employee records (Microsoft Excel)
- Email headers from two weeks of internal company email (CSV)
- Resumes and short biographies of most employees (Microsoft Word)
- Historical reports and descriptions of the place (Microsoft Word)
- Relevant current and historical news reports (txt)
  - Varied quality.

MC 1: Off-the-Shelf Tools

- Text data analysis
  - e.g., JigSaw from GaTech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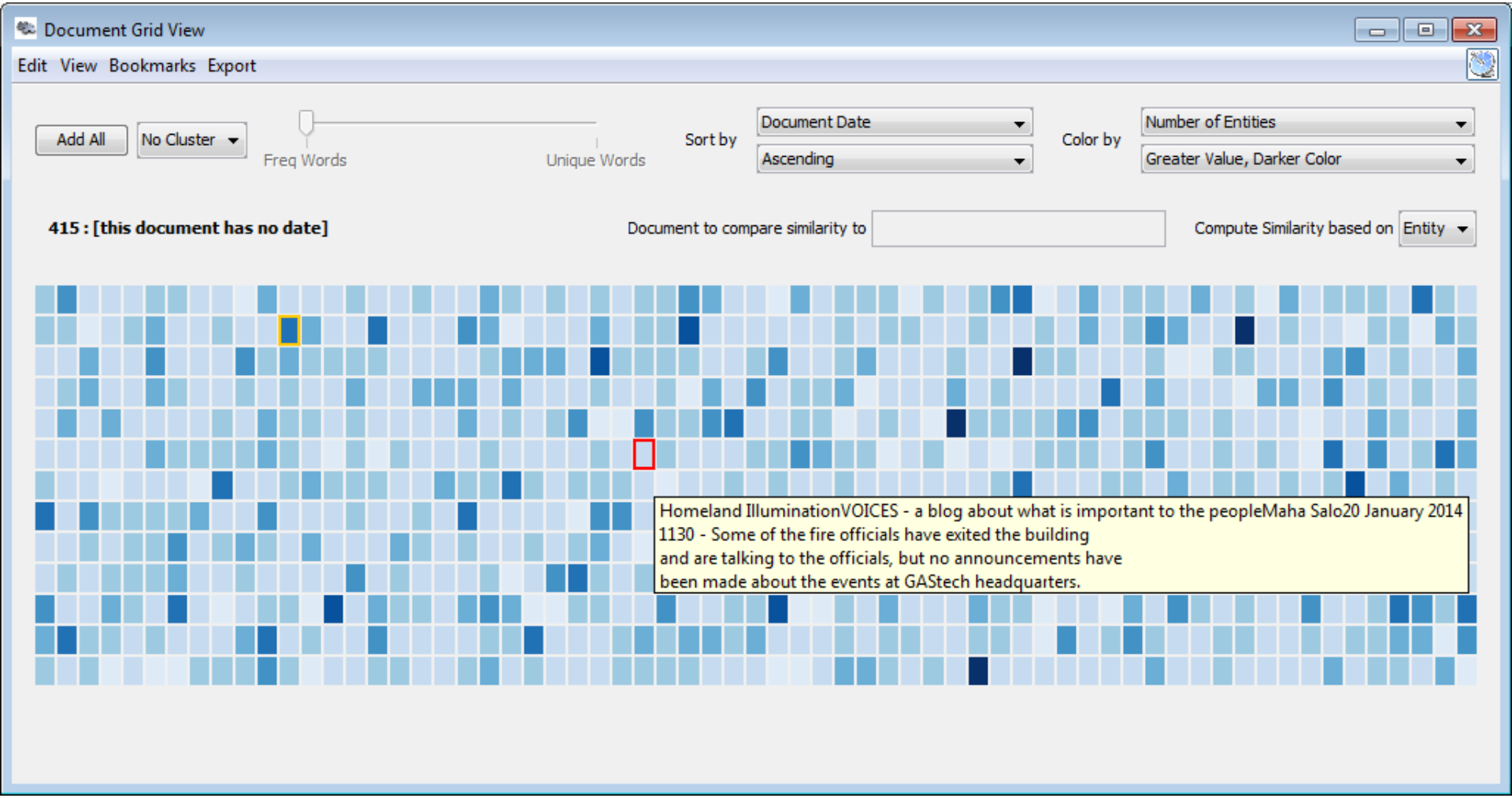
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415 : [this document has no date]
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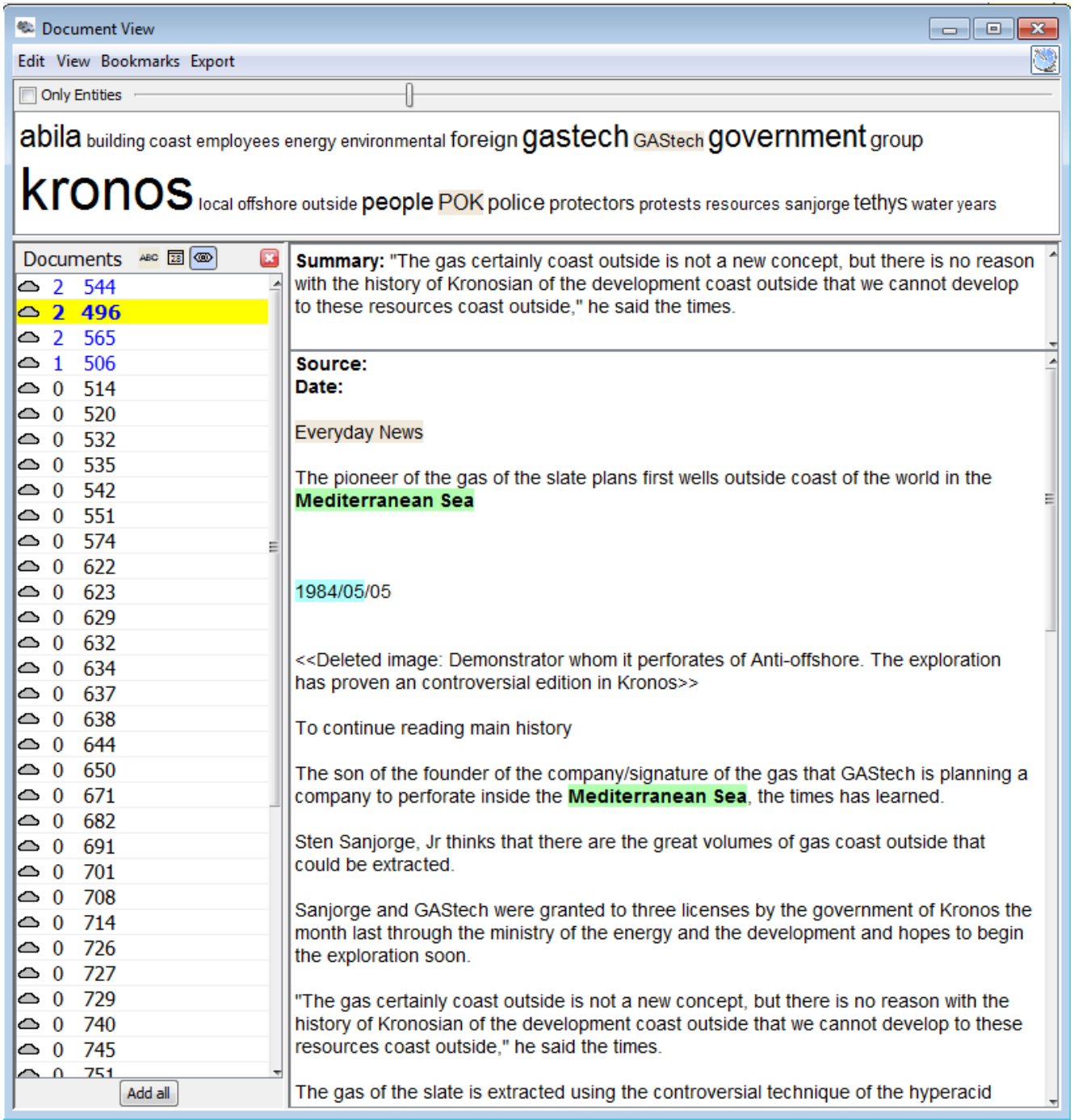
Homeland IllluminationVOICES - a blog about what is important to the peopleMaha Salo20 January 2014
1130 - Some of the fire officials have exited the building
and are talking to the officials, but no announcements have
been made about the events at GAStech headquarters.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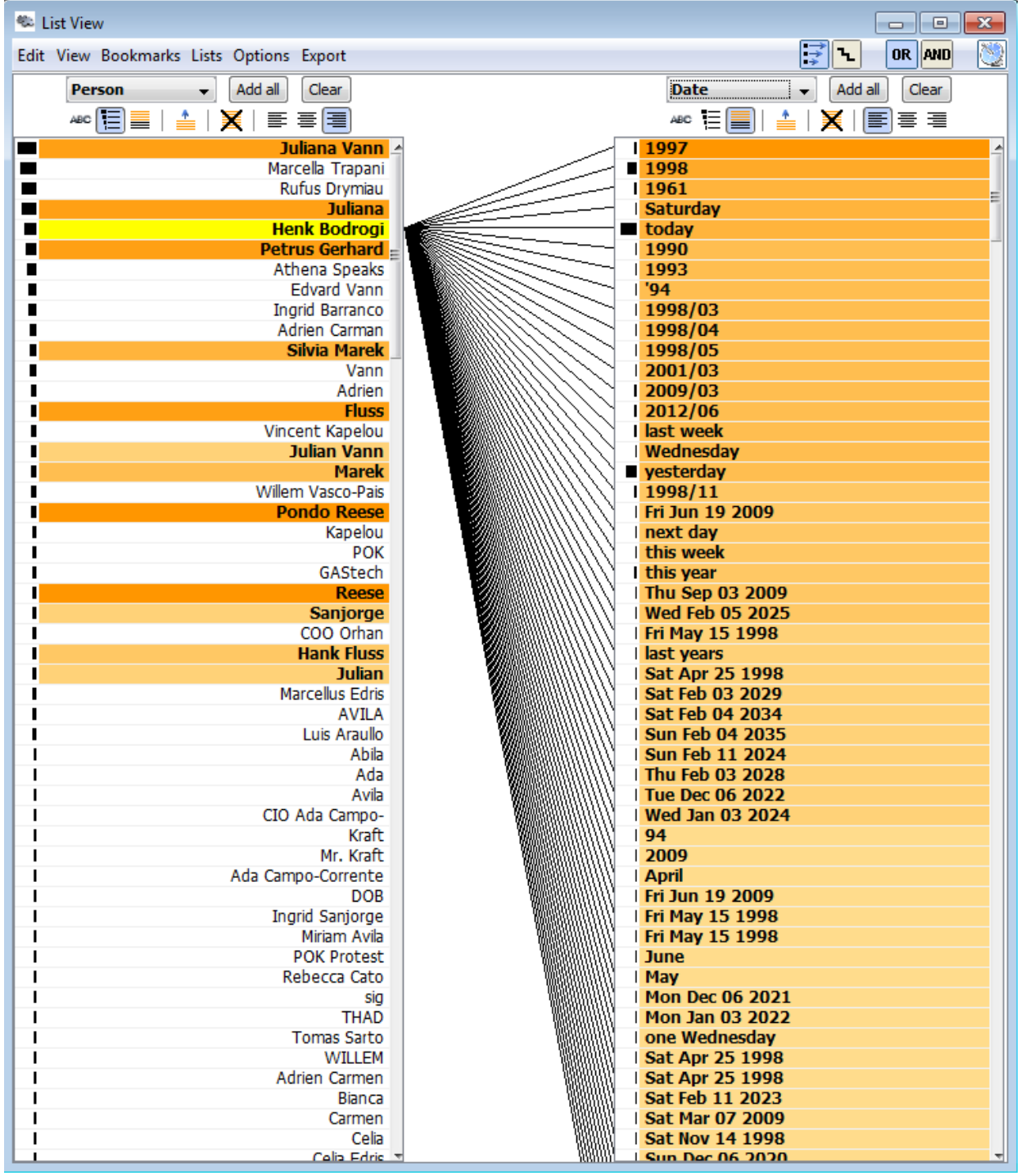
Summary: "The gas certainly coast outside is not a new concept, but there is no reason with the history of Kronosian of the development coast outside that we cannot develop to these resources coast outside," he said the times.
Source:
Date:
Everyday News
The pioneer of the gas of the slate plans first wells outside coast of the world in the Mediterranean Sea
1984/05/05
<<Deleted image: Demonstrator whom it perforates of Anti-offshore. The exploration has proven an controversial edition in Kronos>>
To continue reading main history
The son of the founder of the company/signature of the gas that GAStech is planning a company to perforate inside the Mediterranean Sea, the times has learned.
