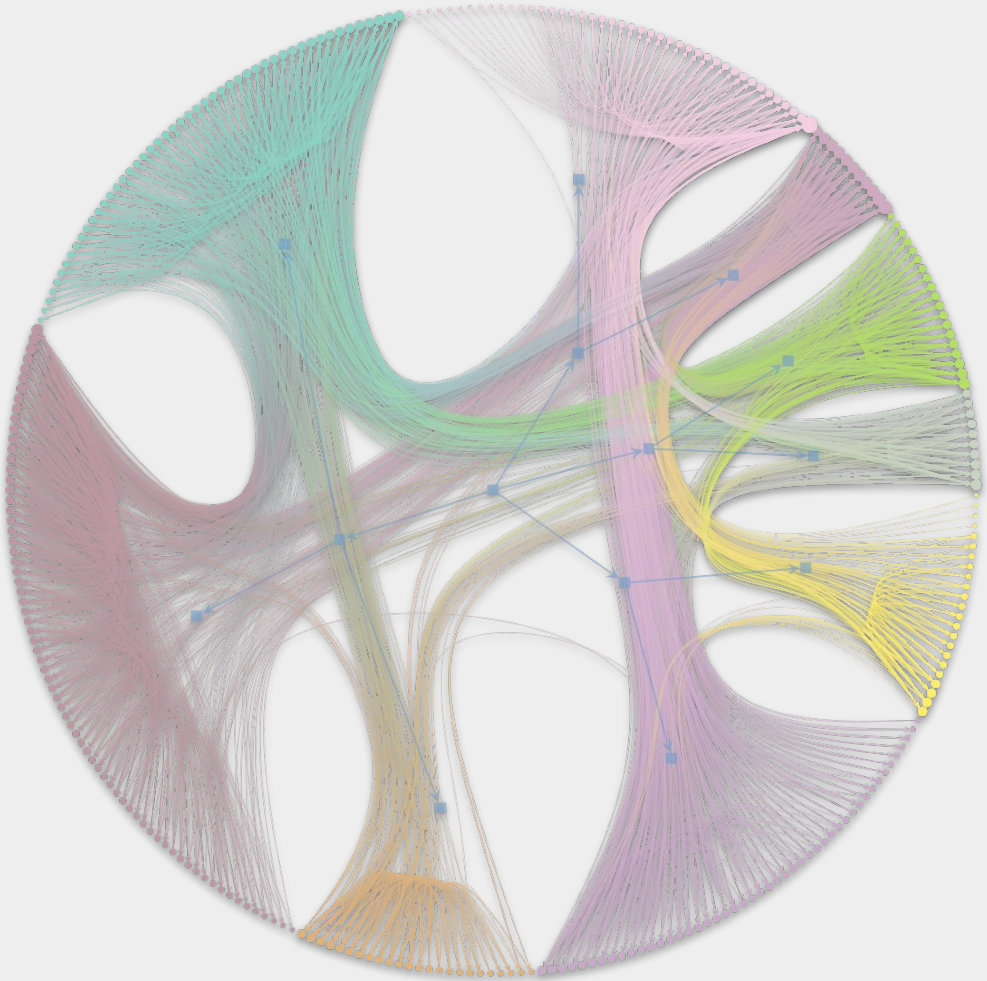
Network Elements

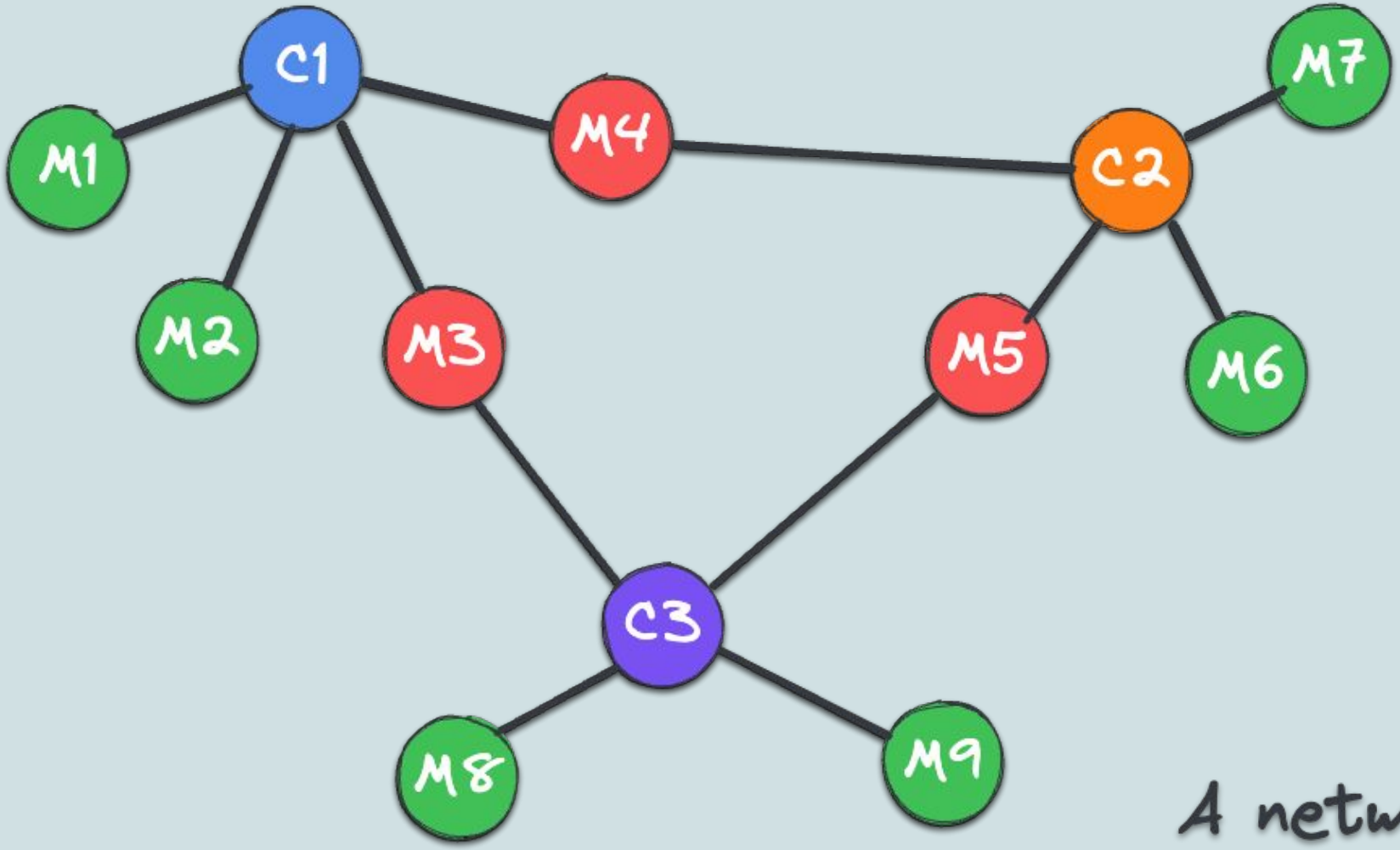
Part 01

ivanovitch.silva@ufrn.br
@ivanovitchm

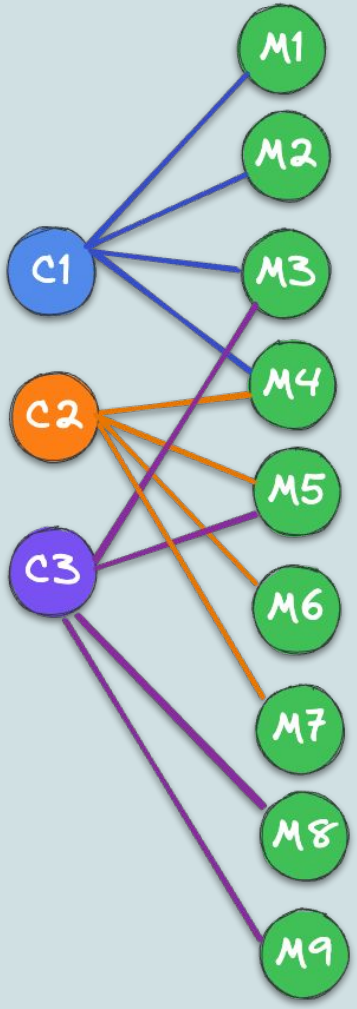
UFRN UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

