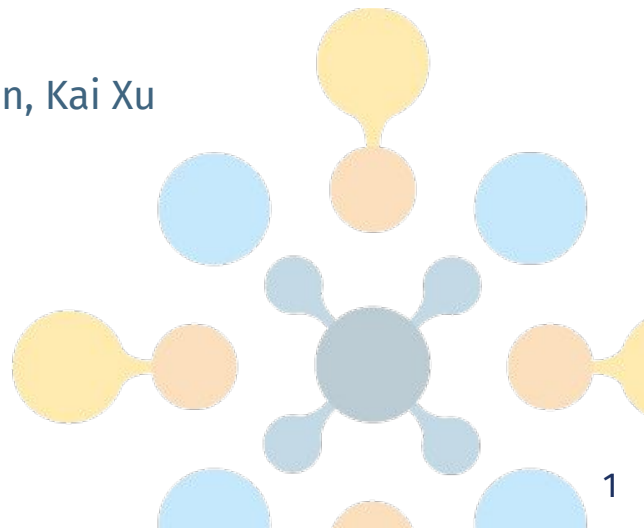




Visual Analysis of Complex Temporal Networks Supported by Analytic Provenance

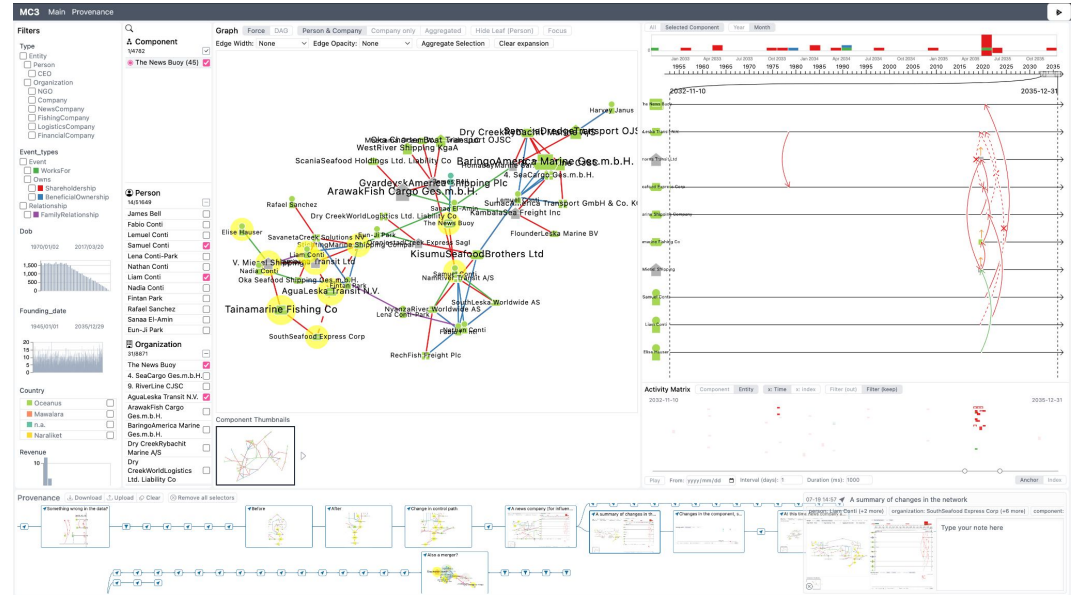
Yuhan Guo, Yuchu Luo, Xinyue Chen, Hanning Shao, Xiaoru Yuan, Kai Xu
VAST Challenge 2024 MC3



Design

Goal: Support visually explore the large temporal network

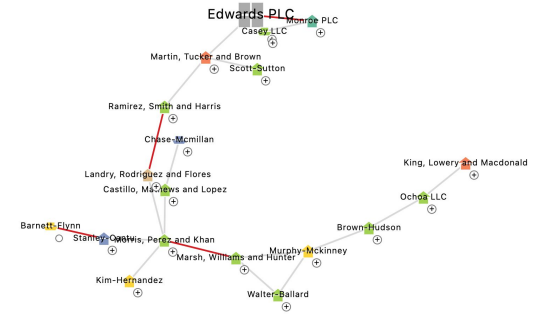
- **Graph view + temporal view** for inspecting data from two complementary perspectives
- **Flexible filtering** for locating relevant data
- **Provenance capturing** for organising the analytic process