Sten Sanjorge, Jr thinks that there are the great volumes of gas coast outside that could be extracted.
Sanjorge and GAStech were granted to three licenses by the government of Kronos the month last through the ministry of the energy and the development and hopes to begin the exploration soon.
"The gas certainly coast outside is not a new concept, but there is no reason with the history of Kronosian of the development coast outside that we cannot develop to these resources coast outside," he said the times.
The gas of the slate is extracted using the controversial technique of the hyperacid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Petrus Gerhard
Athena Speaks
Edvard Vann
Ingrid Barranco
Adrien Carman
Silvia Marek
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Hank Fluss
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Marcellus Edris
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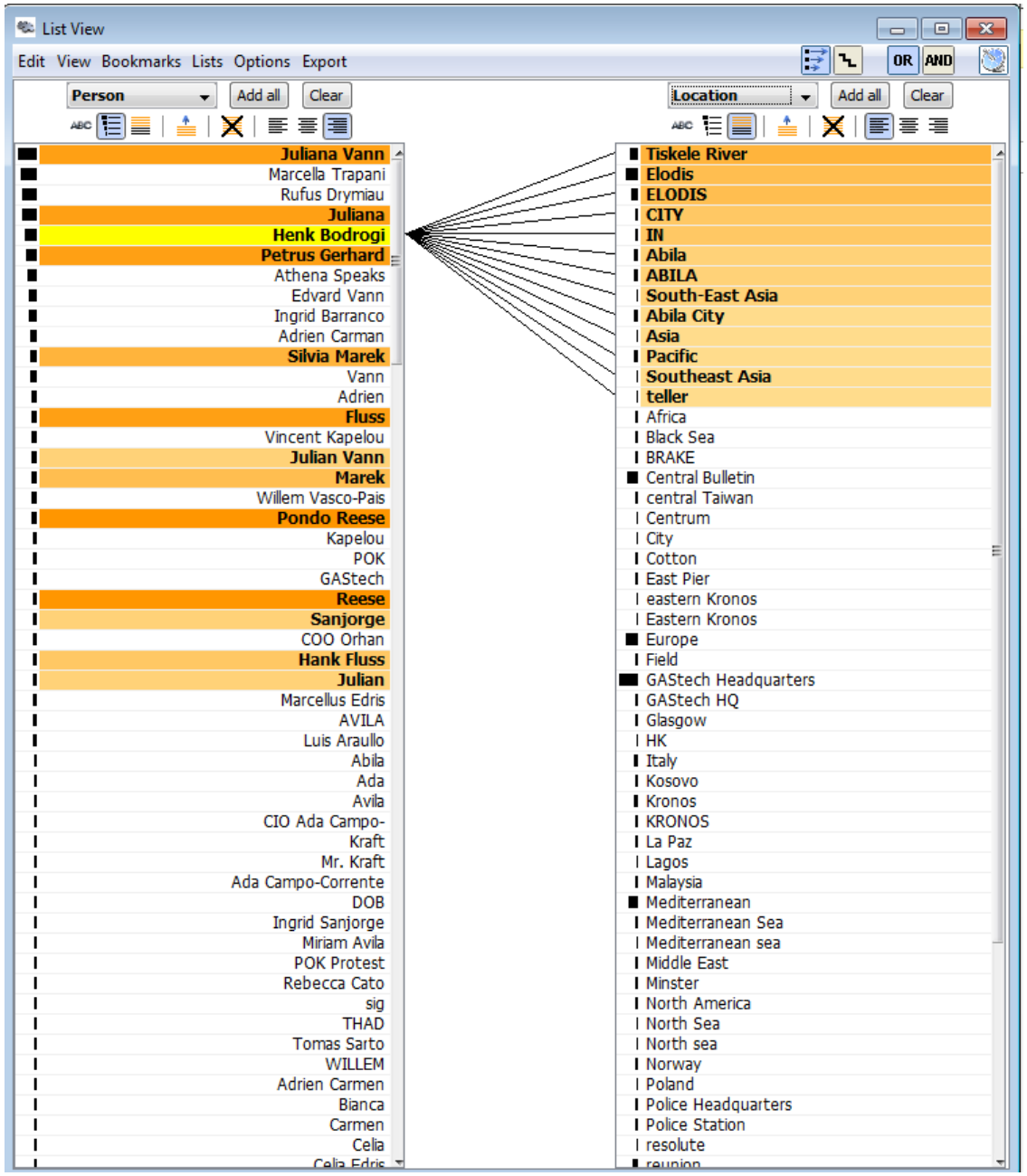
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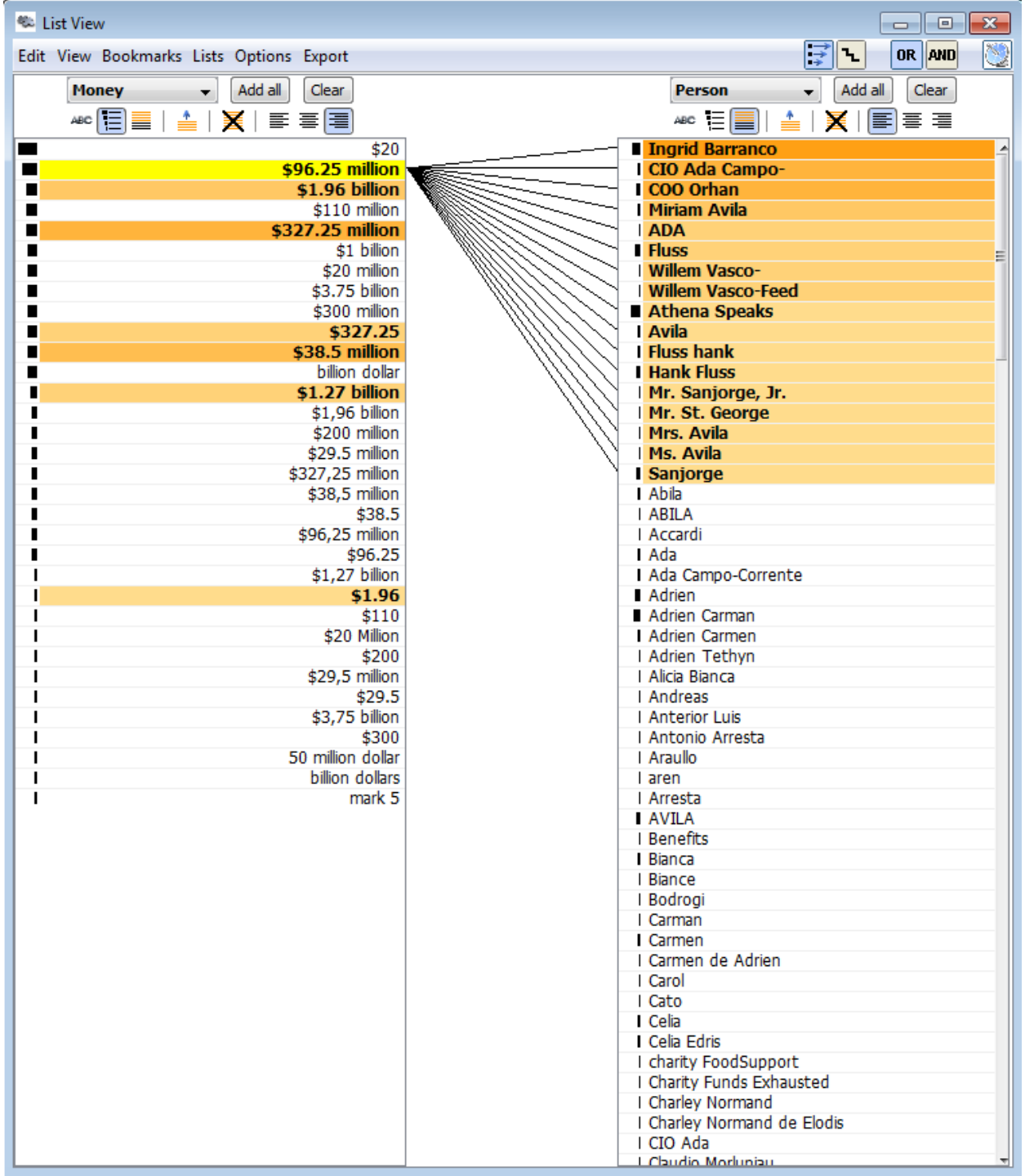
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Mr. St. George
Mrs. Avila
Ms. Avila
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Adrien Tethyn
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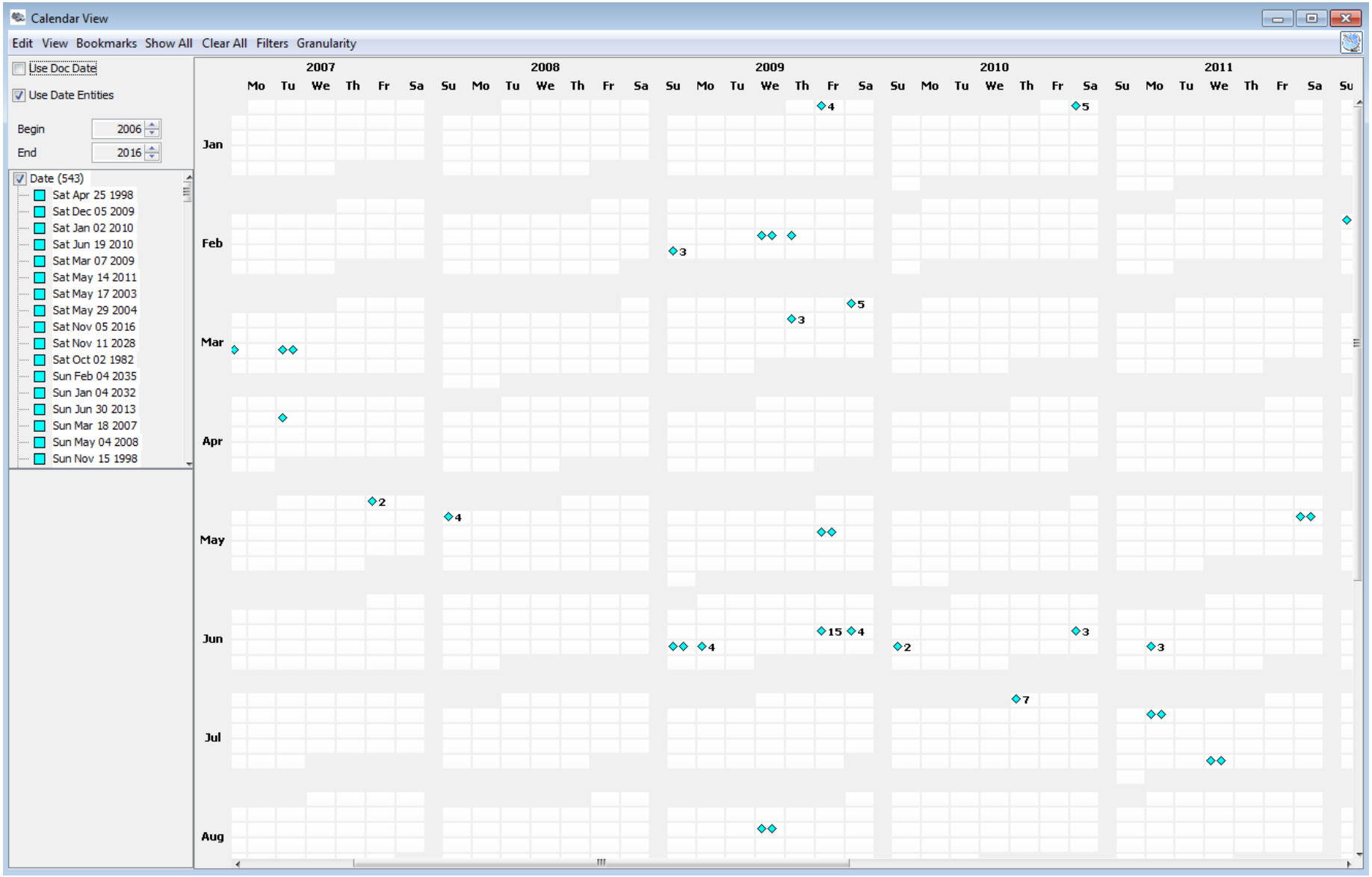
Off-the-Shelf Tools May Be Insufficient!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Sat Mar 07 2009
Sat May 14 2011
Sat May 17 2003
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Sat Nov 05 2016
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MC 1: Some Designs by Contest Teams