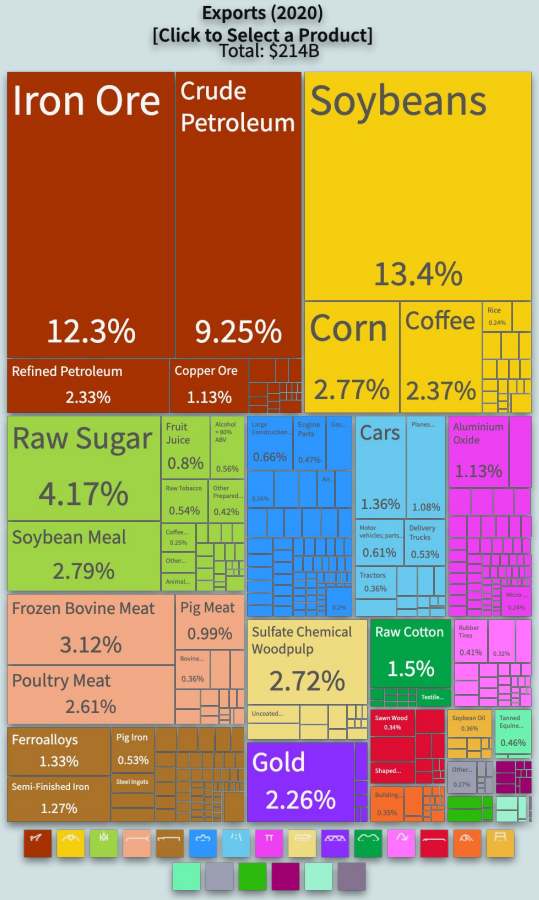
DCA

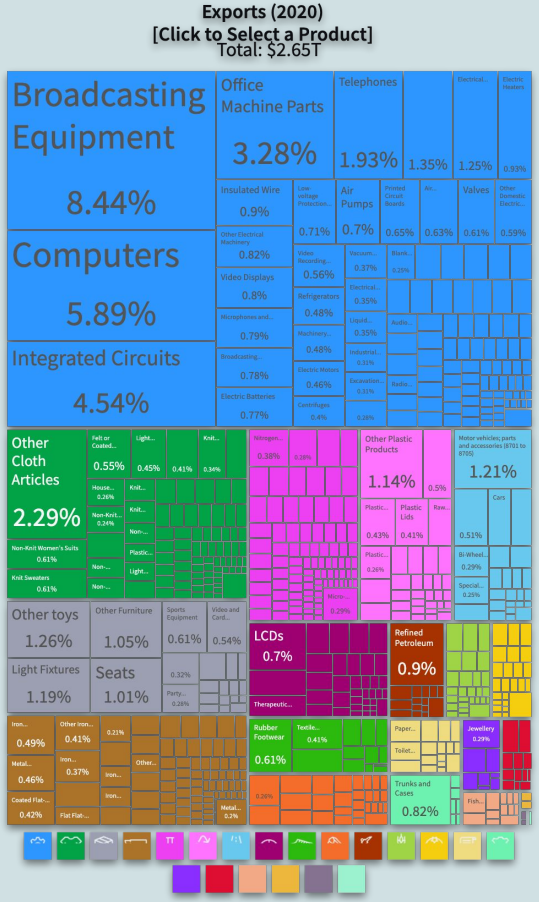




A network



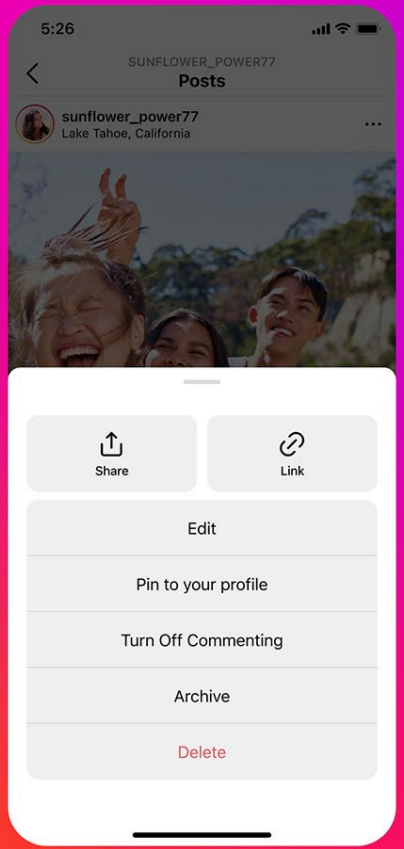


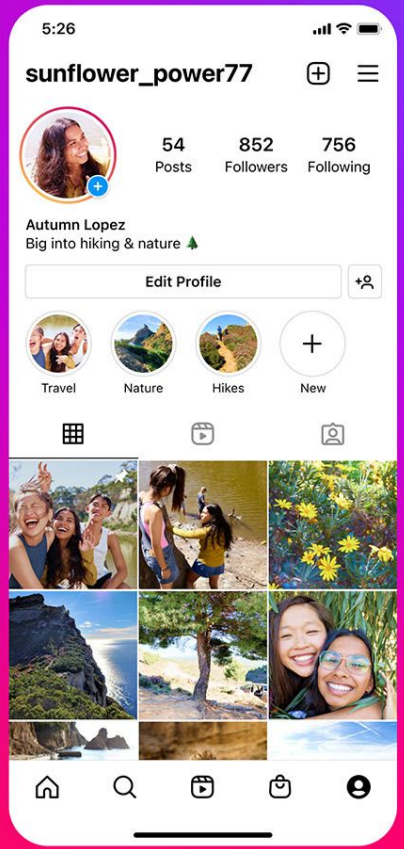


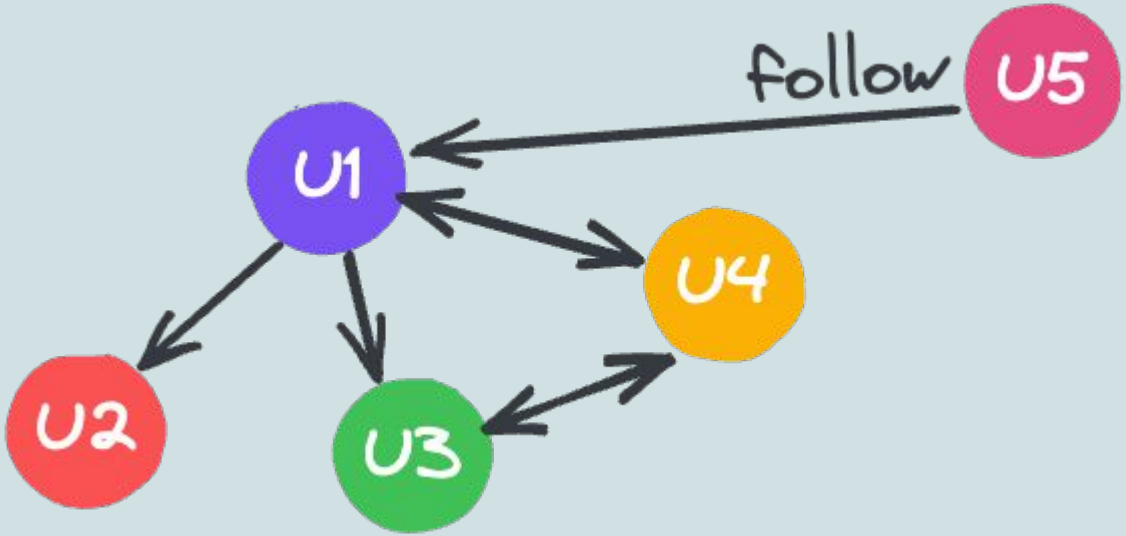
bipartite network

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


5:26
SUNFLOWER_POWER77
Posts
sunflower_power77
Lake Tahoe, California
Now you can pin posts to your profile
Liked by liam_beanz99 and 12 others
sunflower_power77 Lake trip with the best ❤️
#laketahoe2022
View all 5 comments
Add a comment...
1 day ago


5:26
SUNFLOWER_POWER77
Posts
sunflower_power77
Lake Tahoe, California
Share
Link
Edit
Pin to your profile
Turn Off Commenting
Archive
Delete


5:26
sunflower_power77
54
Posts
852
Followers
756
Following
Autumn Lopez
Big into hiking & nature
Edit Profile
Travel
Nature
Hikes
New



