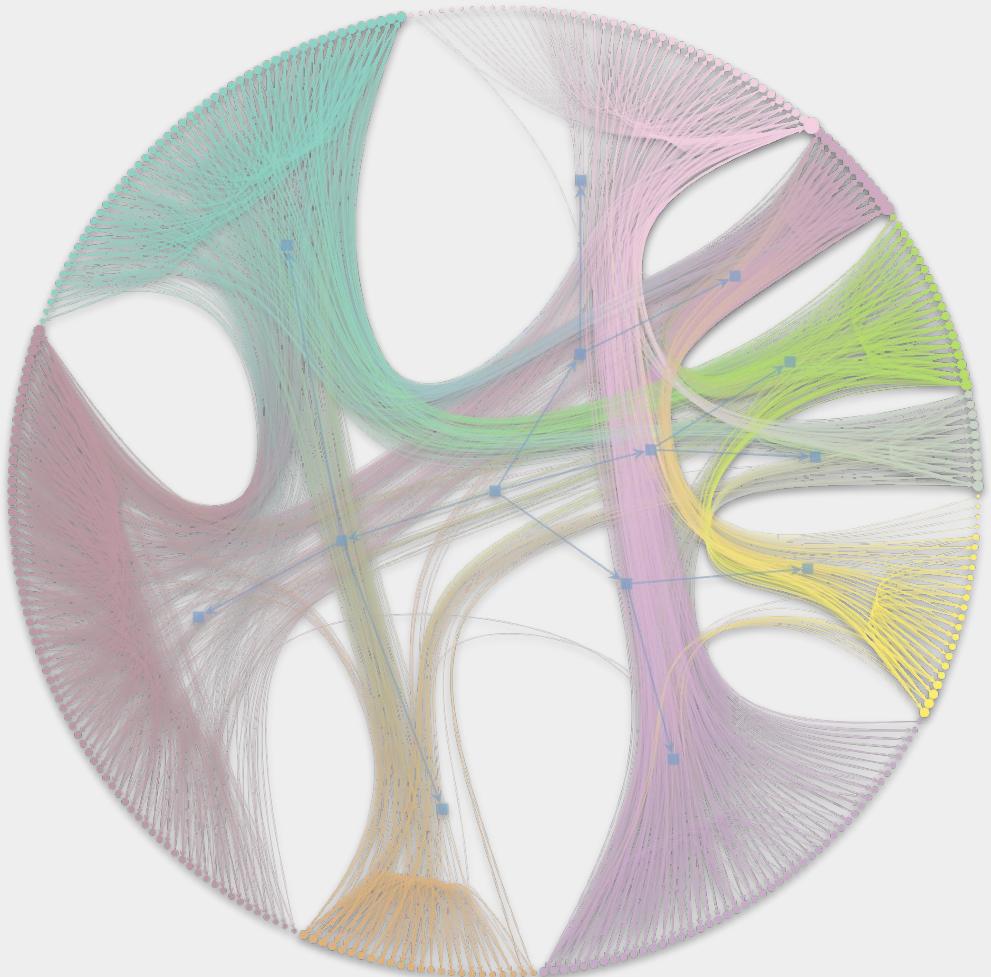


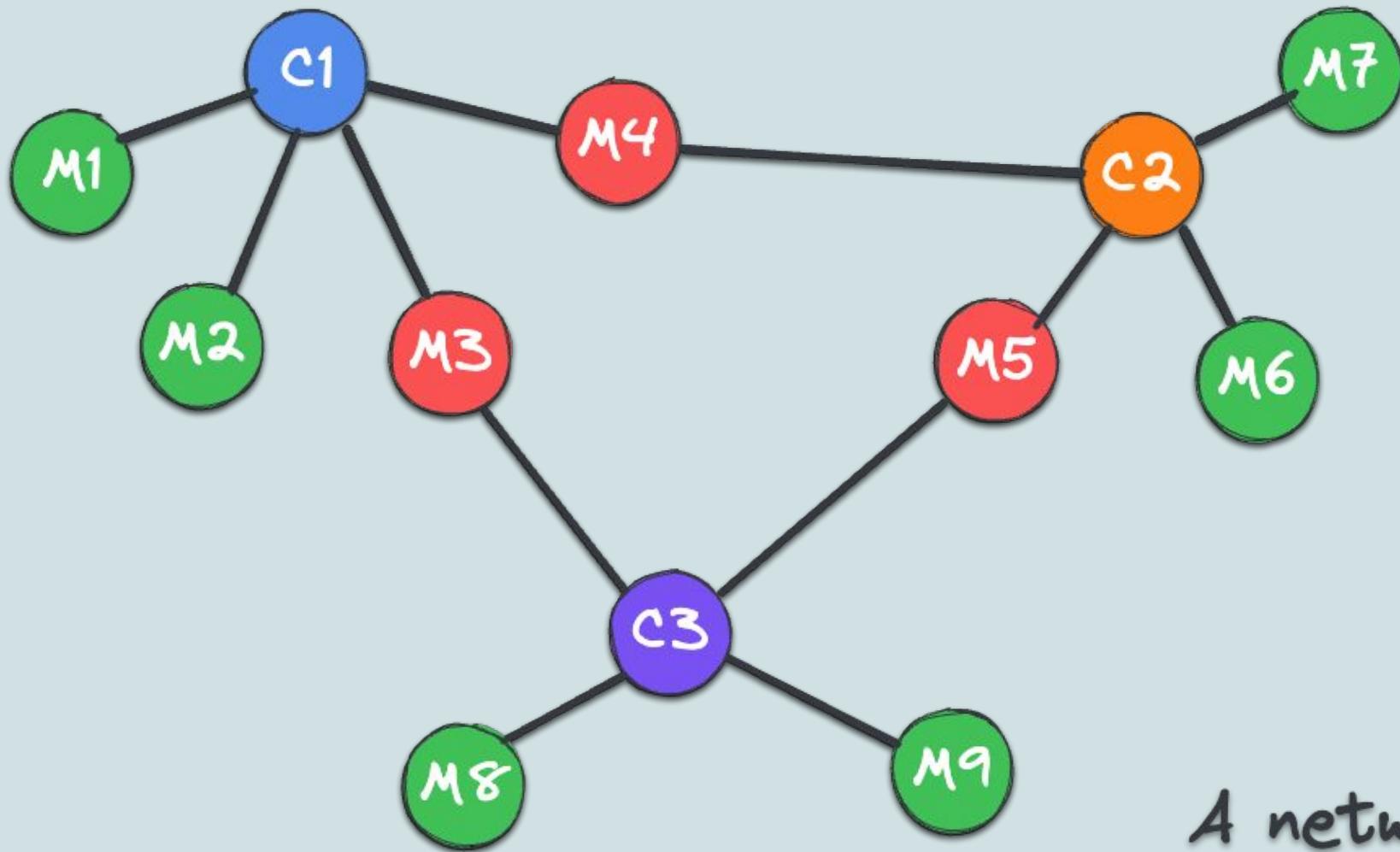
Network Elements

Part 01

ivanovitch.silva@ufrn.br
@ivanovitchm







A network

CHINA'S EXPORTS

BY REGION

2009

45% \$120B
22% \$55B
19% \$47B
3% \$8B
3% \$7B
2% \$5B
2% \$4B
1% \$3B



China has increased exports to South Asia, the Middle East, and Africa under its Belt & Road Initiative.

2022

\$1.3T
36%

EAST ASIA & PACIFIC

\$821B
23%

EUROPE & CENTRAL ASIA

\$637B
18%

NORTH AMERICA

U.S. 16%

\$252B
7%

LATIN AMERICA & CARIBBEAN

\$197B
5%

MIDDLE EAST & NORTH AFRICA

\$175B
5%

SOUTH ASIA

\$125B
3%

SUB-SAHARAN AFRICA

\$92B
2%

OTHER ASIA

Trade Tug of War:

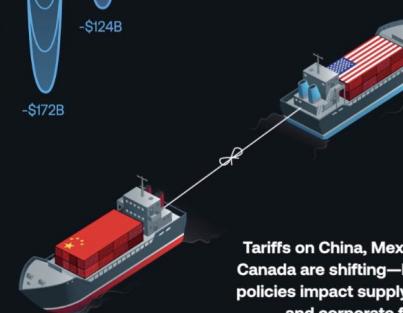
America's Biggest Trade Deficits

The Trump administration has highlighted trade deficits—where the U.S. imports more than it exports—as one reason for tariffs.