THE FIRST GENERATION

Henk Bodrogi

Carmine Osvaldo

THE SECOND GENERATION

Elian Karel

THE THIRD GENERATION

Silvia Marek

Mander Vann

A. Henk Bodrogi

During the early years, POK was under the leadership of Henk Bodrogi.

B. Carmine Osvaldo

Carmine Osvaldo, as a deputy co-leader, took an important role in POK movements.

C. Elian Karel

In October 2001 Henk Bodrogi stepped down as leader of POK, formally handing his responsibilities to Elian KareL.

D. Silvia Marek

Following the death of Elian Karel in 2009, Silvia Marek took over the leadership role of POK.

E. Mandor Vann

As POK became more violent, Mandor Vann appeared to be a leader in the background.

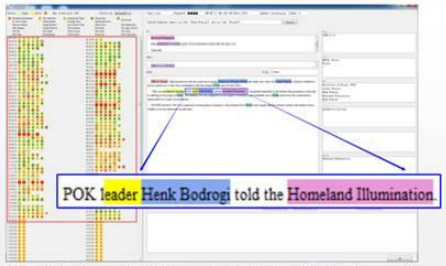


Figure (a) : Screenshot from our toolkit when finding keywords *Henk Bodrogi* and *leader*.

The small red rectangles the red box represent the news with keywords: *Henk Bodrogi* and *leader*. 20 related news were distributed mostly in 1998-2001, typically in *134.txt, 399.txt*. When clicked on *399.txt*, the keywords are highlighted in the blue box and directly show that the POK leader was Henk Bodrogi.

Meanwhile, the records in *10 year historical clean* prove our hypothesis.

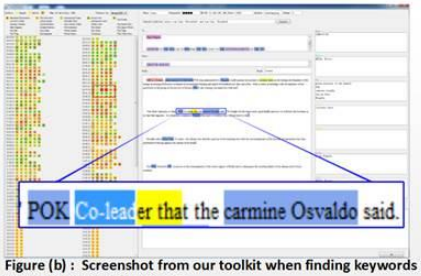


Figure (b) : Screenshot from our toolkit when finding keywords *Carmine Osvaldo* and *leader*.

Only two articles are related to Osvaldo shown in (b), *468.txt and 482.txt*. In *468.txt*, the keywords highlighted reflect that Carmine Osvaldo was a co-leader in POK.

The data in *10 year historical clean* proves our finding that Osvaldo took an important role in the POK movements.

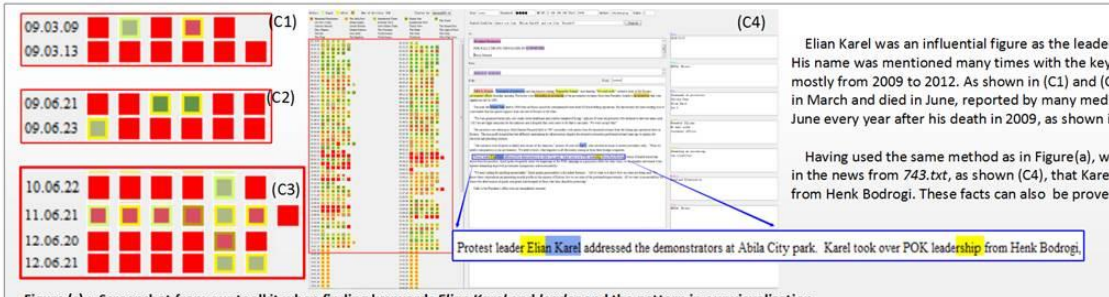


Figure (c) : Screenshot from our toolkit when finding keywords *Elian Karel* and *leader* and the pattern in our visualization.

Elian Karel was an influential figure as the leader in the second generation. His name was mentioned many times with the keyword *leader* in the news, mostly from 2009 to 2012. As shown in (C1) and (C2), in 2009, he was arrested in March and died in June, reported by many medias. Karel was memorized in June every year after his death in 2009, as shown in (C3).

Having used the same method as in Figure(a), we found convincing evidence in the news from *743.txt*, as shown (C4), that Karel inherited the leadership from Henk Bodrogi. These facts can also be proved in the historical records.

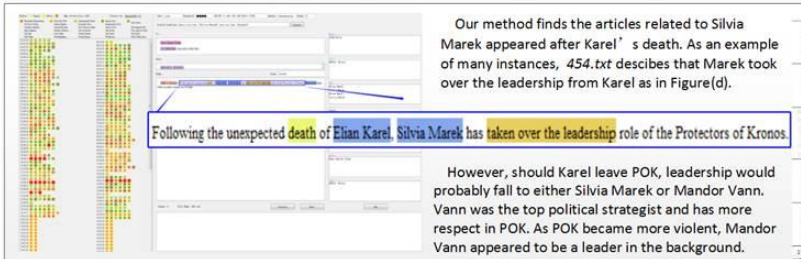
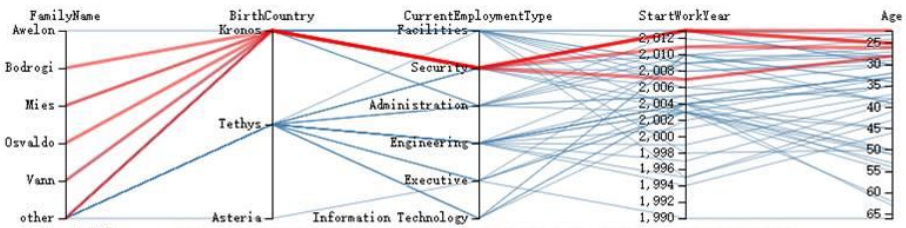


Figure (d) : Screenshots from our toolkit when finding *Silvia Marek* and *leader* .