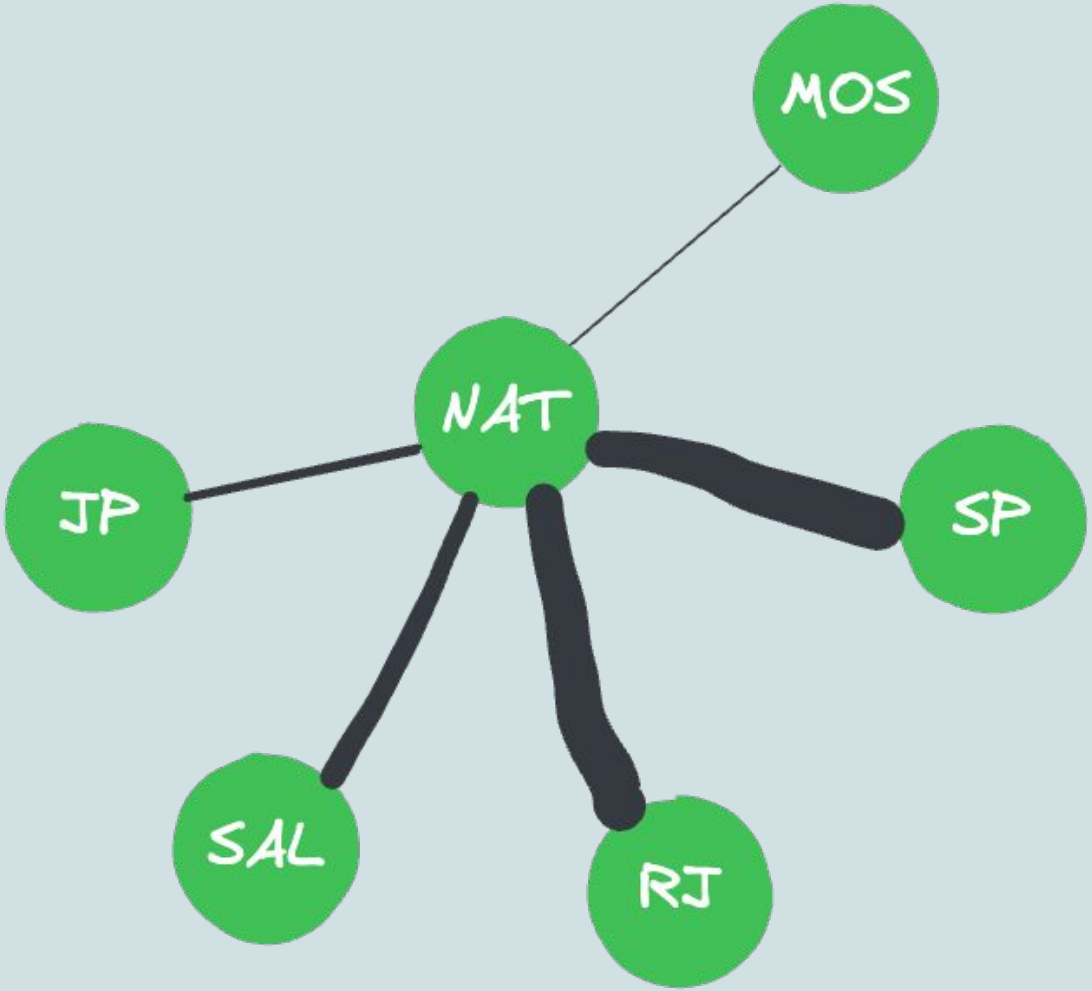
leomessi

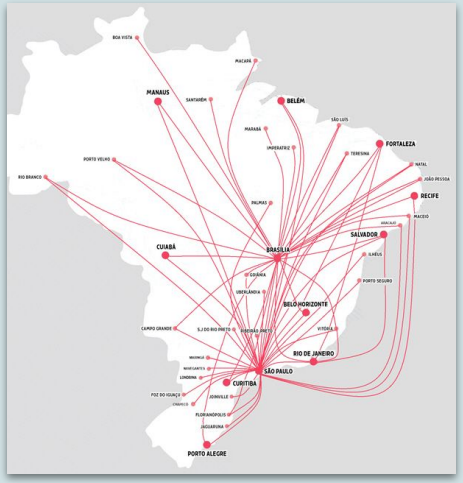
Following Message

1,102 posts **488M** followers **299** following

Leo Messi

Athlete
Bienvenidos a la cuenta oficial de Instagram de Leo Messi / Welcome to the official Leo Messi Instagram account
apple.co/Messigift

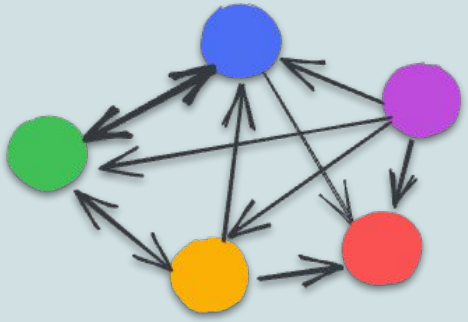

MOS
NAT
JP
SP
SAL
RJ


BOA VISTA
MACAPÁ
MANAUS
SANTARÉM
BELÉM
SÃO LUÍS
MARABÁ
FORTALEZA
IMPERATRIZ
TERESINA
PORTO VELHO
NATAL
RIO BRANCO
JOÃO PESSOA
RECIFE
PALMAS
MACEIÓ
ARACAJU
SALVADOR
CUIABÁ
BRASÍLIA
ILHÉUS
GOIÂNIA
PORTO SEGURO
UBERLÂNDIA
BELO HORIZONTE
CAMPO GRANDE
S.J DO RIO PRETO
UBERABA
VITÓRIA
RIO DE JANEIRO
MARINGÁ
LONDRINA
SÃO PAULO
CURITIBA
FOZ DO IGUAÇU
JOINVILLE
CHAPECÓ
FLORIANÓPOLIS
CRICIÚMA
PORTO ALEGRE