Rank	1	2	3	4	5	6	7	8	9	10
China	China	Mexico	Vietnam	Ireland	Germany	Taiwan	Japan	S. Korea	Canada	India

-\$46B
-\$74B
-\$85B
-\$87B
-\$124B
-\$172B
-\$295B
-\$69B
-\$66B
-\$63B

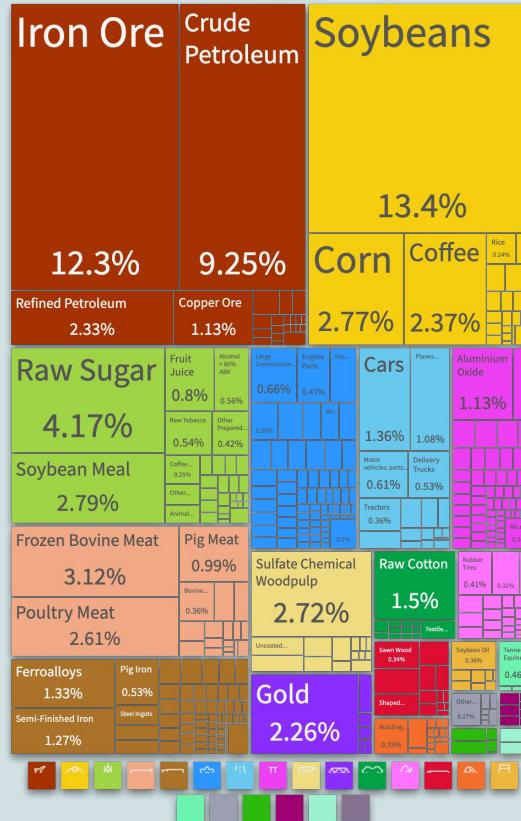
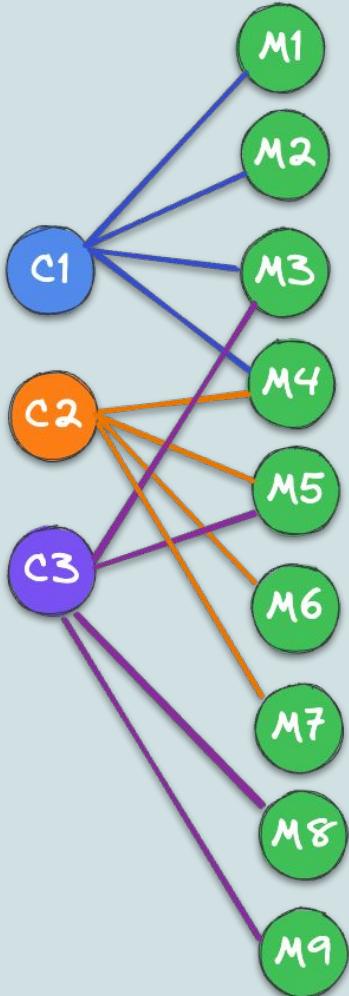
Deficit:



Tariffs on China, Mexico, and Canada are shifting—how will policies impact supply chains and corporate finance?

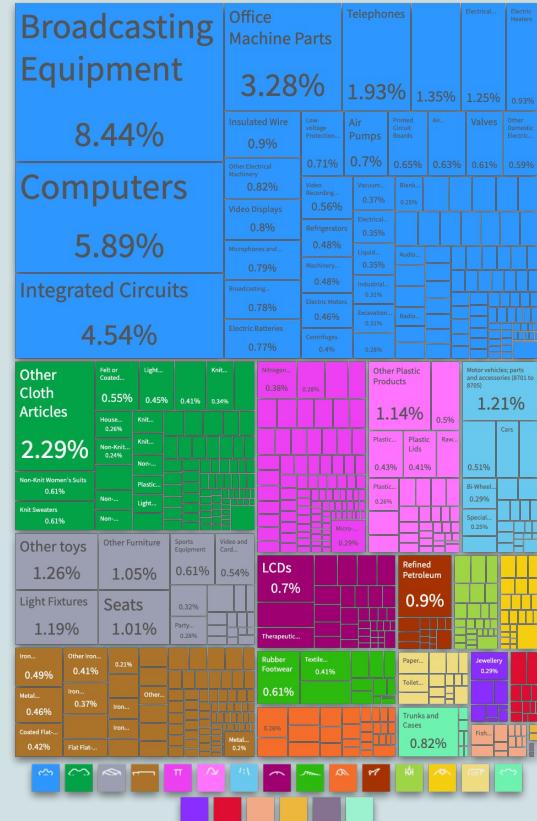
Unpredictable tariffs threaten your bottom line.
Stay ahead with real-time contract and spend insights to protect margins and optimize costs.

Learn More

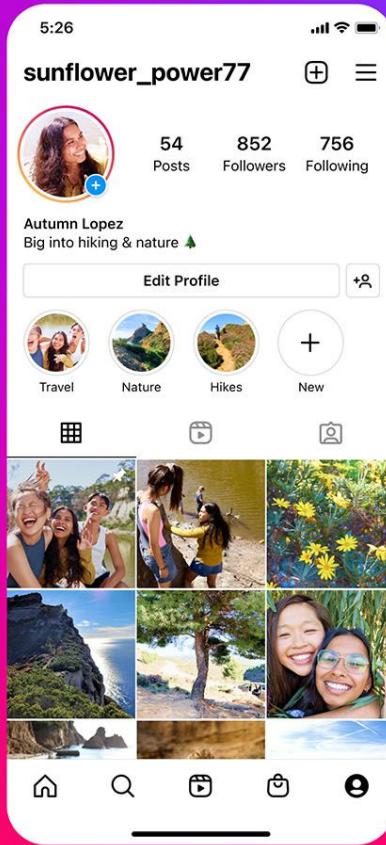
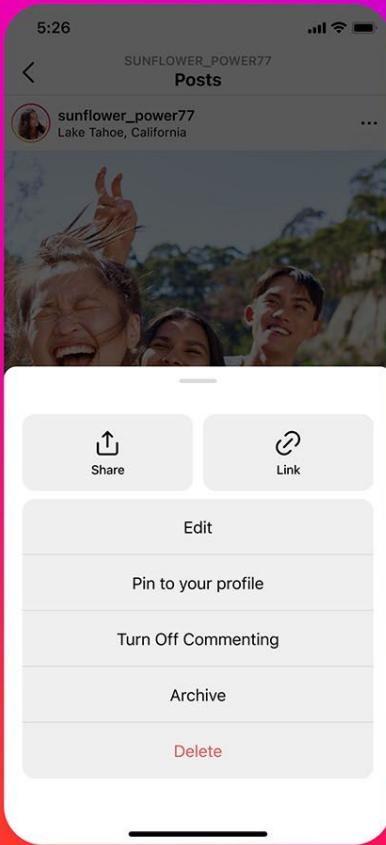