Our method finds the articles related to Silvia Marek appeared after Karel's death. As an example of many instances, *454.txt* descibes that Marek took over the leadership from Karel as in Figure(d).

However, should Karel leave POK, leadership would probably fall to either Silvia Marek or Mandor Vann. Vann was the top political strategist and has more respect in POK. As POK became more violent, Mandor Vann appeared to be a leader in the background.

Figure (e) : Screenshots from another toolkit when finding *POK* and *violent* . The figure shows the rising trend of the word frequency distribution.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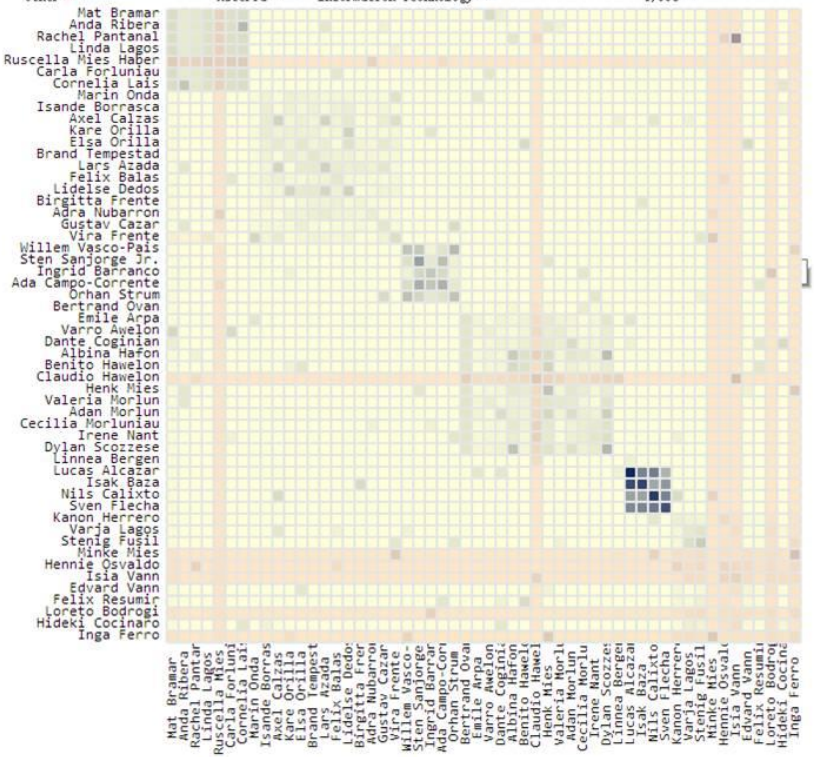
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Rachel Pantanal
Linda Lagos
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Carla Forluniau
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Marin Onda
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Kare Orilla
Elsa Orilla
Brand Tempestad
Lars Azada
Felix Balas
Lidelse Dedos
Birgitta Frente
Adra Nubarron
Gustav Cazar
Vira Frente
Willem Vasco-Pais
Sten Sanjorge Jr.
Ingrid Barranco
Ada Campo-Corrente
Orhan Strum
Bertrand Ovan
Emile Arpa
Varro Awelon
Dante Coginian
Albina Hafon
Benito Hawelon
Claudio Hawelon
Henk Mies
Valeria Morlun
Adan Morlun
Cecilia Morluniau
Irene Nant
Dylan Scozzese
Linnea Bergen
Lucas Alcazar
Isak Baza
Nils Calixto
Sven Flecha
Kanon Herrero
Varja Lagos
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Loreto Bodrogi
Hideki Cocinaro
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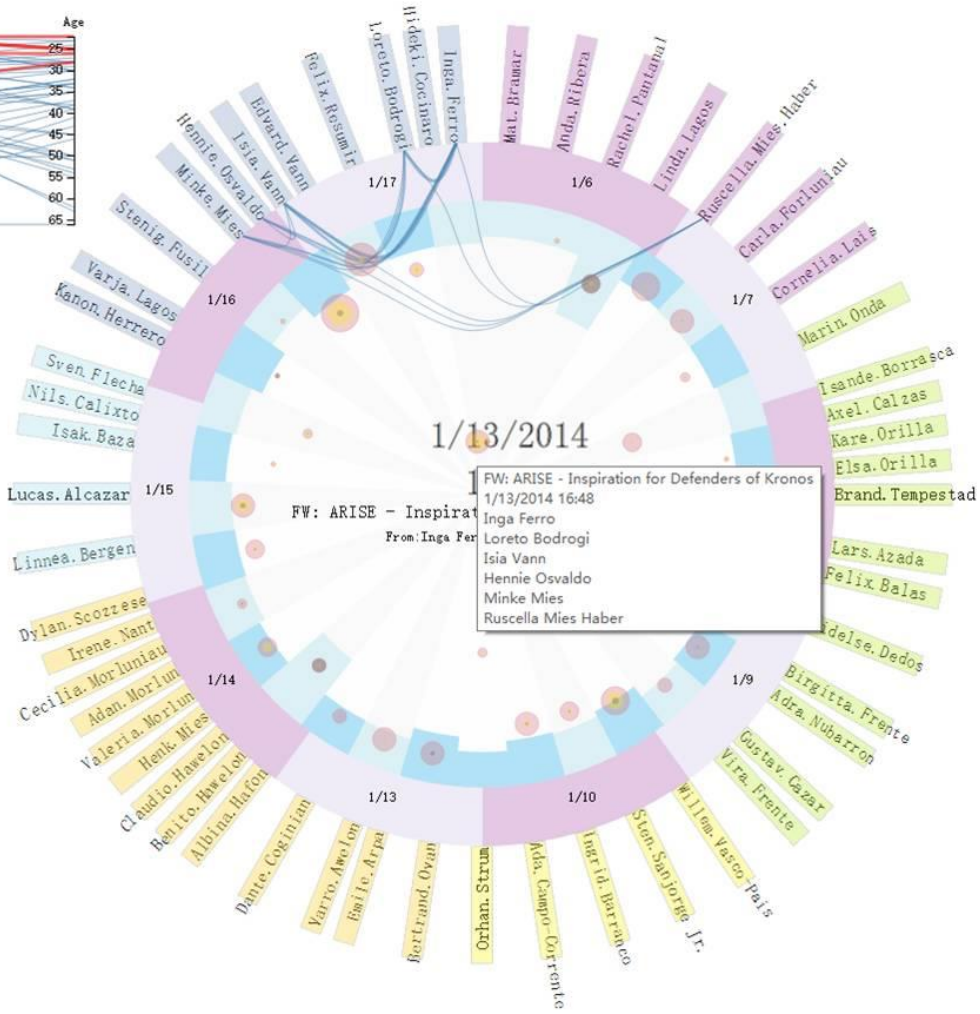
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FW: ARISE - Inspiration for Defenders of Kronos
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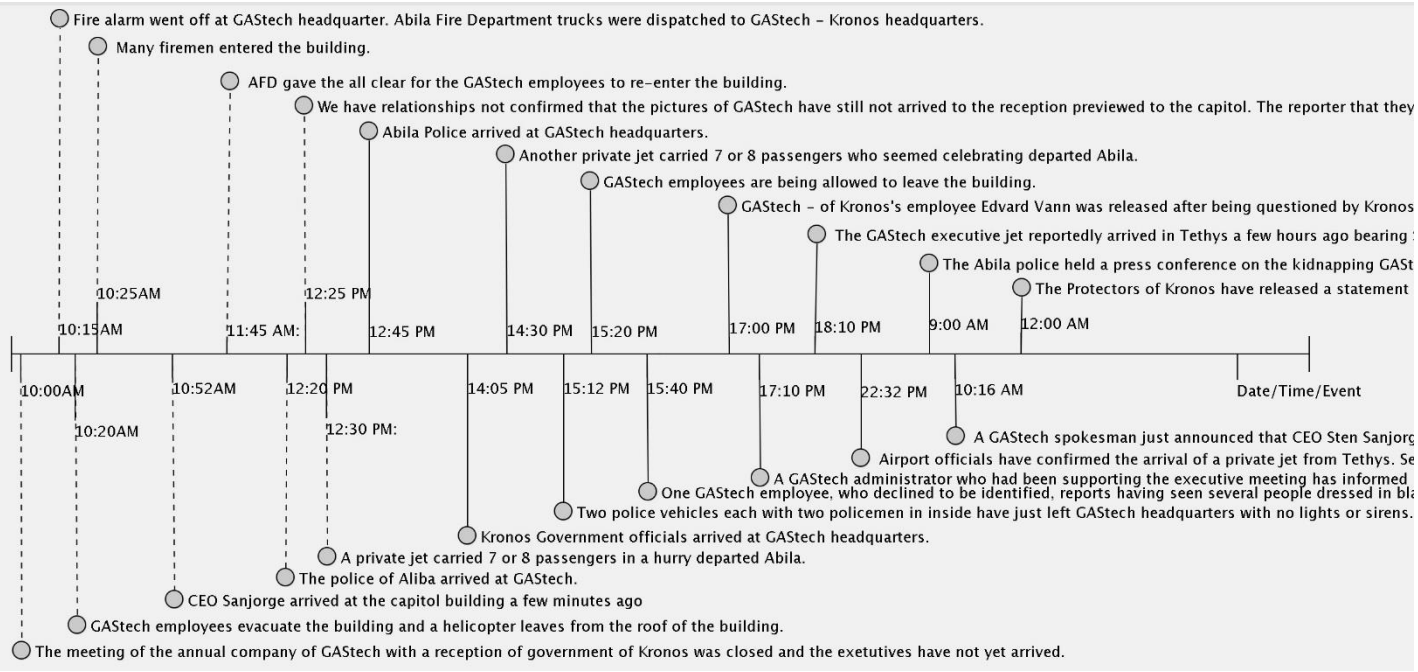
Fire alarm went off at GAStech headquarter. Abila Fire Department trucks were dispatched to GAStech - Kronos headquarters.
Many firemen entered the building.
AFD gave the all clear for the GAStech employees to re-enter the building.
We have relationships not confirmed that the pictures of GAStech have still not arrived to the reception previewed to the capitol. The reporter that they
Abila Police arrived at GAStech headquarters.
Another private jet carried 7 or 8 passengers who seemed celebrating departed Abila.
GAStech employees are being allowed to leave the building.
GAStech - of Kronos's employee Edvard Vann was released after being questioned by Kronos
The GAStech executive jet reportedly arrived in Tethys a few hours ago bearing
The Abila police held a press conference on the kidnapping GASt
The Protectors of Kronos have released a statement
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15:12 PM
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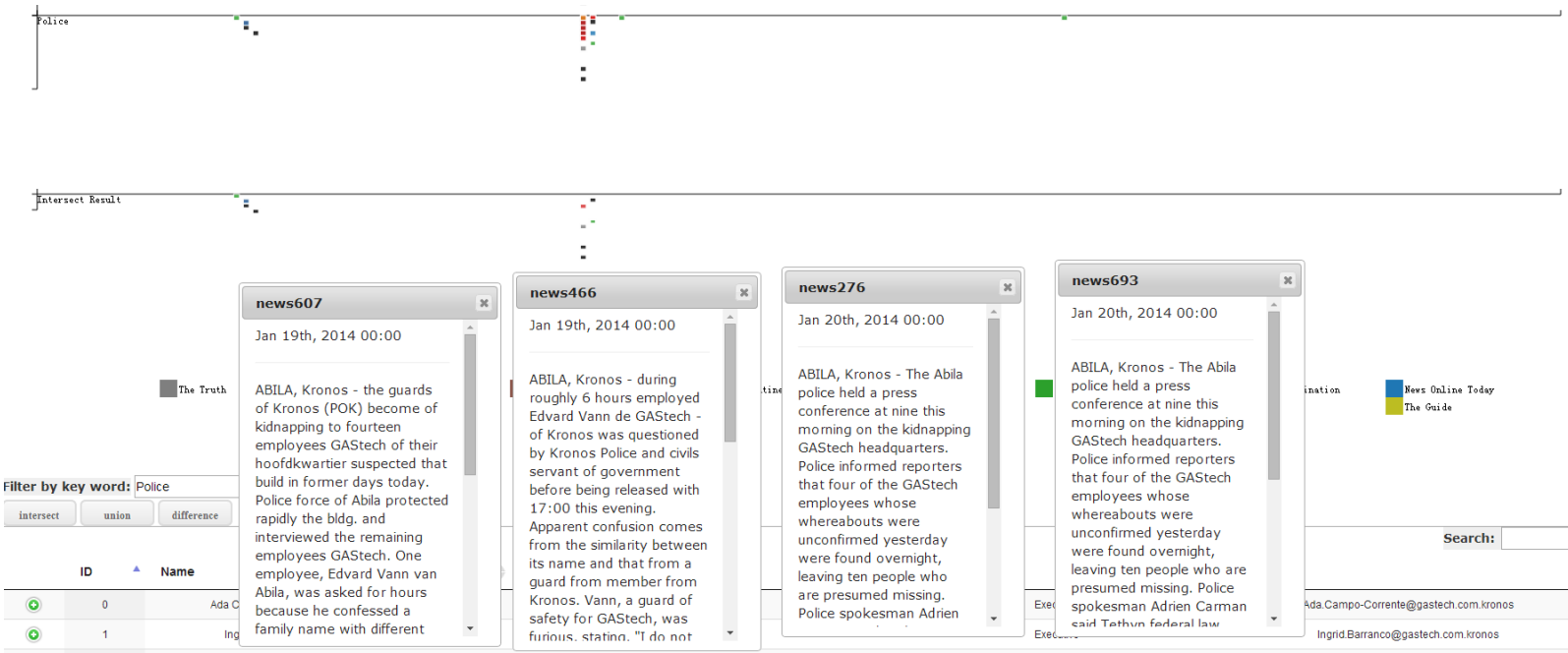
12:30 PM:
A GAStech spokesman just announced that CEO Sten Sanjorg
Airport officials have confirmed the arrival of a private jet from Tethys. Se
A GAStech administrator who had been supporting the executive meeting has informed
One GAStech employee, who declined to be identified, reports having seen several people dressed in bl
Two police vehicles each with two policemen in inside have just left GAStech headquarters with no lights or sirens.
Kronos Government officials arrived at GAStech headquarters.
A private jet carried 7 or 8 passengers in a hurry departed Abila.
The police of Aliba arrived at GAStech.
CEO Sanjorge arrived at the capitol building a few minutes ago
GAStech employees evacuate the building and a helicopter leaves from the roof of the building.
The meeting of the annual company of GAStech with a reception of government of Kronos was closed and the exetutives have not yet arrived.