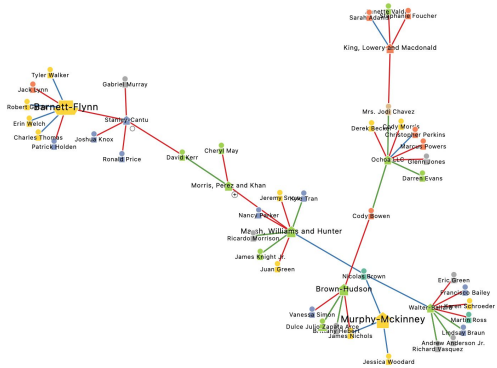
Graph View

- Node: icon - type, color - country; Edge: color - type
- Provide multiple layout options

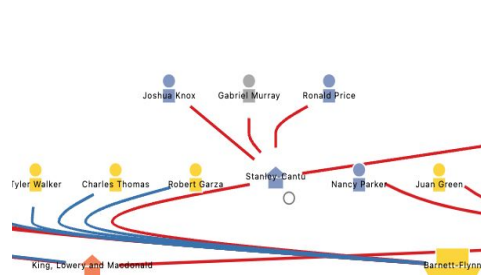
Company only



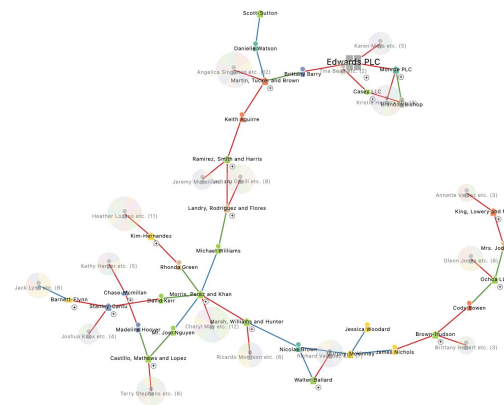
Force-directed



DAG

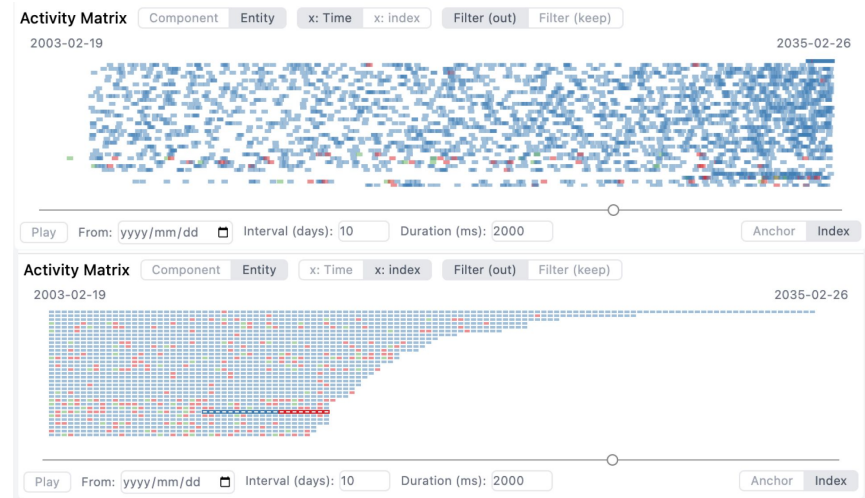
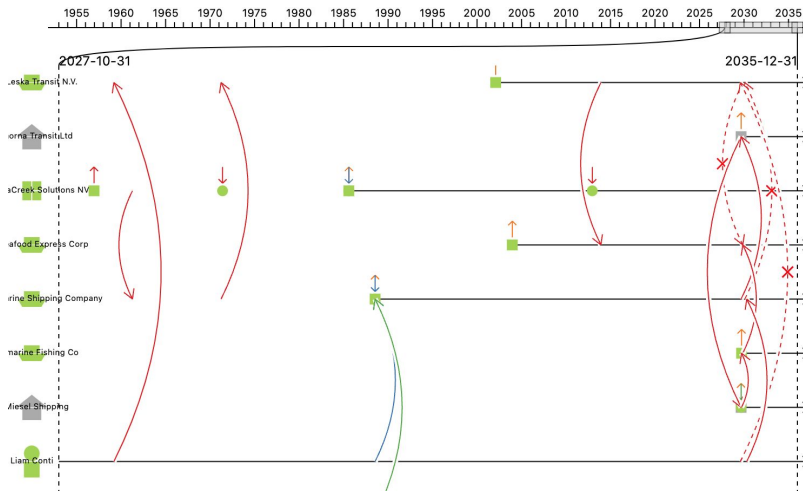