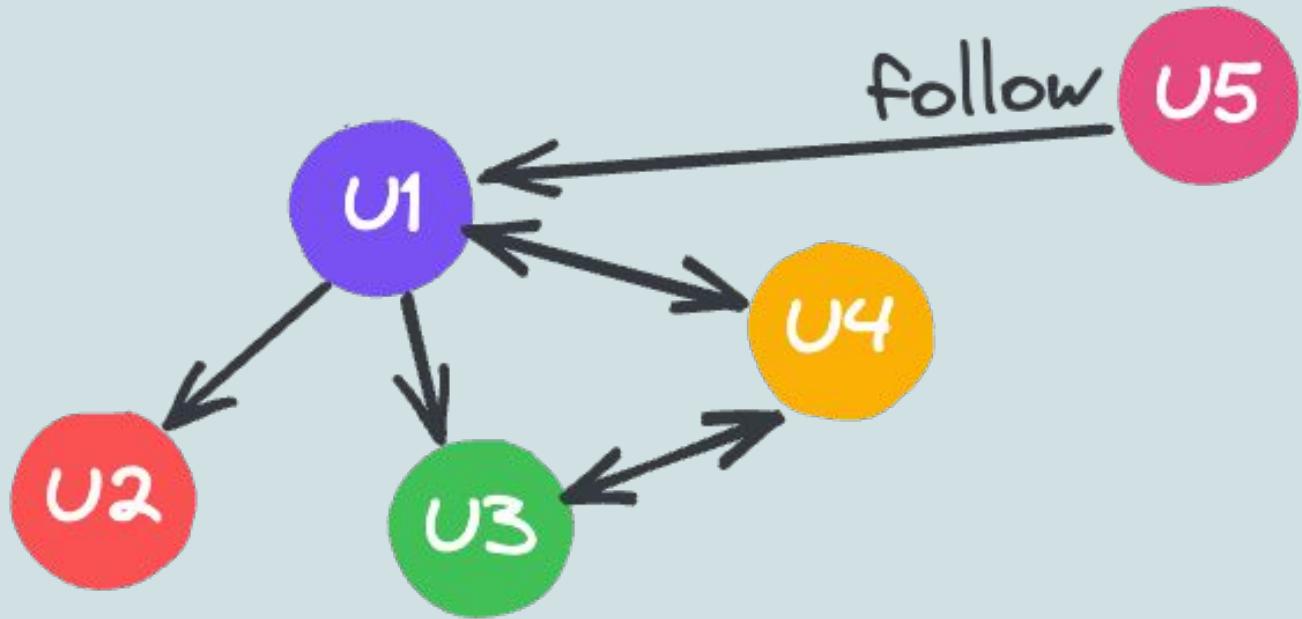
bipartite network

Exports (2020)
[Click to Select a Product]
Total: \$2.65T



<https://oec.world/en/profile/country/chn>





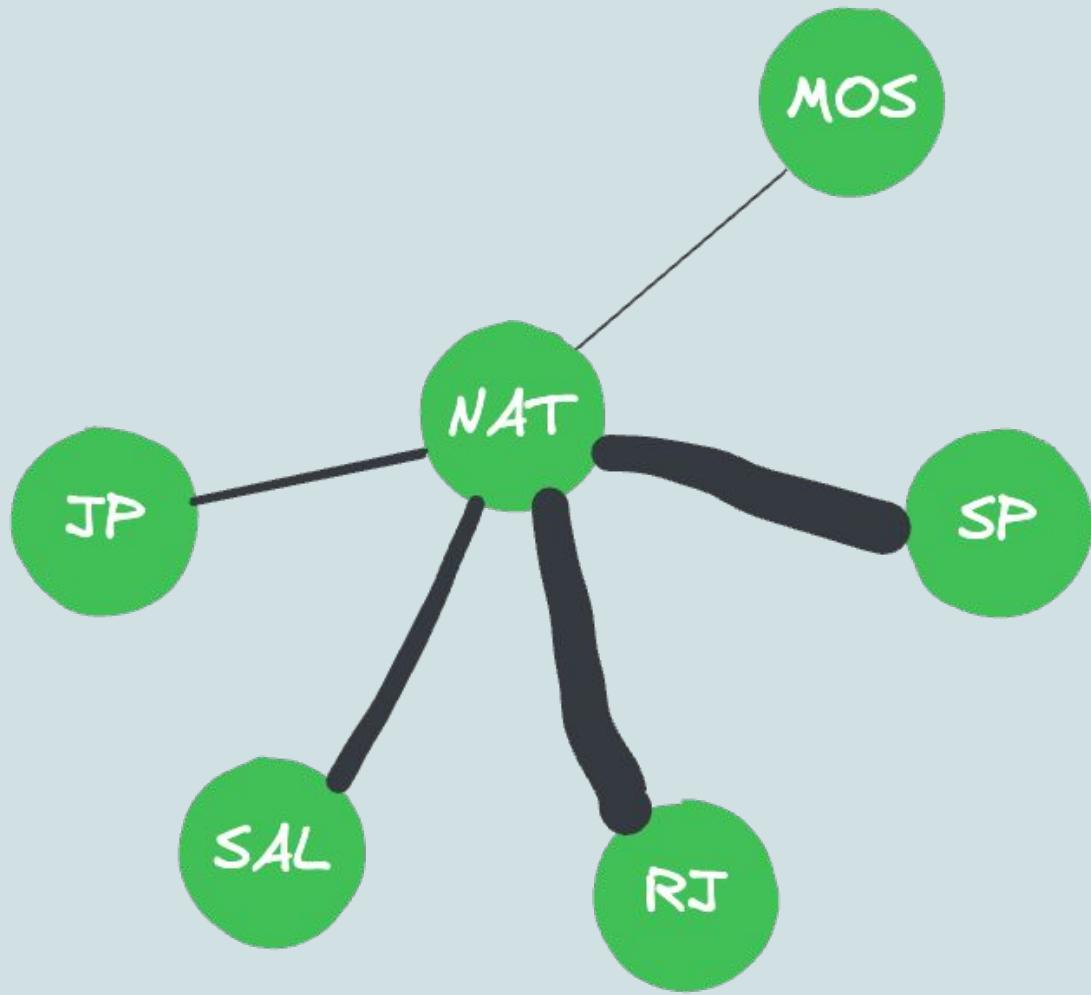
leomessi Following Message ...

1,338 posts 504M followers 338 following

Leo Messi
Athlete
Bienvenidos a la cuenta oficial de Instagram de Leo Messi / Welcome to the official Leo Messi Instagram account
[apple.co/mlsmessi + 3](http://apple.co/mlsmessi)

This image shows a screenshot of the Instagram profile for the account "leomessi". The profile picture is a circular photo of a smiling man holding a trophy. The bio text is in Spanish and English, welcoming users to the official account. The profile statistics are displayed below the bio: 1,338 posts, 504M followers, and 338 following. There are buttons for "Following", "Message", and more options. A link to the account's website is provided at the bottom of the bio.







alvarofpp / dataset-flights-brazil

Type to search



Issues

Pull requests

Actions

Projects

Security

Insights



dataset-flights-brazil

Public



1



0



Starred

9



main

1 Branch

0 Tags

Go to file



Add file

Code

alvarofpp style: Applies linters

738139c · 2 months ago

38 Commits

.githooks

build: Adds Docker and Makefile

2 months ago

.github/workflows

ci: Adds integration workflow

2 months ago

data

chore: Updates data files

2 months ago

.gitignore

build: Adds Docker and Makefile

2 months ago

Dockerfile

build: Adds Docker and Makefile

2 months ago

LICENSE

docs: Adds LICENSE

2 months ago

Makefile

refact: Makefile

2 months ago

README.md

fix: Write the same file twice

2 months ago

docker-compose.yml

build: Adds Docker and Makefile

2 months ago

extract.py

style: Applies linters

2 months ago

requirements.txt

build: Adds Docker and Makefile

2 months ago

About

Flights in Brazil registered by ANAC
(Agência Nacional de Aviação Civil -
National Civil Aviation Agency)