Police
Intersect Result
news607
Jan 19th, 2014 00:00
ABILA, Kronos - the guards of Kronos (POK) become of kidnapping to fourteen employees GAStech of their hoofdkwartier suspected that build in former days today. Police force of Abila protected rapidly the bldg. and interviewed the remaining employees GAStech. One employee, Edvard Vann van Abila, was asked for hours because he confessed a family name with different
news466
Jan 19th, 2014 00:00
ABILA, Kronos - during roughly 6 hours employed Edvard Vann de GAStech - of Kronos was questioned by Kronos Police and civils servant of government before being released with 17:00 this evening. Apparent confusion comes from the similarity between its name and that from a guard from member from Kronos. Vann, a guard of safety for GAStech, was furious, stating, "I do not
news276
Jan 20th, 2014 00:00
ABILA, Kronos - The Abila police held a press conference at nine this morning on the kidnapping GAStech headquarters. Police informed reporters that four of the GAStech employees whose whereabouts were unconfirmed yesterday were found overnight, leaving ten people who are presumed missing. Police spokesman Adrien
news693
Jan 20th, 2014 00:00
ABILA, Kronos - The Abila police held a press conference at nine this morning on the kidnapping GAStech headquarters. Police informed reporters that four of the GAStech employees whose whereabouts were unconfirmed yesterday were found overnight, leaving ten people who are presumed missing. Police spokesman Adrien Carman
The Truth
News Online Today
The Guide
Filter by key word:
Police
intersect
union
difference
Search:
ID
Name
0
1
Ada.Campo-Corrente@gastech.com.kronos
Ingrid.Barranco@gastech.com.kronos

MC 2

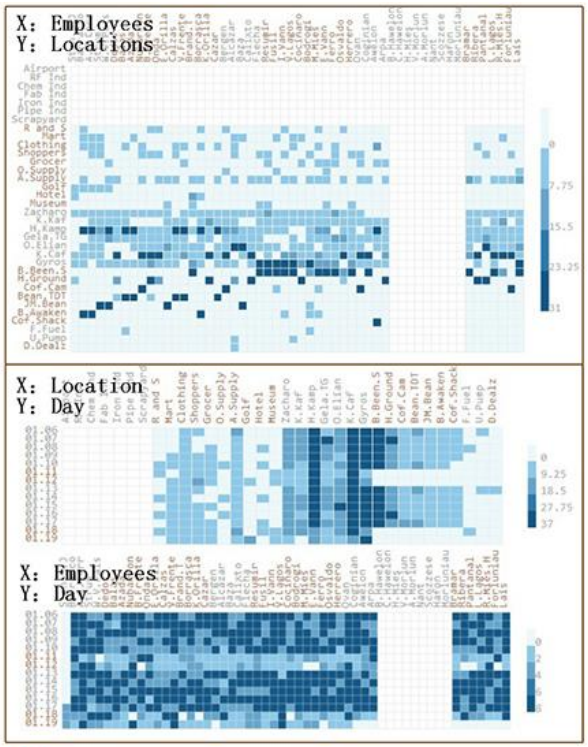
- On the behaviors of company employees
  - Movement and tracking data
- Goals
  - To draw common routes of company employees
  - To identify unusual events and patterns
    - Who, when, where, etc.
  - To identify uncertain factors
- Data
  - Spatial-temporal data (GPS location)
  - Transaction data (cards)