Aggregated



Temporal View

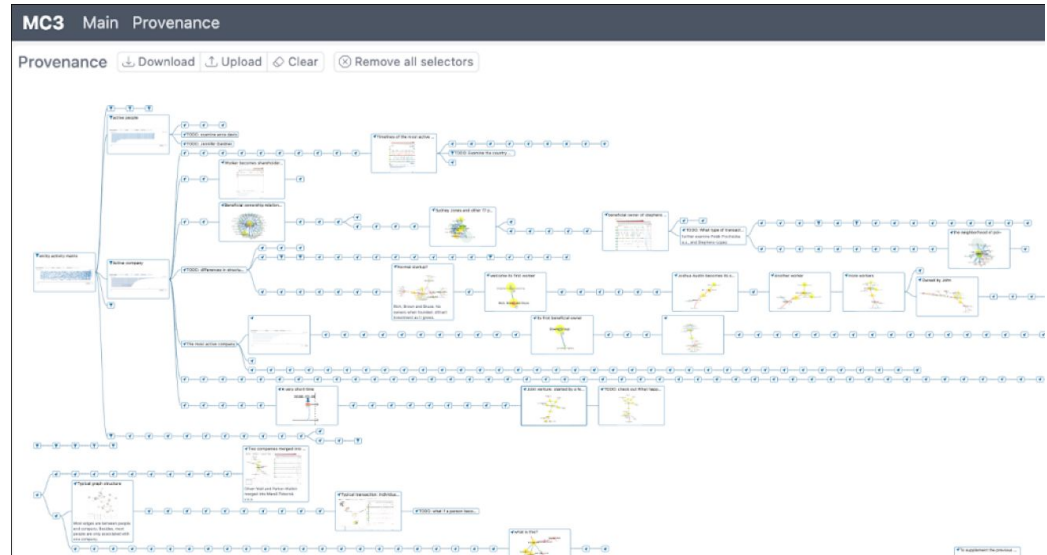
- Timeline: show detailed temporal events around selected entities
- Activity matrix: entity-level event distribution



Provenance Map

Motivation: Users may easily get lost in the exploration process

- Automatically capture user interaction (selection and filtering) provenance
- Go back to previous states
- Take notes



Filters

Type

- Entity
- Person
- CEO
- Organization
- NGO
- Company
- NewsCompany
- FishingCompany
- LogisticsCompany
- FinancialCompany

Event_types

- Event
- WorksFor
- Owns
- Shareholdership
- BeneficialOwnership
- Relationship
- FamilyRelationship

Dob

1979/01/02 2017/03/20

Founding_date

1945/01/01 2035/12/26

Country

- Oceanus
- Mawalara
- n.a.
- ...

Revenue

Component
4782/4782

- Abbott, Mcbride and Edwards
- Acosta, Fields and Moore
- Baldwin, Kline and May
- Barnett-Flynn
- Bennett-Kirby
- Cooper LLC
- Anderson-Green
- Galvan Inc

Person
51649/51649

- Laura Newman
- Jillian Morales
- Anna Bailey
- Dawn King
- Elizabeth Bell
- Rose Whitney
- Craig Holloway
- Daniel Marquez
- Kayla Boone
- Eric Montes

Organization
887/887

- Abbott, McBride and Edwards
- Abbott-Gomez
- Abbott-Harrison
- Abbott-Ibarra
- Abbott-Sullivan
- Acevedo and Sons
- Acevedo PLC
- Acevedo, Lloyd and Young
- Acevedo, Miller and ...

Graph Force DAG Person & Company Company only Aggregated Hide Leaf (Person) Focus

Edge Width: None Edge Opacity: None Aggregate Selection Clear expansion

Component Thumbnails

Activity Matrix

1980-11-14 2035-12-31

1980-11-14 2035-12-31

Component Entity x: Time x: index Filter (out) Filter (keep)

Play From: yyyy/mm/dd Interval (days): 1 Duration (ms): 1000 Anchor Index

Reflection

- Providing rich graph layout options is helpful for presenting complex graphs (to suit different tasks/structures of selected sub-graph)
- Collection of analytic provenance reduces cognitive load in exploration and analysis
- Better to integrate automatic analysis algorithms, the current analysis is mostly bottom-up



Thanks!

Q & A

Our system is available at [https:// vis4sense.github.io/vast-2024-mc3/](https://vis4sense.github.io/vast-2024-mc3/)