csv brazil python3 dataset

flights air-traffic graphml

air-traffic-data

Readme

View license

Activity

9 stars

1 watching

0 forks

Report repository

Languages





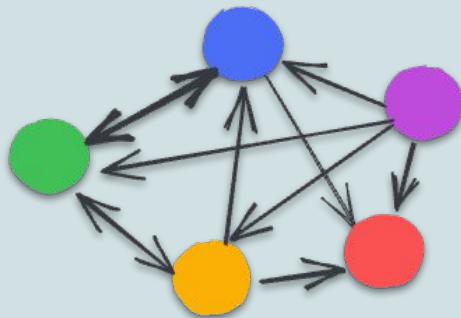
WhatsApp



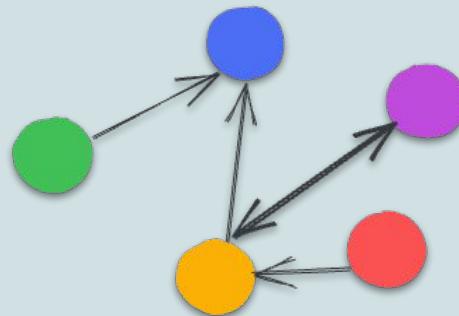
GitHub

<https://github.com/kurasaitja/Whatsapp-Analysis>

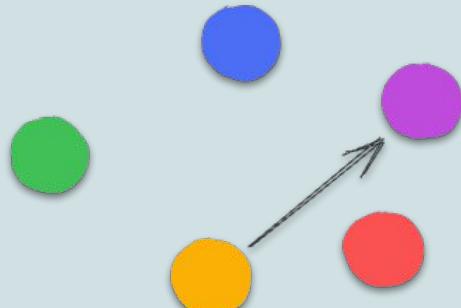
Monday



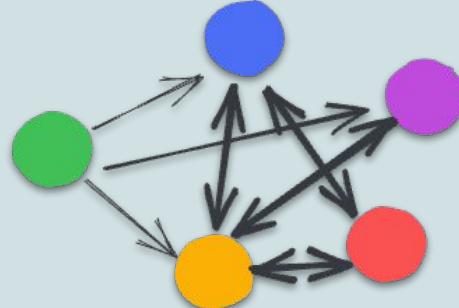
Tuesday



Wednesday



Thursday



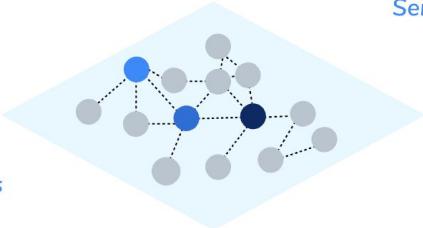
Temporal network



Data



Relationships



Graph

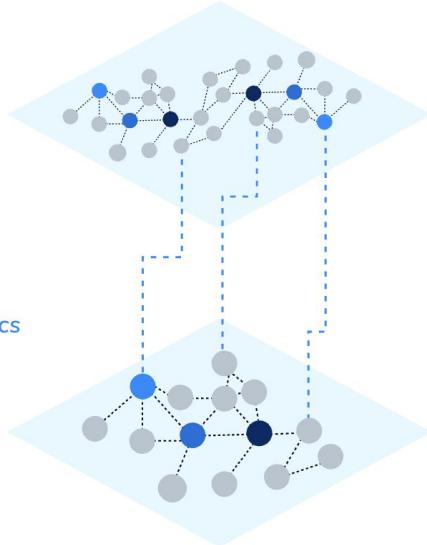
Dynamic Context

1. Data

Bridge together diverse and disparate data silos regardless of data type, such as structured, unstructured, and semi-structured.



Semantics



Knowledge Graph

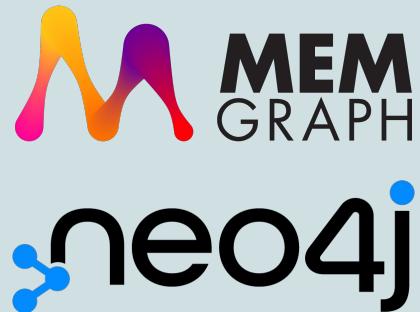
Deep Dynamic Context

2. Graph

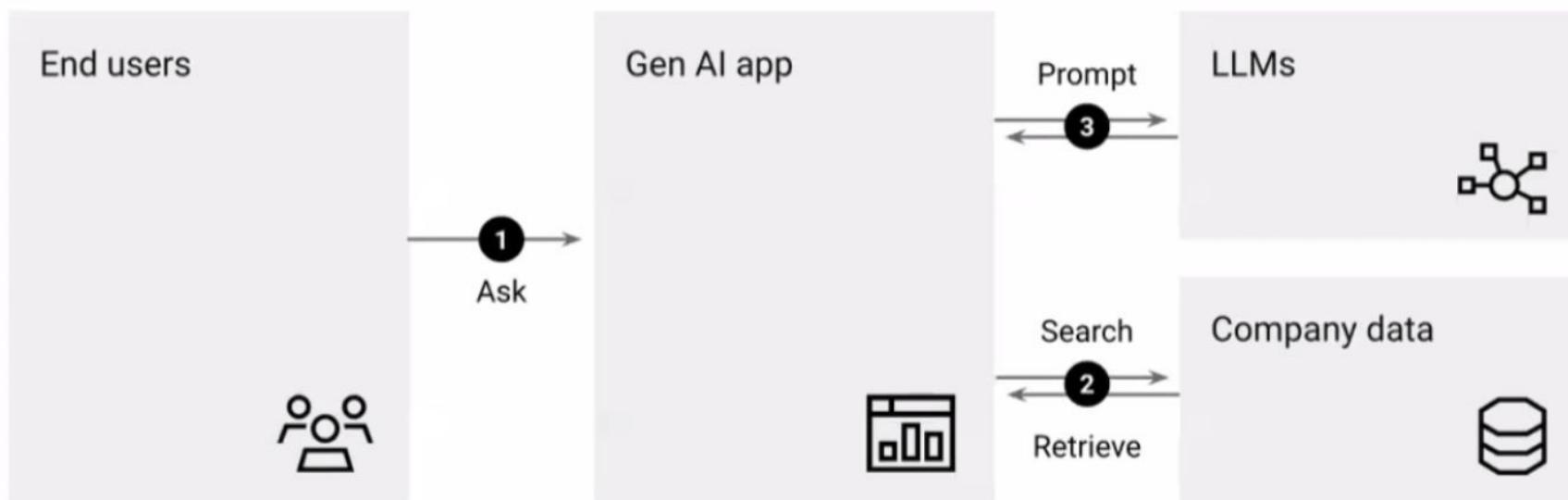
Map data and draw connections among them for the first layer of dynamic context, which provides immediate understanding.

3. Semantics

Apply semantics to provide deeper context to connected data. The deeper the context, the more powerful the insights.



Retrieval Augmented Generation (RAG)



[Sign In](#)

COMMUNITY CALL

How is NASA Building a People Knowledge Graph with LLMs and Memgraph



DAVID MEZA
Branch Chief, People Analytics and Head of Analytics, NASA

MADISON OSTERMANN
Data Scientist & Data Engineer, NASA

KATHARINE KNOTT
Data Scientist, NASA

APR
22
1:00pm

How is NASA Building a People Knowledge Graph with LLMs and Memgraph

By Memgraph

A "People Graph" is NASA's People Analytics Team's proposed solution for identifying subject matter experts, determining who should collaborate on which projects, helping employees upskill effectively, and more. By seamlessly deploying Memgraph on their private AWS network and leveraging S3 storage and EC2 compute environments, they have built an analytics infrastructure that supports the advanced data and AI pipelines powering this project. In this session, they will showcase how they have used Large Language Models (LLMs) to extract insights from unstructured data and developed a "People

27 7 6 10
DAYS HRS MIN SEC

[Save my spot!](#)