Data

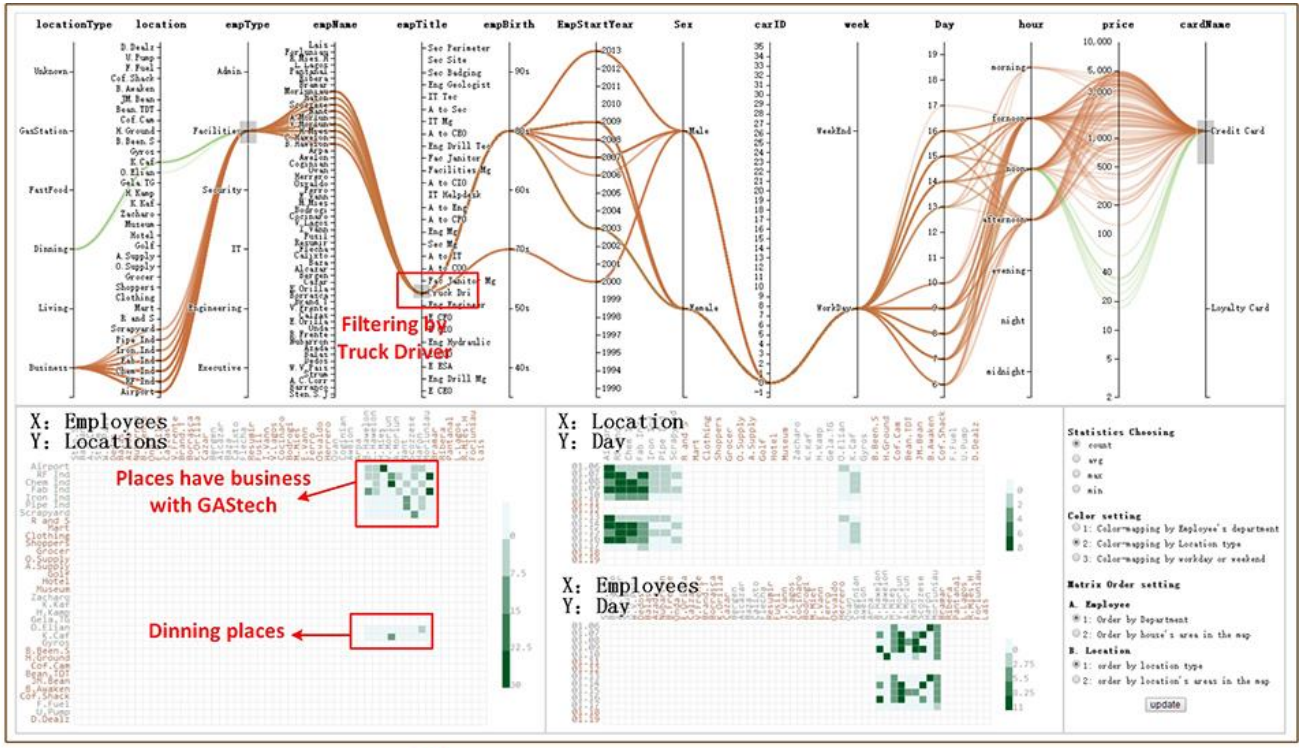
- Vehicle assignments by employee (csv)
  - Employee Name, Car ID, Current Employment Type, Current Employment Title
- ESRI shapefiles of Abila and Kronos
  - ArcGIS
- Vehicle tracking data (csv)
  - Timestamp, Car ID, Latitude, Longitude
- Loyalty card transaction data (csv)
  - Timestamp, location, price, name
- Credit and debit card transaction data (csv)
  - Timestamp, location, price, name
- A tourist map (jpg)