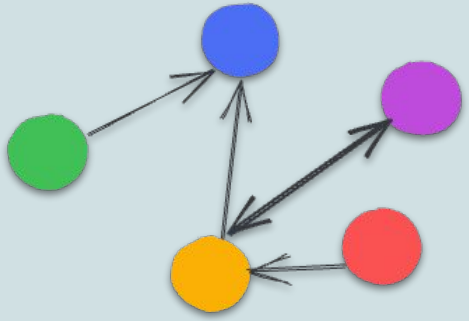
GitHub

https://github.com/kurasaiteja/Whatsapp-Analysis

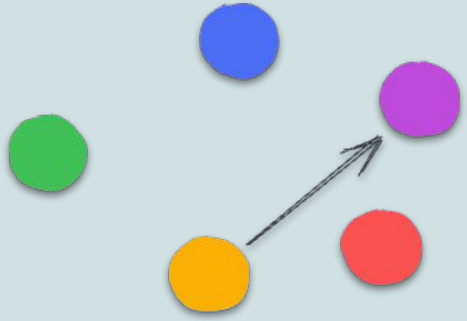
Monday



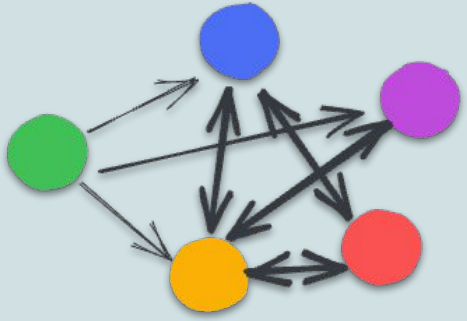
Tuesday



Wednesday



Thursday



Temporal network

Jure Leskovec

FOLLOW

Professor of Computer Science, Stanford University
Verified email at cs.stanford.edu - Homepage

Data mining Machine Learning Graph Neural Networks Knowledge Graphs Complex Networks

TITLE	CITED BY	YEAR
Inductive representation learning on large graphs W Hamilton, Z Ying, J Leskovec Advances in neural information processing systems 30	11796	2017
node2vec: Scalable feature learning for networks A Grover, J Leskovec Proceedings of the 22nd ACM SIGKDD international conference on Knowledge …	10392	2016
How powerful are graph neural networks? K Xu, W Hu, J Leskovec, S Jegelka arXiv preprint arXiv:1810.00826	5536	2018
SNAP Datasets: Stanford large network dataset collection J Leskovec, A Krevl	4054	2014
Friendship and mobility: user movement in location-based social networks E Cho, SA Myers, J Leskovec Proceedings of the 17th ACM SIGKDD international conference on Knowledge …	3468	2011
Graphs over time: densification laws, shrinking diameters and possible explanations J Leskovec, J Kleinberg, C Faloutsos Proceedings of the eleventh ACM SIGKDD international conference on Knowledge …	3137	2005

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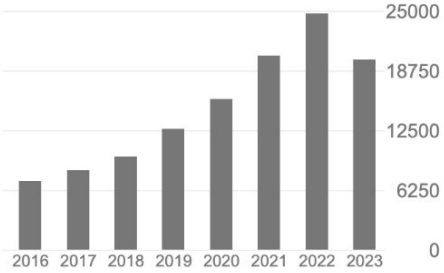

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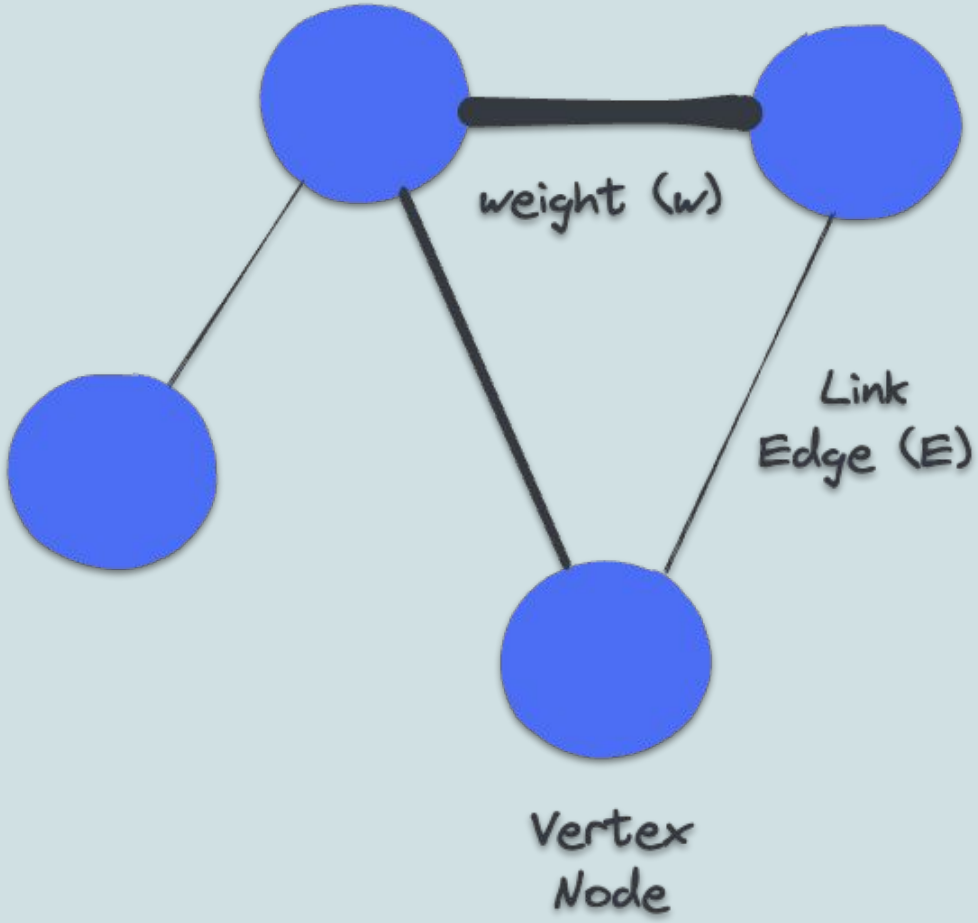
Co-authors