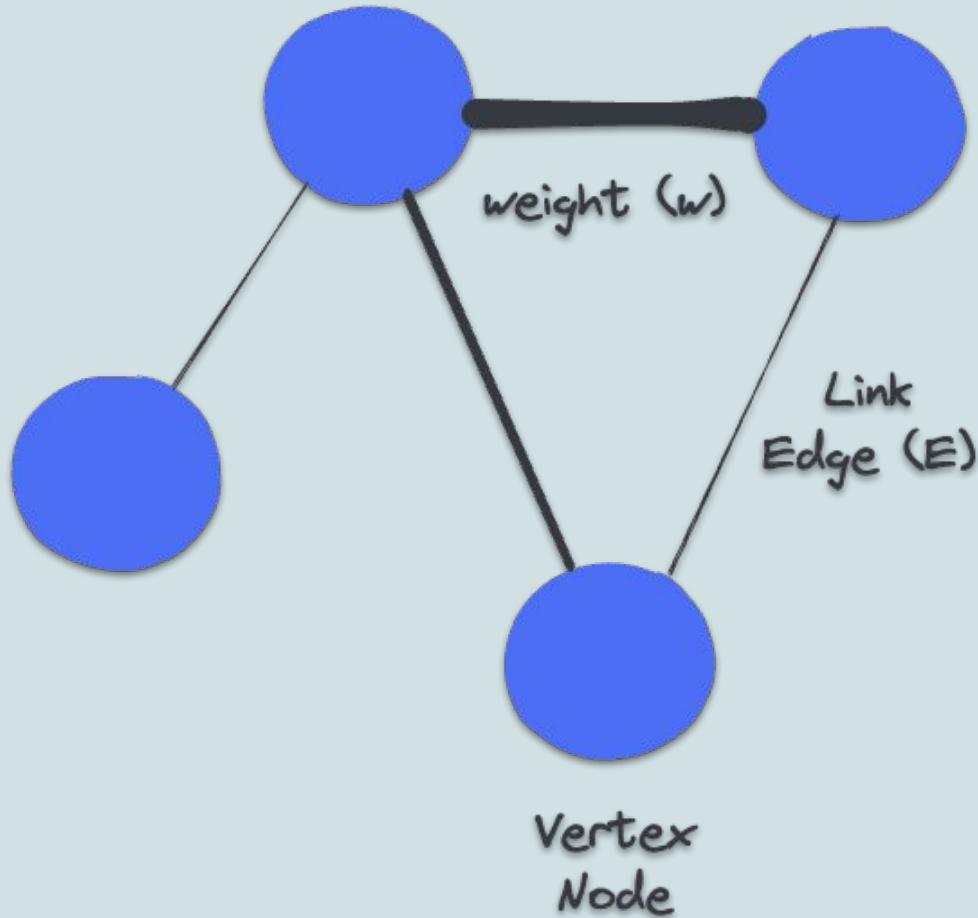
HOSTED BY



Memgraph

SHARE





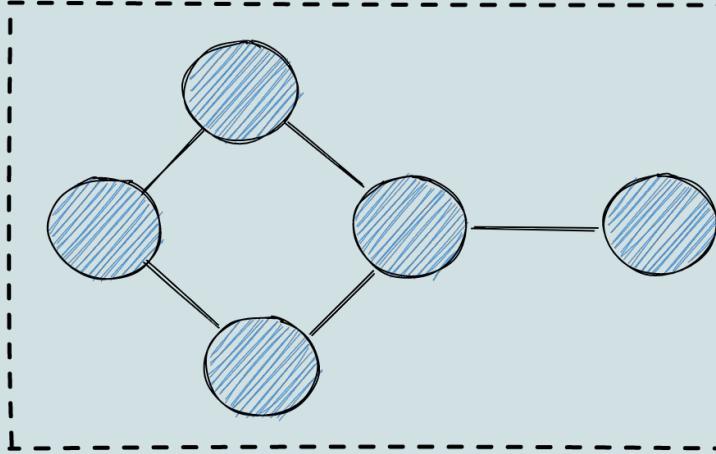
Basic Definitions

$$G = (V, E, W)$$

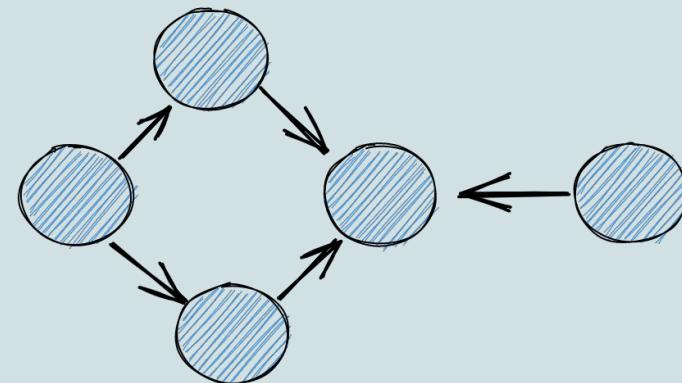
$$E \subseteq V \times V$$

$$W \subseteq R^+$$

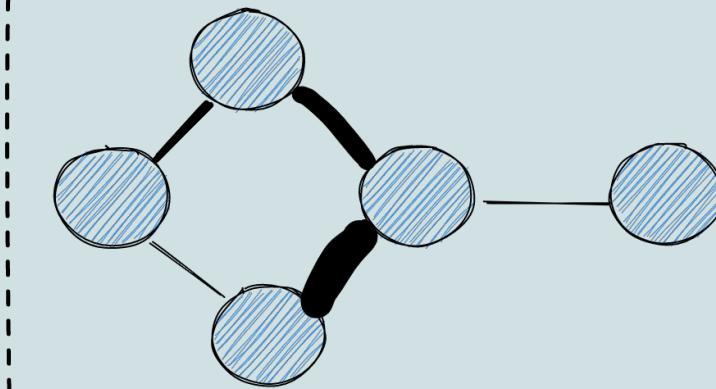
Undirected



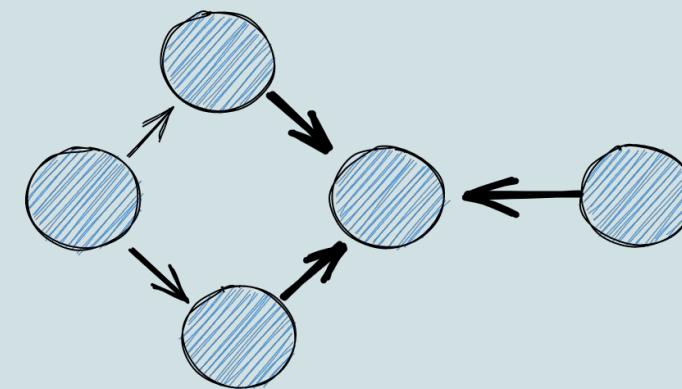
Directed



Unweighted



Weighted



Knowing

Information is directly acquired from reliable sources such as books, teachers, lectures, and courses

Focus on absorbing and retaining information.

Learning that takes place when information or experiences are exchanged between individuals or groups.

Teaching others reinforces one's own understanding.

Sharing

Learning

Discovering

Self-directed learning that happens when one ventures out to find new information

Driven by curiosity and inherently exploratory.

"Learning by doing", based on the premise that direct experience is one of the most potent forms of learning.

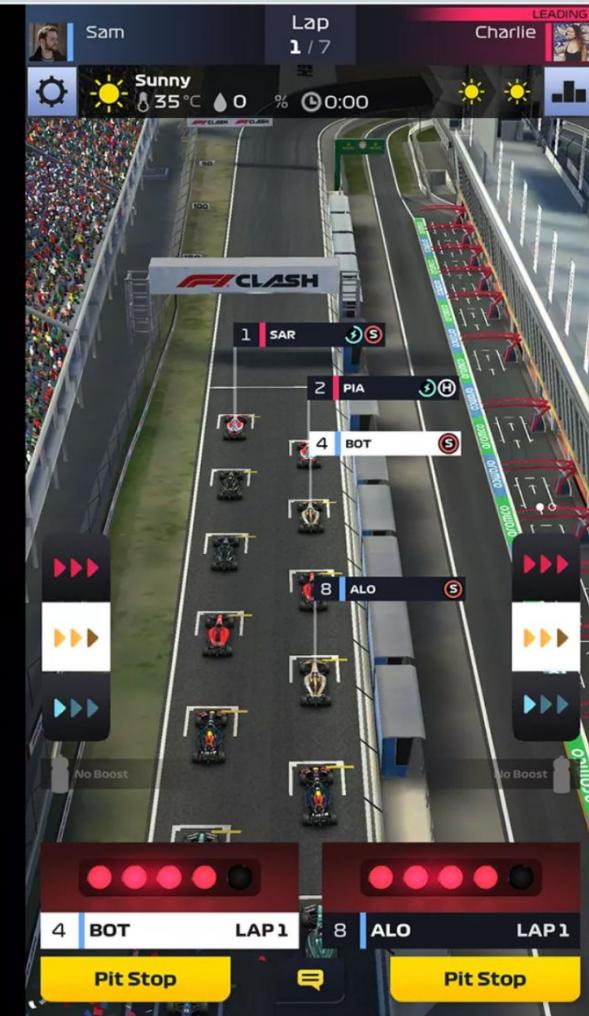
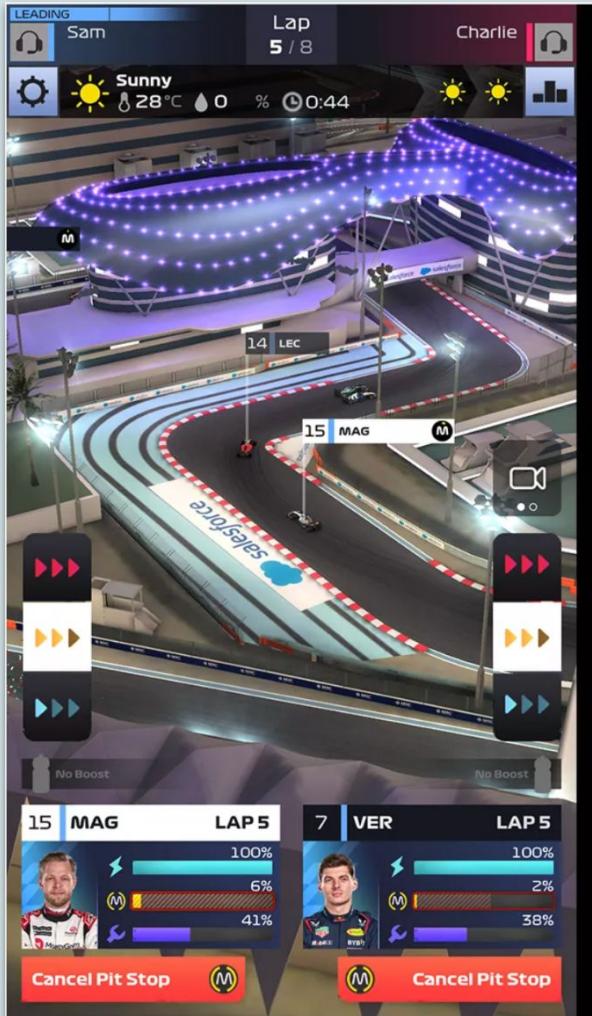
Involves real-life situations

Experiencing

 F1® CLASH**F1® CLASH** F1® CLASH

Compete in thrilling 1v1 races with the toughest rival race drivers from around the world.