MC 2: Using GIS Tools

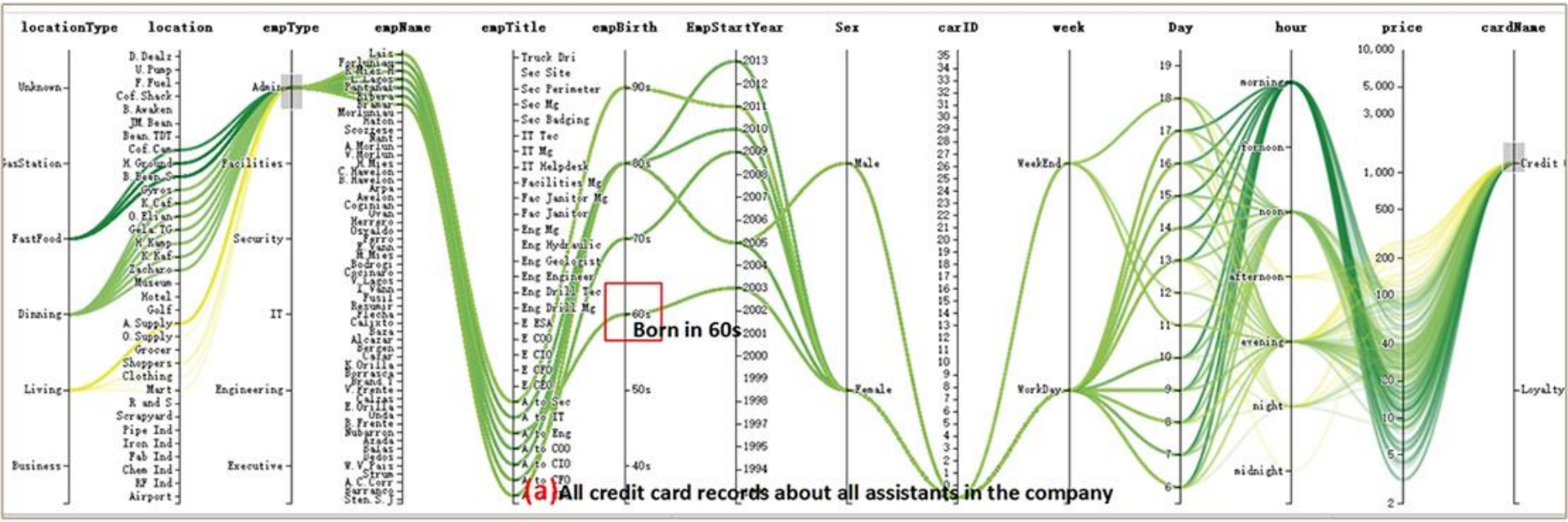
MC 2: Customized Tools

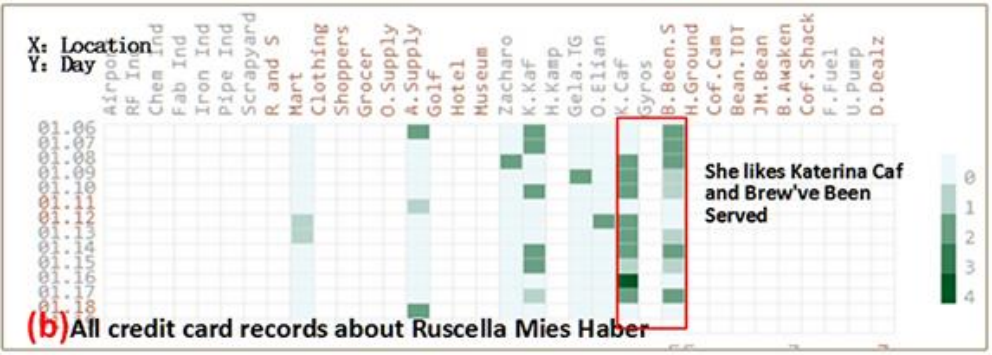


(a) The credit card transactions of general staffs

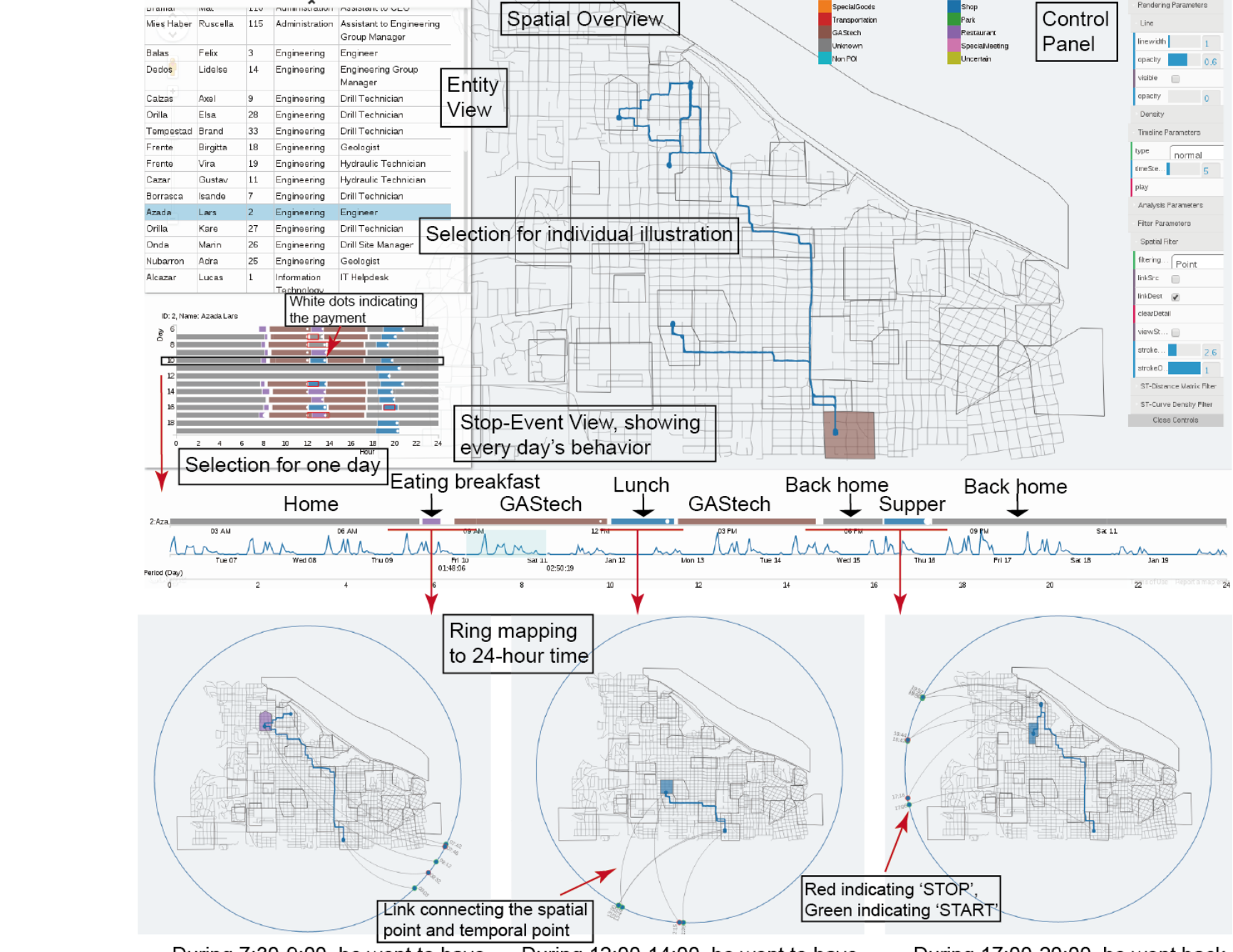


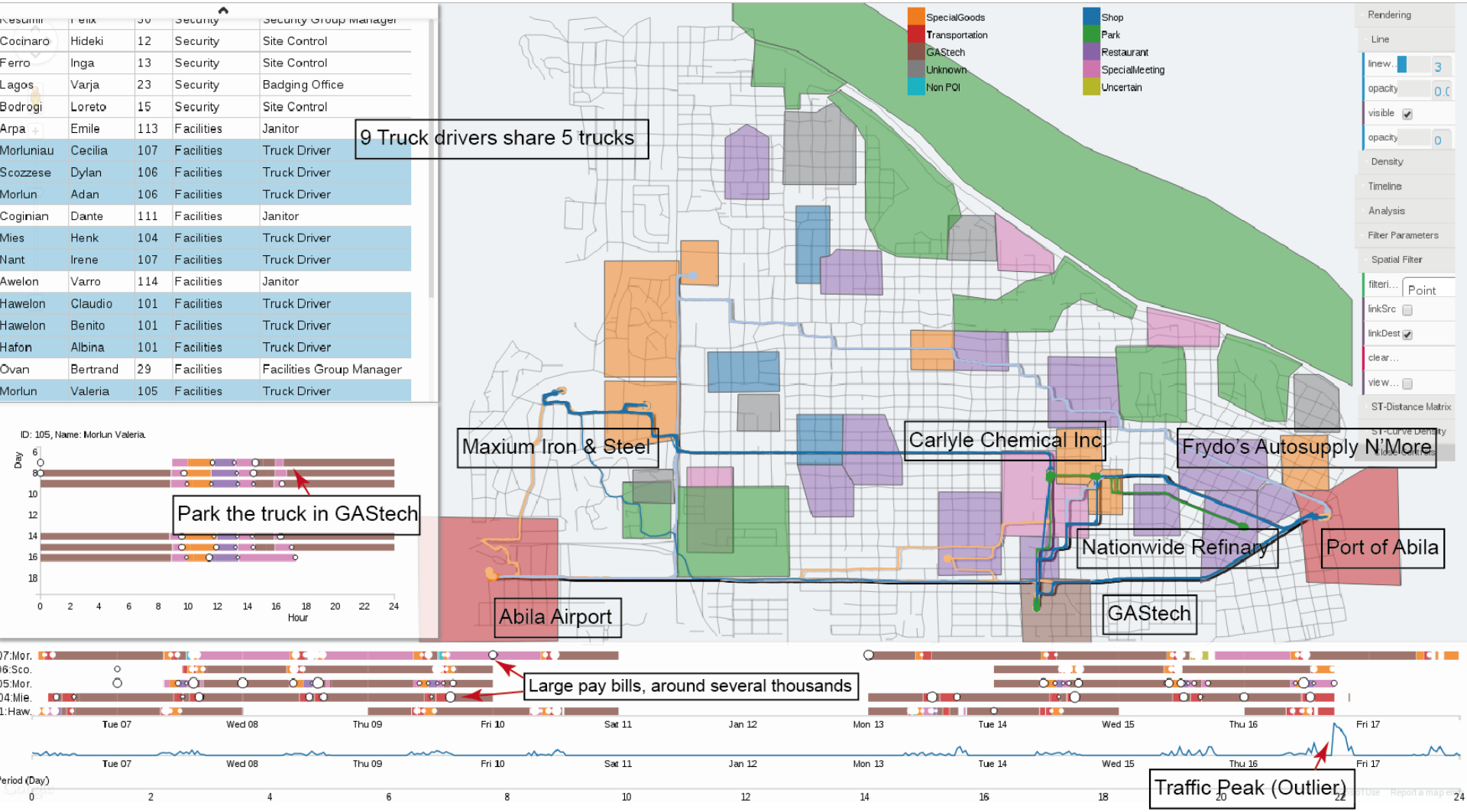
(b) The credit card transactions of all truck drivers


locationType
location
empType
empName
empTitle
empBirth
EmpStartYear
Sex
carID
week
Day
hour
price
cardName
Unknown
GasStation
FastFood
Dinning
Living
Business
Admin
Facilities
Security
IT
Engineering
Executive
90s
80s
70s
60s
50s
40s
Male
Female
WeekEnd
WorkDay
morning
forenoon
noon
afternoon
evening
night
midnight
Credit
Loyalty
Born in 60s
(a) All credit card records about all assistants in the company


X: Location
Y: Day
She likes Katerina Caf and Brew've Been Served
(b) All credit card records about Ruscella Mies Haber


Home of Isia Vann & Loreto Bodrogi
Capitol
Katerina Caf and Brew've Been Served
GasTech
To Port of Abila
(c) Some positions in the map


Spatial Overview
Control Panel
Entity View
Selection for individual illustration
White dots indicating the payment
Stop-Event View, showing every day's behavior
Selection for one day
Home
Eating breakfast
GAStech
Lunch
GAStech
Back home
Supper
Back home
Ring mapping to 24-hour time
Link connecting the spatial point and temporal point
Red indicating 'STOP', Green indicating 'START'
During 7:30-9:00, he went to have breakfast, and went to GAStech
During 12:00-14:00, he went to have lunch, and went back to GAStech
During 17:00-20:00, he went back home and seek for supper



Cocinaro	Hideki	12	Security	Site Control
Ferro	Inga	13	Security	Site Control
Lagos	Varja	23	Security	Badging Office
Bodrogi	Loreto	15	Security	Site Control
Arpa	Emile	113	Facilities	Janitor
Morluniau	Cecilia	107	Facilities	Truck Driver
Scozzese	Dylan	106	Facilities	Truck Driver
Morlun	Adan	106	Facilities	Truck Driver
Coginian	Dante	111	Facilities	Janitor
Mies	Henk	104	Facilities	Truck Driver
Nant	Irene	107	Facilities	Truck Driver
Awelon	Varro	114	Facilities	Janitor
Hawelon	Claudio	101	Facilities	Truck Driver
Hawelon	Benito	101	Facilities	Truck Driver
Hafon	Albina	101	Facilities	Truck Driver
Ovan	Bertrand	29	Facilities	Facilities Group Manager
Morlun	Valeria	105	Facilities	Truck Driver

MC 3

- On current events
  - Streaming data
- Goals
  - To present the timeline of up to five major events discovered in the streaming data
  - To select the event that is most likely helpful to the investigation
- Data
  - Text data with time stamps

Data

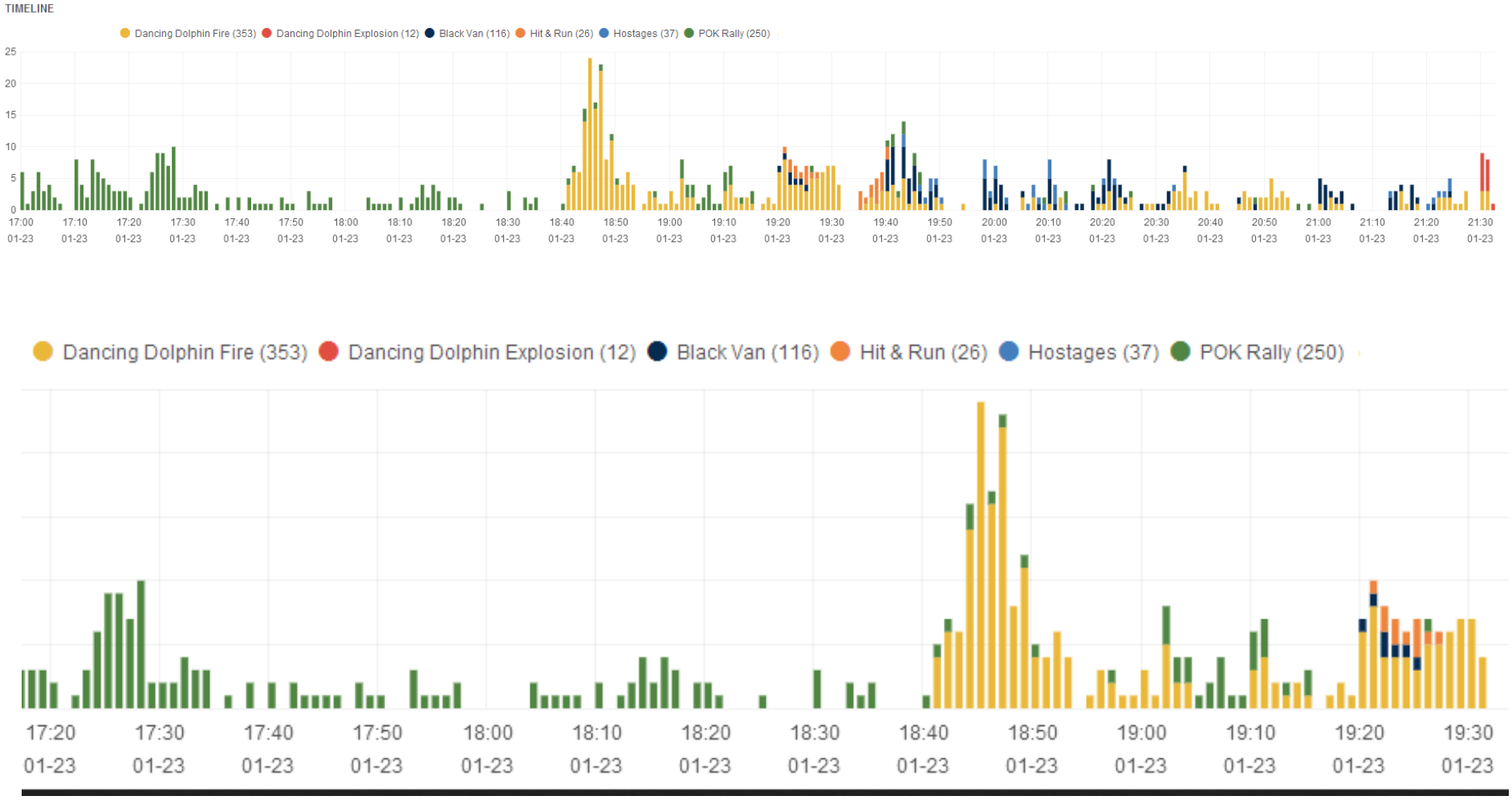
- Microblog messages
- Call center data

- Both in three segments (time periods)

MC3: Off-the-Shelf Tools

- World clouds?
  - http://www.wordclouds.com/
- Tableau?