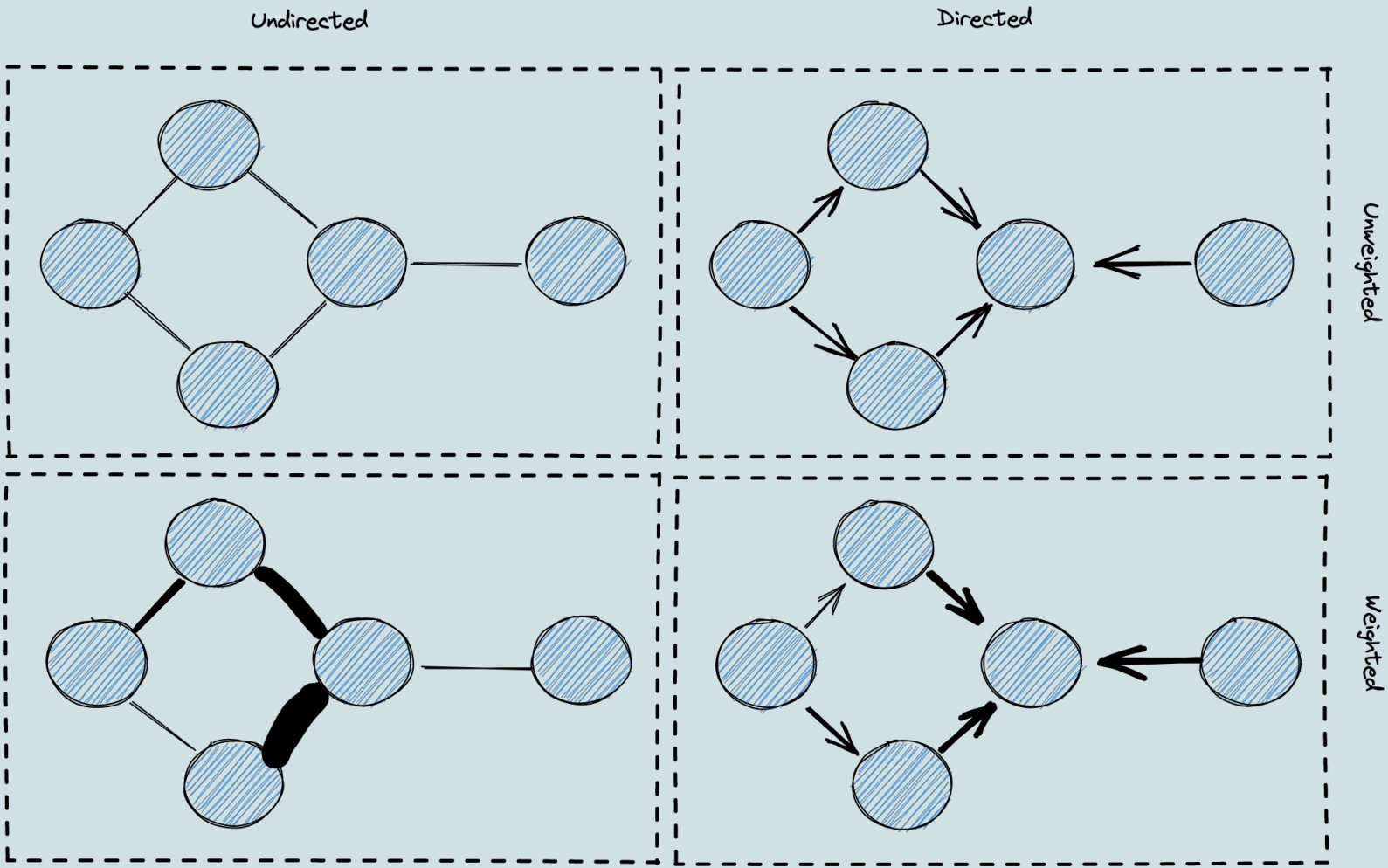


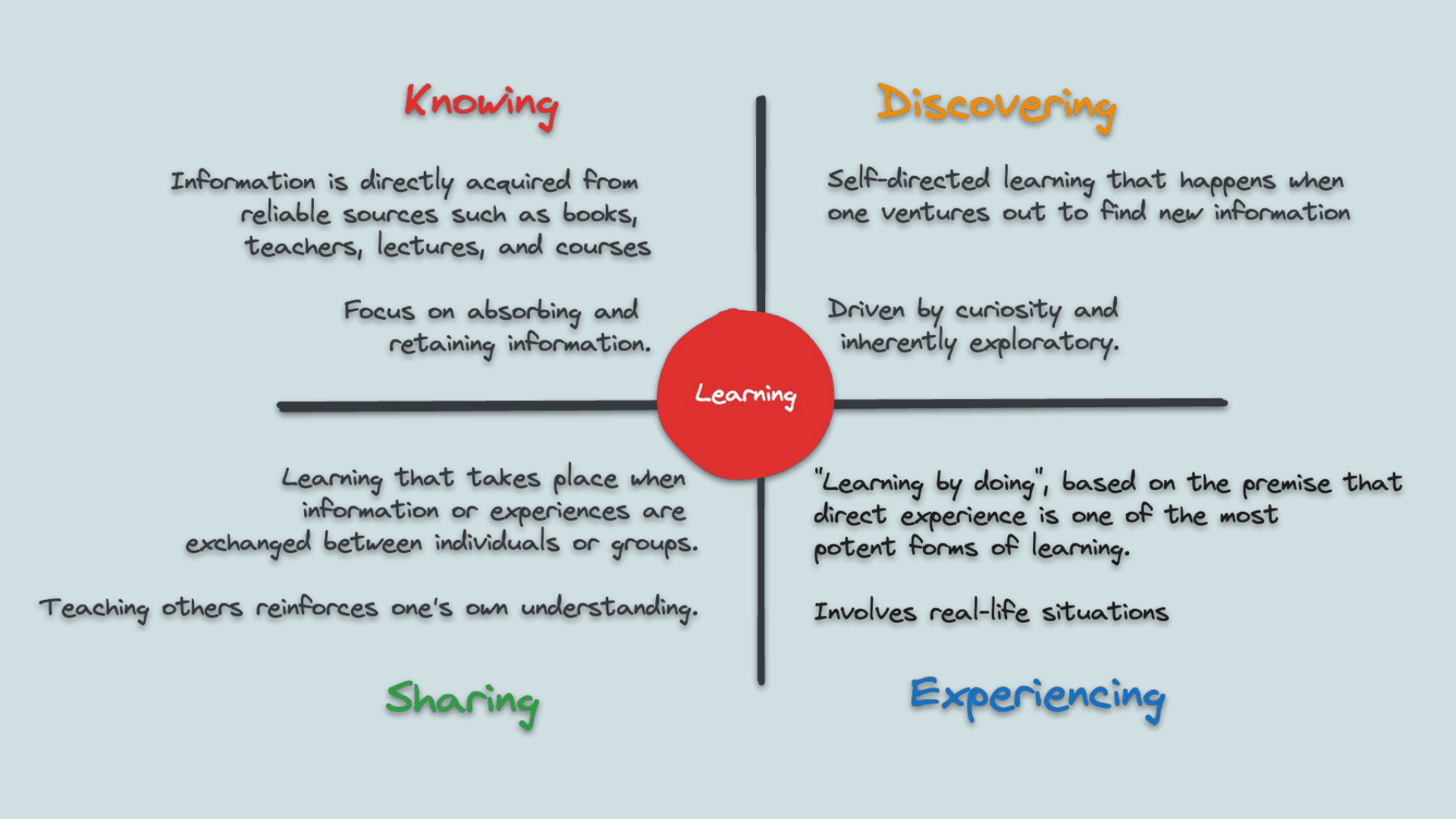
Basic Definitions

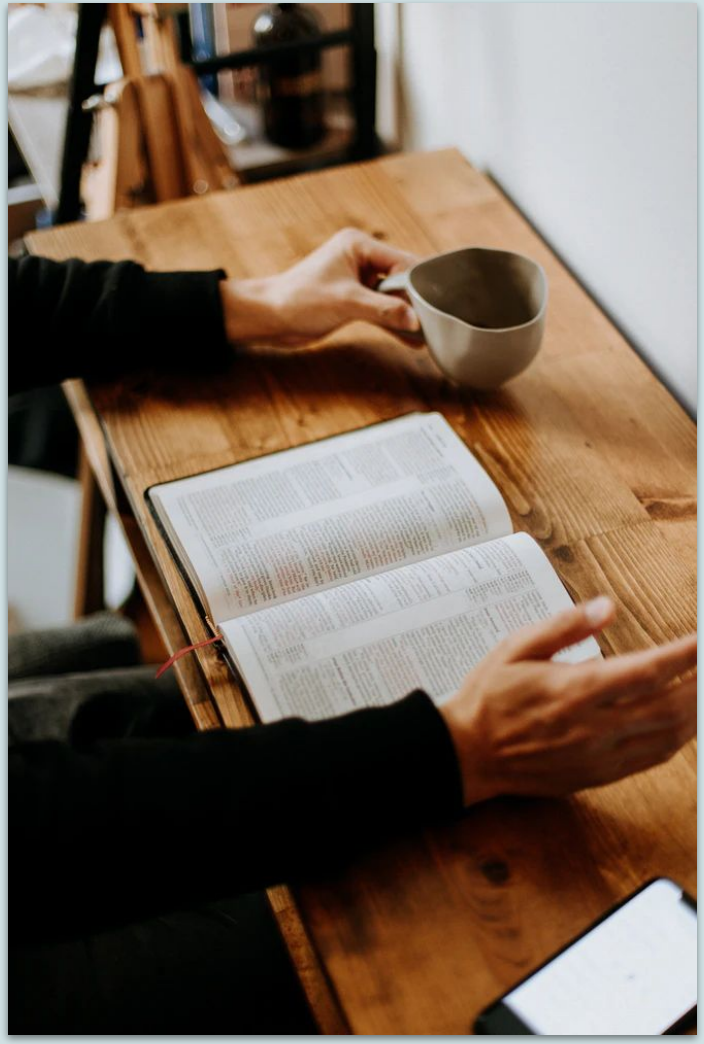
$$G = (V, E, W)$$

$$E \subseteq V \times V$$

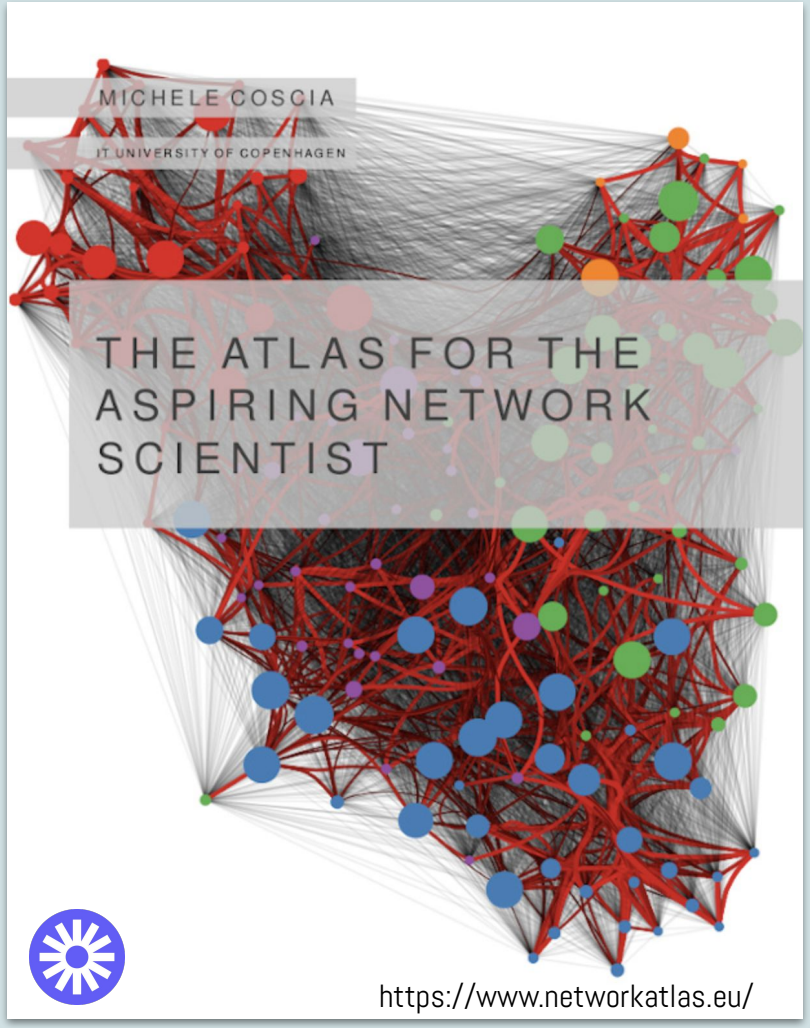
$$W \subseteq R^{+}$$


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.
Discovering
Self-directed learning that happens when one ventures out to find new information