Configuring a setup

$\min(1,220)$

Breaks



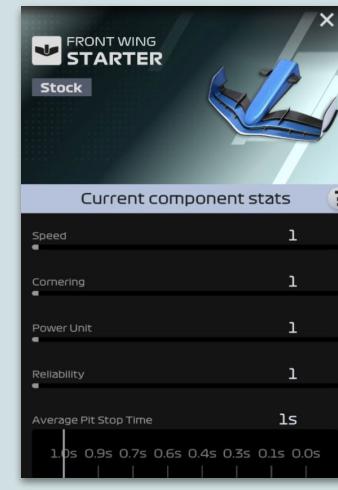
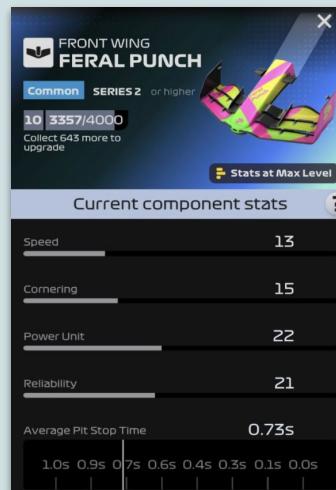
GearBox



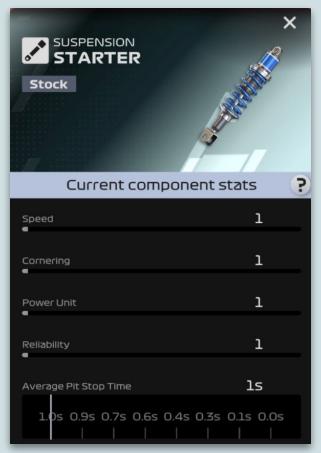
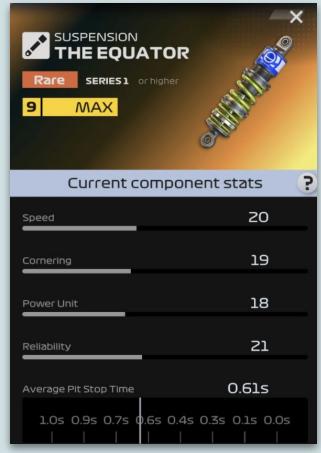
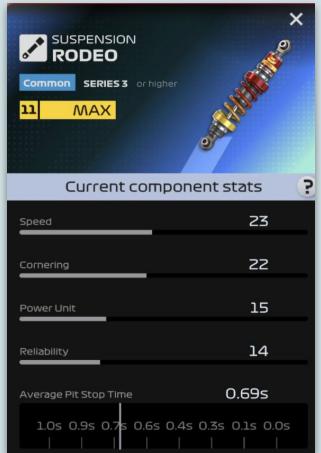
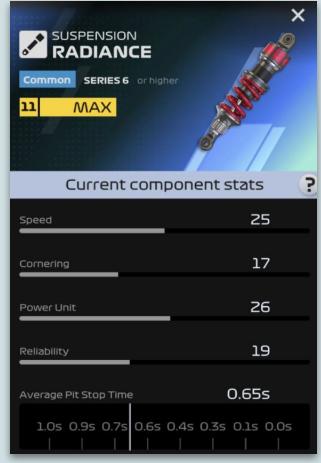
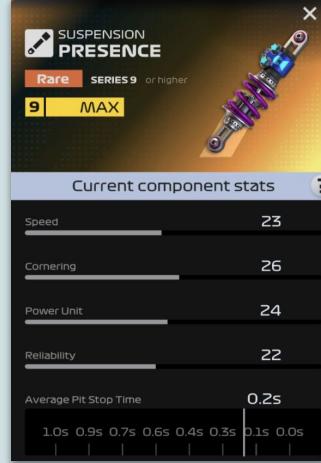
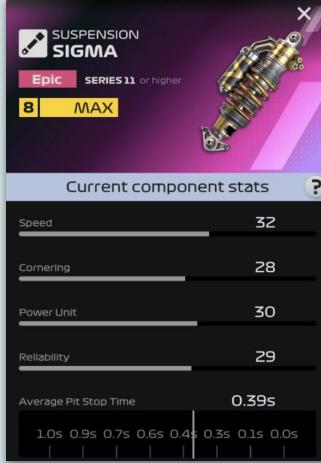
Rear wing