MC 3: Some Designs



Sliding Slice (#13)

2014-01-23 17:46:31 ⟷ 2014-01-23 17:55:28

Events (47)

Talking Authors (24)

Monitored Topics

POK
News
POK Rally

Sliding Slice (#25)

2014-01-23 18:35:00 ⟷ 2014-01-23 18:45:00

Events (90)

Talking Authors (50)

Monitored Topics

POK
News
POK Rally

Sliding Slice (#27)

2014-01-23 18:44:00 ⟷ 2014-01-23 18:53:37

Events (241)

Talking Authors (86)

Monitored Topics

POK
News
POK Rally

Grand Challenge

- Put all pieces together
- Goals
  - Who, what, where, when, why, and how
  - What should the police do next?

A Winning Design

- https://www.youtube.com/watch?v=e8pKPNB_M6o&feature=youtu.be

VAST Challenges Web Site

- http://vast.cs.umass.edu/benchmarks.php
- If you want to use VAST challenge data sets, tasks in a mini challenge would suffice.

Some Advices

- Clearly define your tasks/goals
  - Think about a concrete scenario of data analysis.
- Understand what data entities and relationships you need to address these tasks/goals.
  - Entities: people, place, activity, transaction, ...
  - Relationship: friendship, meeting, participation, payment, …
- Data cleaning and pre-processing is usually needed.
  - What to keep, how to organize, etc.
- Explore data and relationship with other tools
  - Excel, Tableau, etc.
- Start earlier

Work as Group

- Four stages of group work
  1. Forming: team formed
  2. Storming: conflicts
  3. Norming: rules established
  4. Performing: working together efficiently

- Move to State 4 as quickly as possible

Group Members

- Check Canvas for know your team members
  - Go to People/Group

Milestones

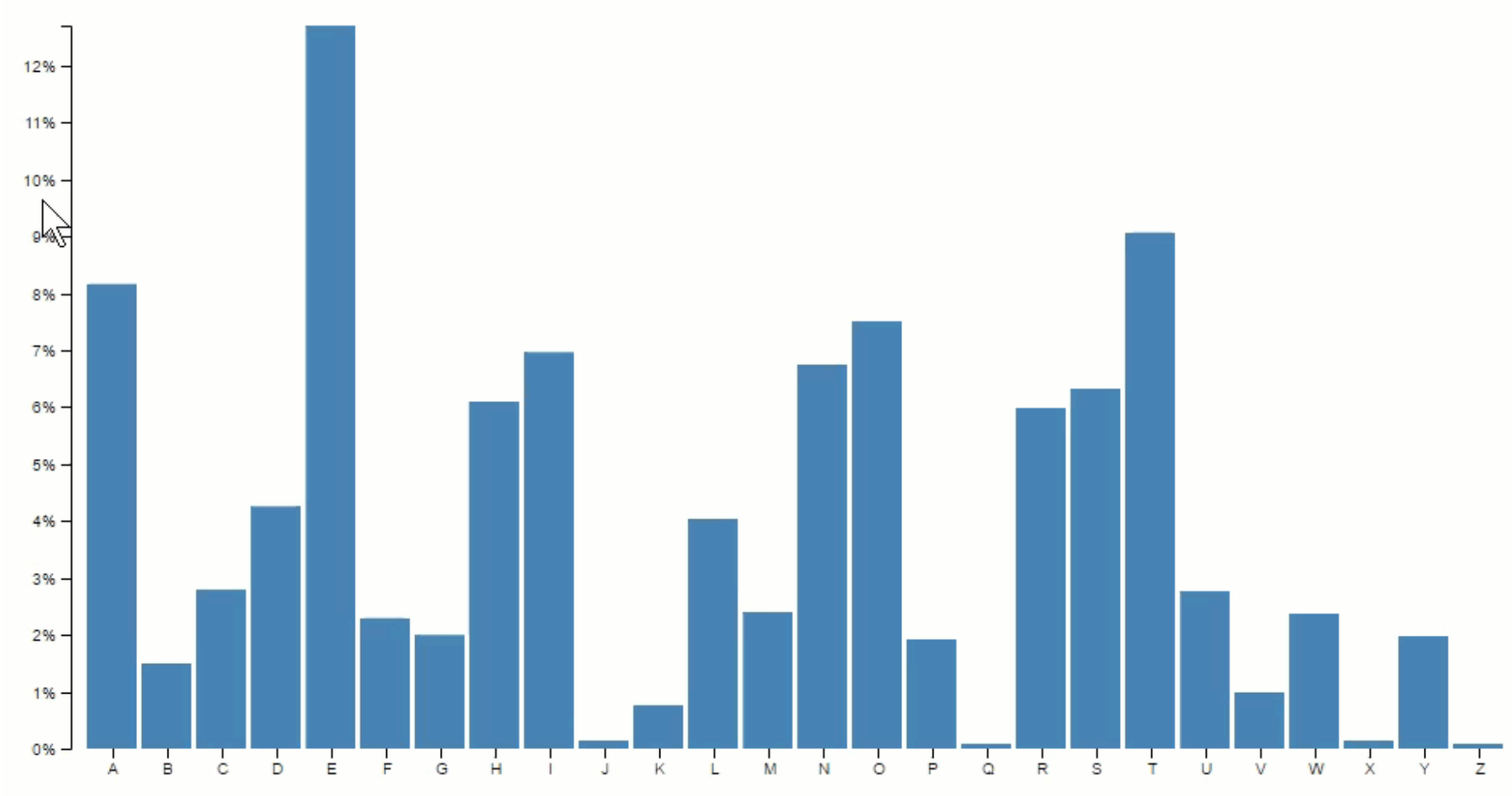
- Four progress report
  - Project description: Week 5
  - Data pre-processing: Week 7
  - Visualization design: Week 10
  - Implementation: Week 12

- Final report: Week 16

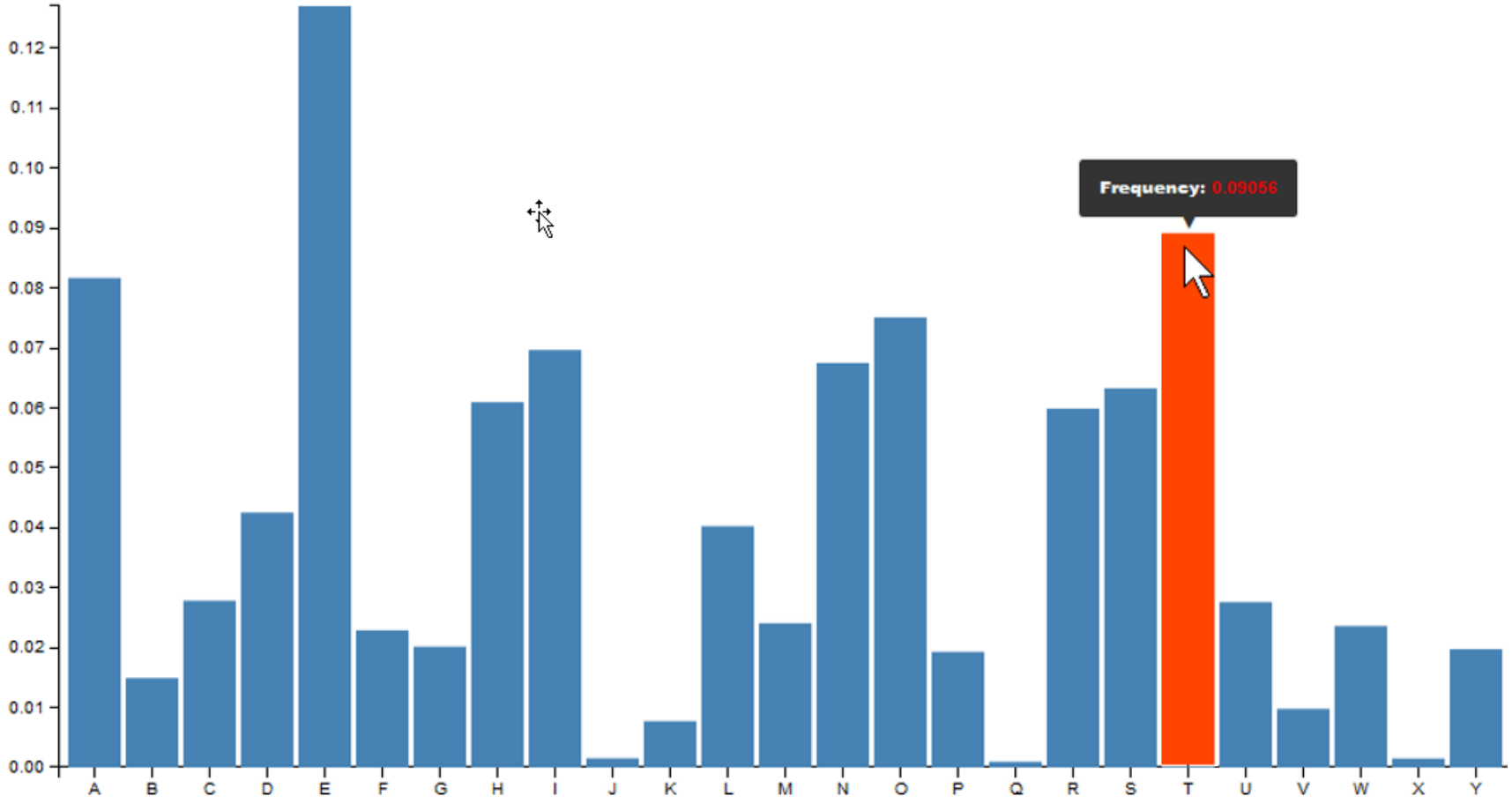
This Thursday

- Programming assignment exercises
  - Histogram: one of the most used graphs in data analysis.
    - Distribution of data.
- Objectives of this assignment
  - the creation of histogram in JavaScript with D3.js;
  - the use of D3 function to read data from data files and process data inputs (e.g., handling data types);
  - the use of JavaScript events to manage user inputs (e.g., mouse hovering, mouse clicking, etc.); and
  - the design of user-driven visualization (different data sorting styles based on different user inputs in this case).

Programming Assignment: Histogram



Bonus Point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0.10
0.09
0.08
0.07
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0.05
0.04
0.03
0.02
0.01
0.00
A B C D E F G H I J K L M N O P Q R S T U V W X Y
Frequency: 0.09056