Driven by curiosity and inherently exploratory.
Learning
Learning that takes place when information or experiences are exchanged between individuals or groups.
Teaching others reinforces one's own understanding.
Sharing
"Learning by doing", based on the premise that direct experience is one of the most potent forms of learning.
Involves real-life situations
Experiencing



Further Reading



Contact

Mailing list
Issue tracker
Source

Releases

Stable (notes)

3.1 — April 2023
Documentation

Latest (notes)

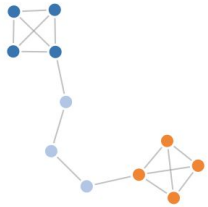
3.2 development
Documentation

Archive

NetworkX

Network Analysis in Python

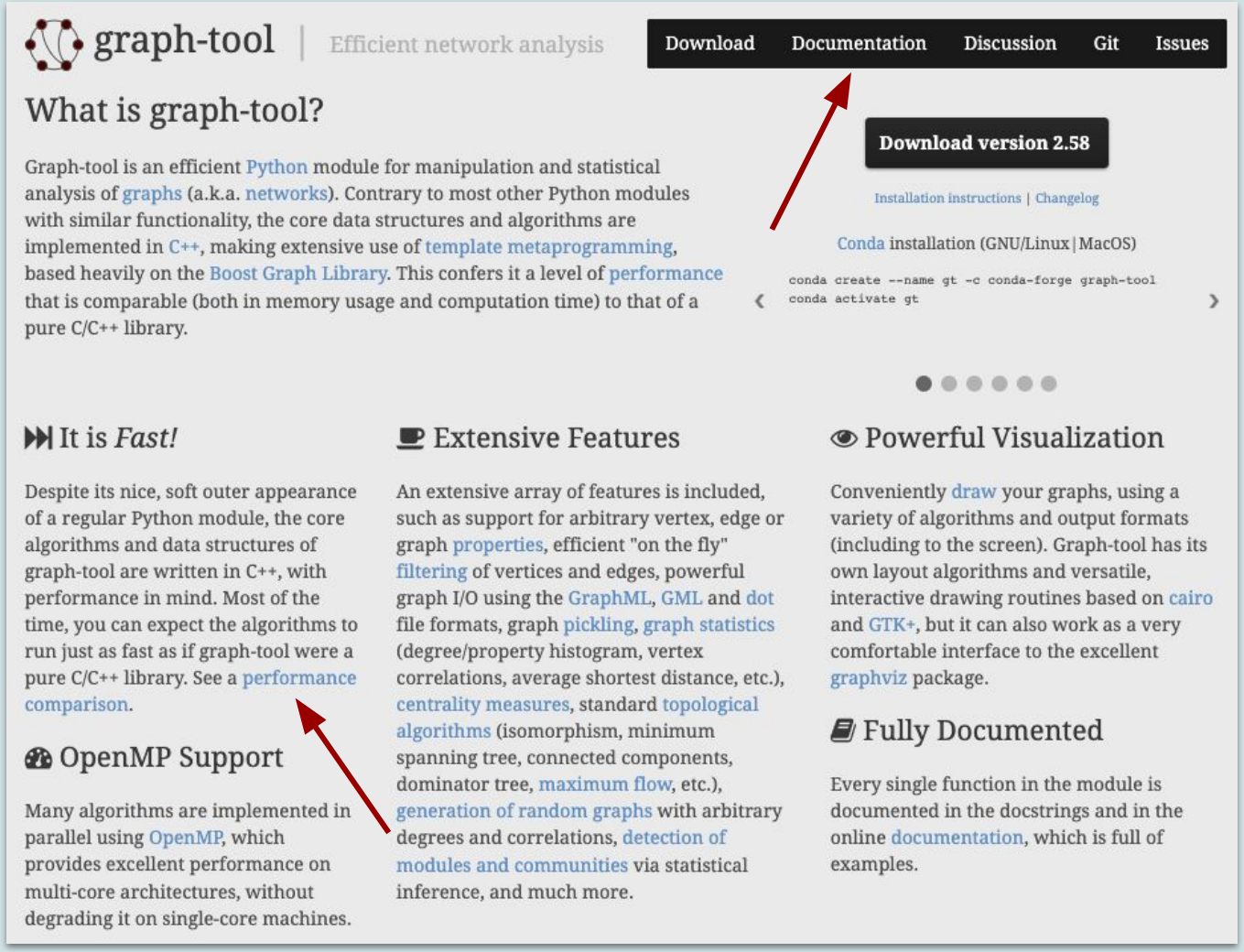
NetworkX is a Python package for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks.



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

https://networkx.org/



https://graph-tool.skewed.de/