Front wing

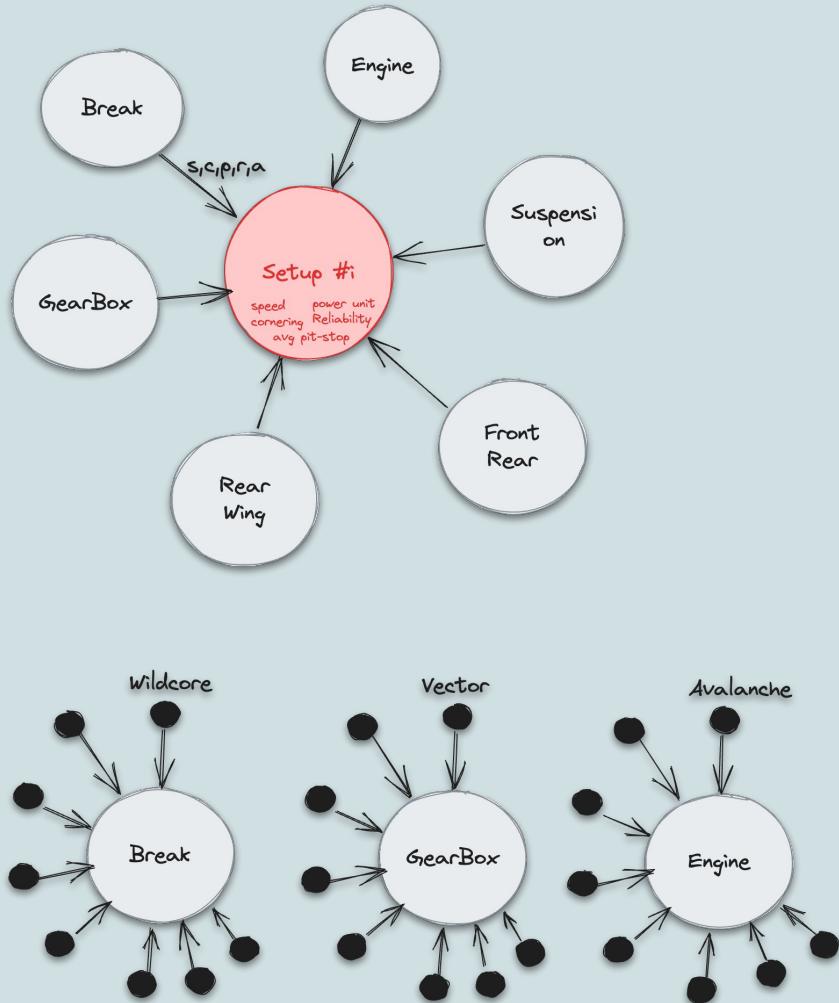


Suspension



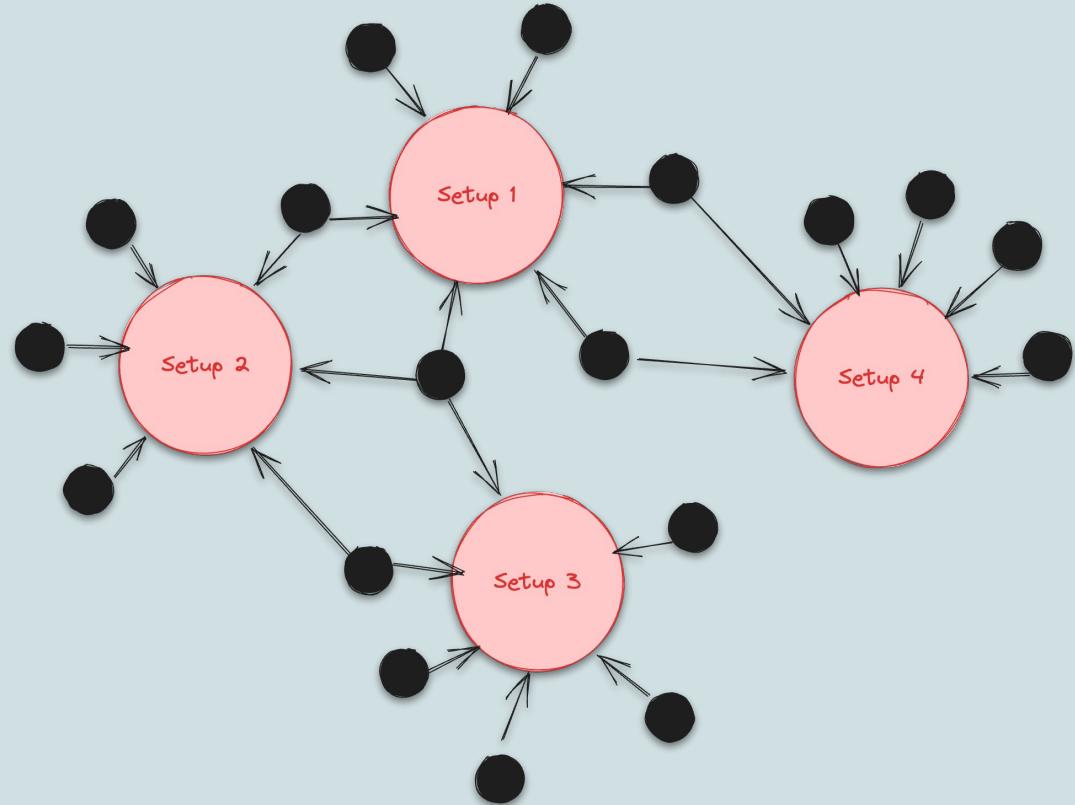
Engine



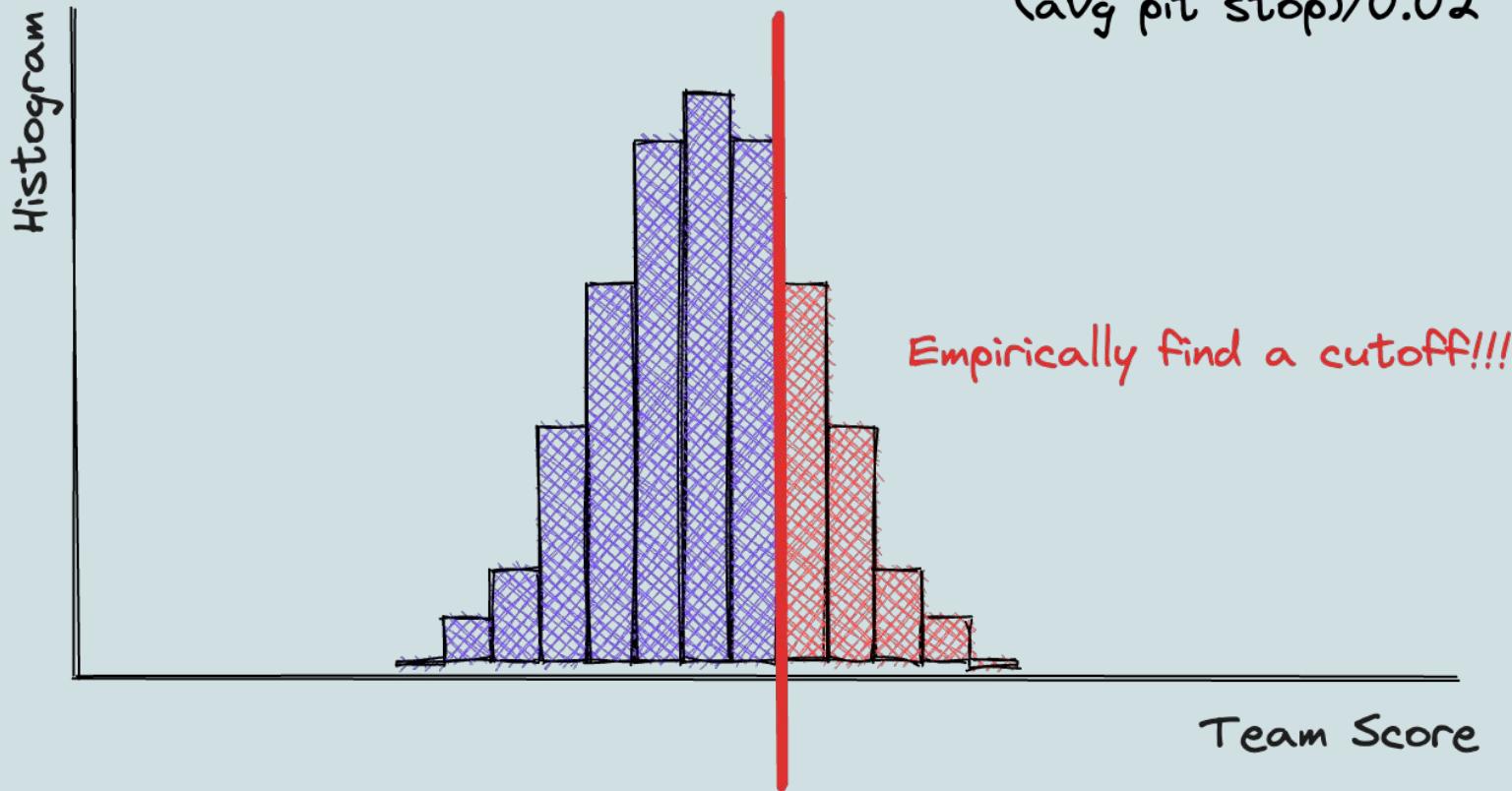




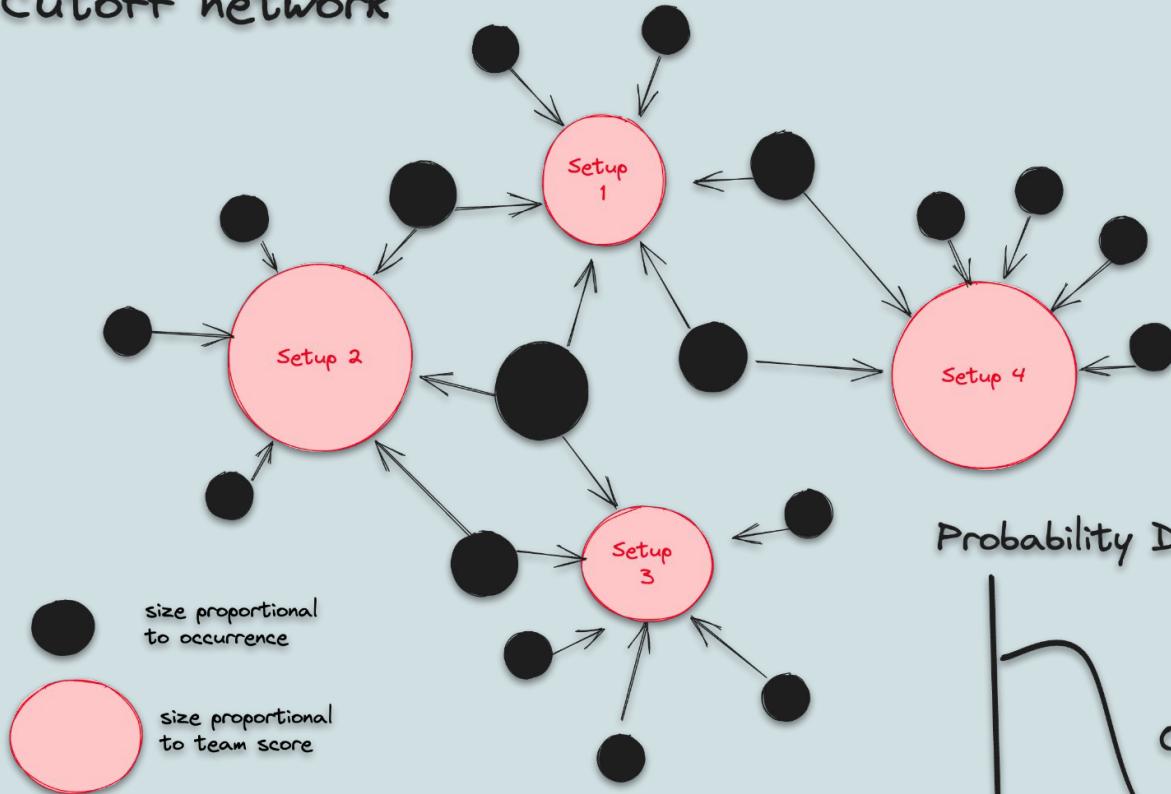
$8^6 = 262,144$
combinations



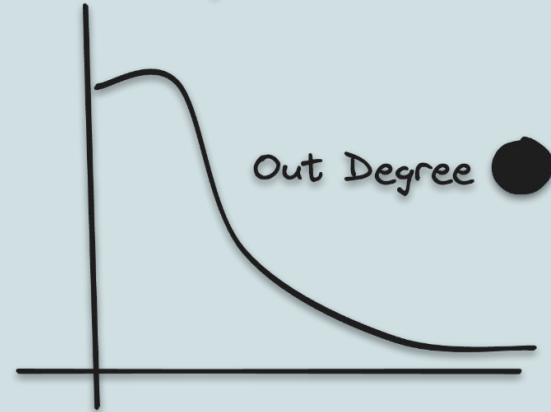
Team Score = speed + cornering + power unit + reliability +
(avg pit stop)/0.02

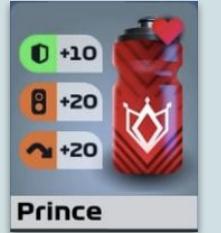
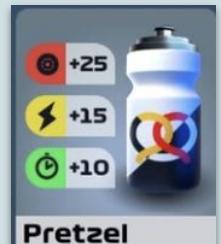


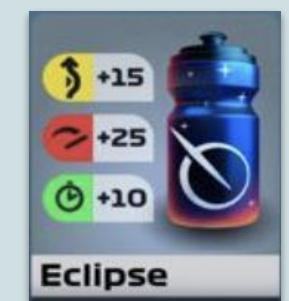
Cutoff network



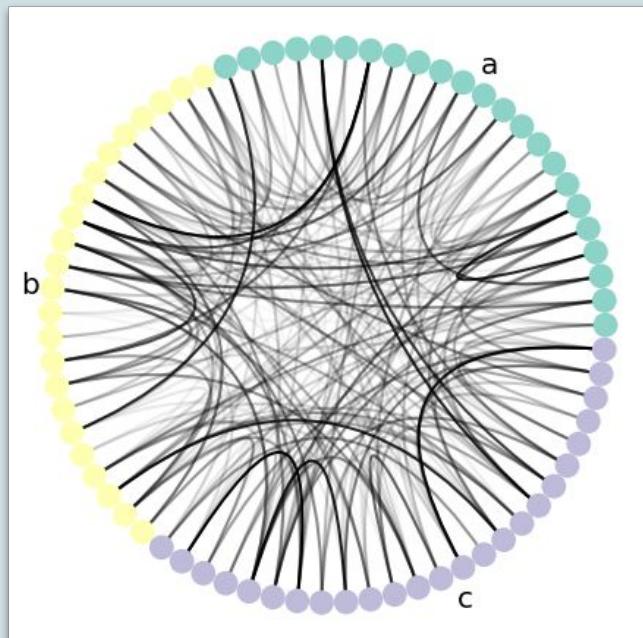
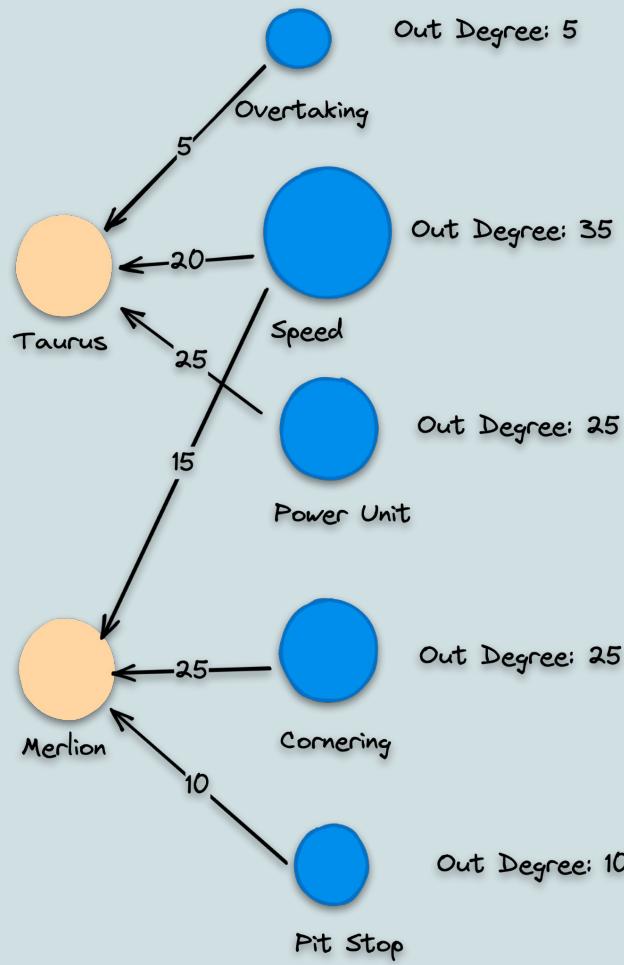
Probability Distribution Function (PDF)







Speed, Cornering, Power_Unit, Reliability, Pit_Stop,
Overtaking, Defending, Race_Start, Tyre_Management





$$\min(\lceil \times 1, 99 \rceil)$$

Further Reading & Practice



Contents



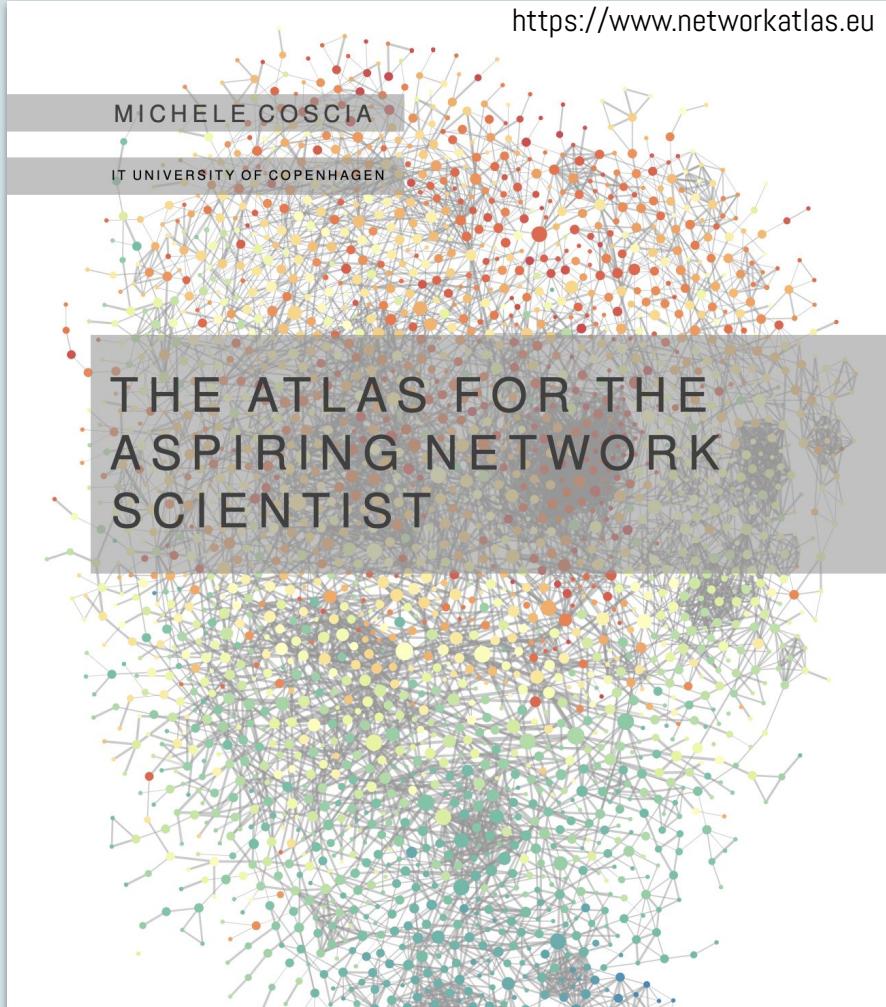
optional



must-read

1 Introduction	7
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3 Statistics	39
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6 Basic Graphs	91
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Releases

[Stable \(notes\)](#)

3.4.2 — October 2024

[Documentation](#)

[Latest \(notes\)](#)

3.5 development

[Documentation](#)

[Archive](#)



NetworkX

Network Analysis in Python

NetworkX is a Python package for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks.

Software for complex networks



- Data structures for graphs, digraphs, and multigraphs
- Many standard graph algorithms
- Network structure and analysis measures
- Generators for classic graphs, random graphs, and synthetic networks
- Nodes can be "anything" (e.g., text, images, XML records)
- Edges can hold arbitrary data (e.g., weights, time-series)
- Open source [3-clause BSD license](#)
- Well tested with over 90% code coverage
- Additional benefits from Python include fast prototyping, easy to teach, and multi-platform