Algorithms and network analysis to analyse disinformation: The Toffee project experience

Fabio Saracco, IMT Lucca

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Fabio Saracco, IMT Lucca

@__Sarawalk__
on Twitter

TOols for Fighting FakEs

Intra-Institute project encouraging the collaboration among different disciplines

Prof. De Nicola
(coordinator)
IMT
Computer
Scientist

Prof. Caldarelli

IMT
(Statistical)
Physicist

Prof. Crimaldi

IMT

Mathematician

Dr. Petrocchi

IIT, CNR
Information
Engeneer

TOols for Fighting FakEs

http://toffee.imtlucca.it

Design, develop and test a **toolkit** to offer users specific guarantees of reliability, credibility, and trustworthiness about the information circulating on the web and on online social media.
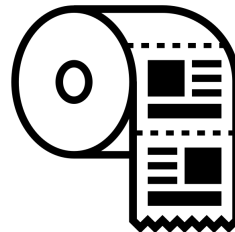
Increase people's confidence on the data they get and about who they follow while minimizing the risk of **false information** and malicious actions.

Our reputation tool will be made publicly available and offer a **reputation score for news and peers** by relying on the outcome of the application of different techniques
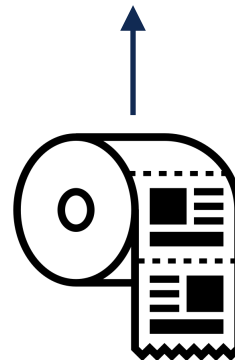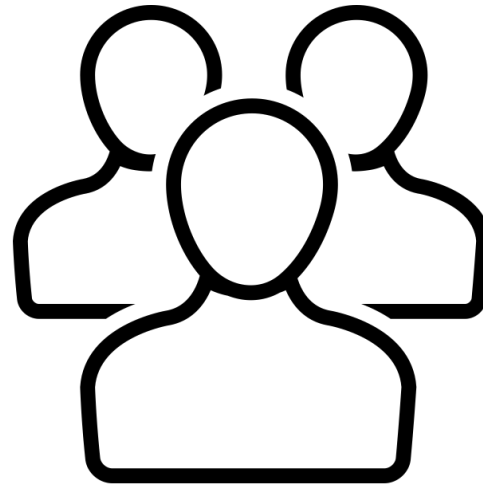
No censorship!

Fake content

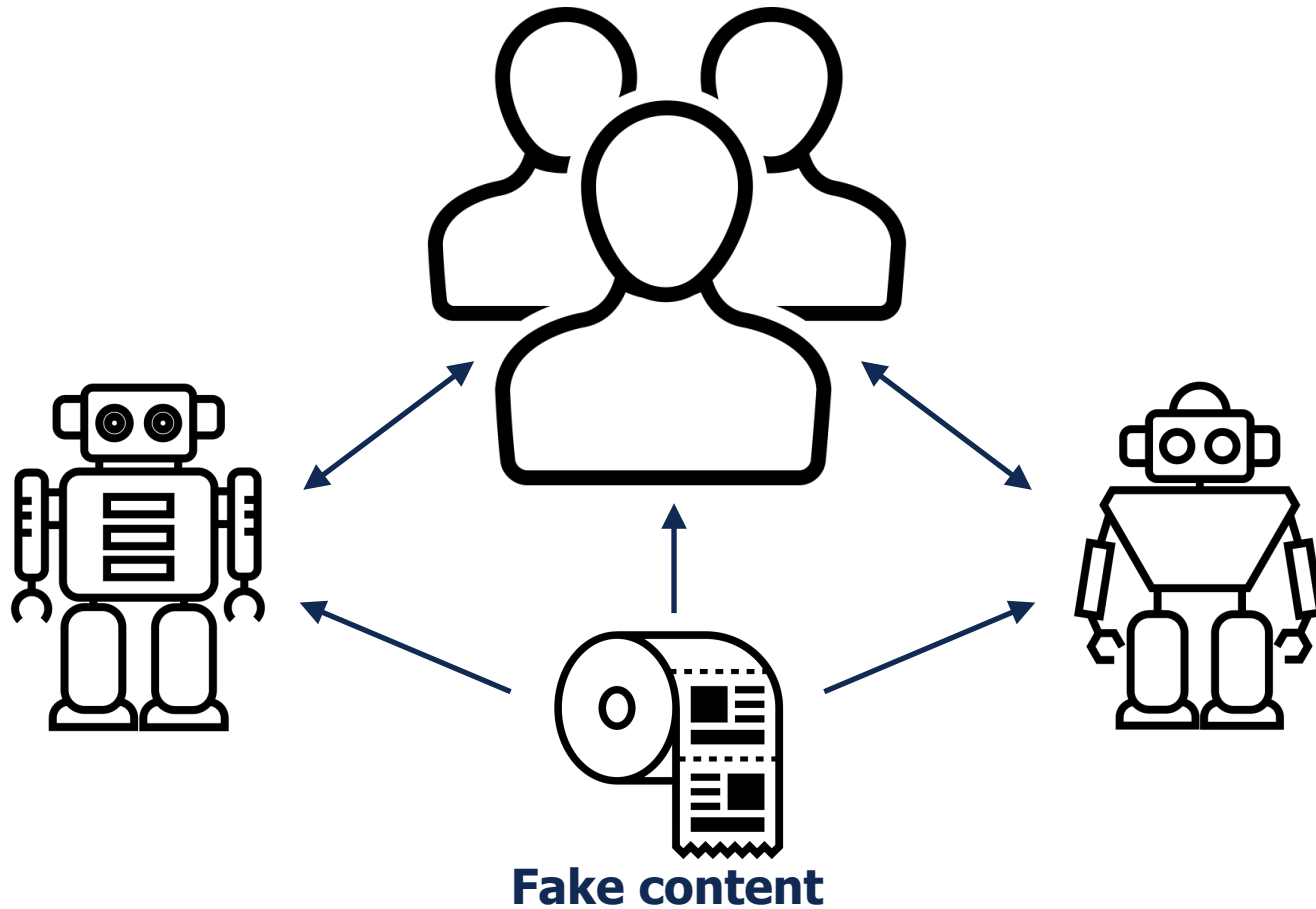**Fake content**
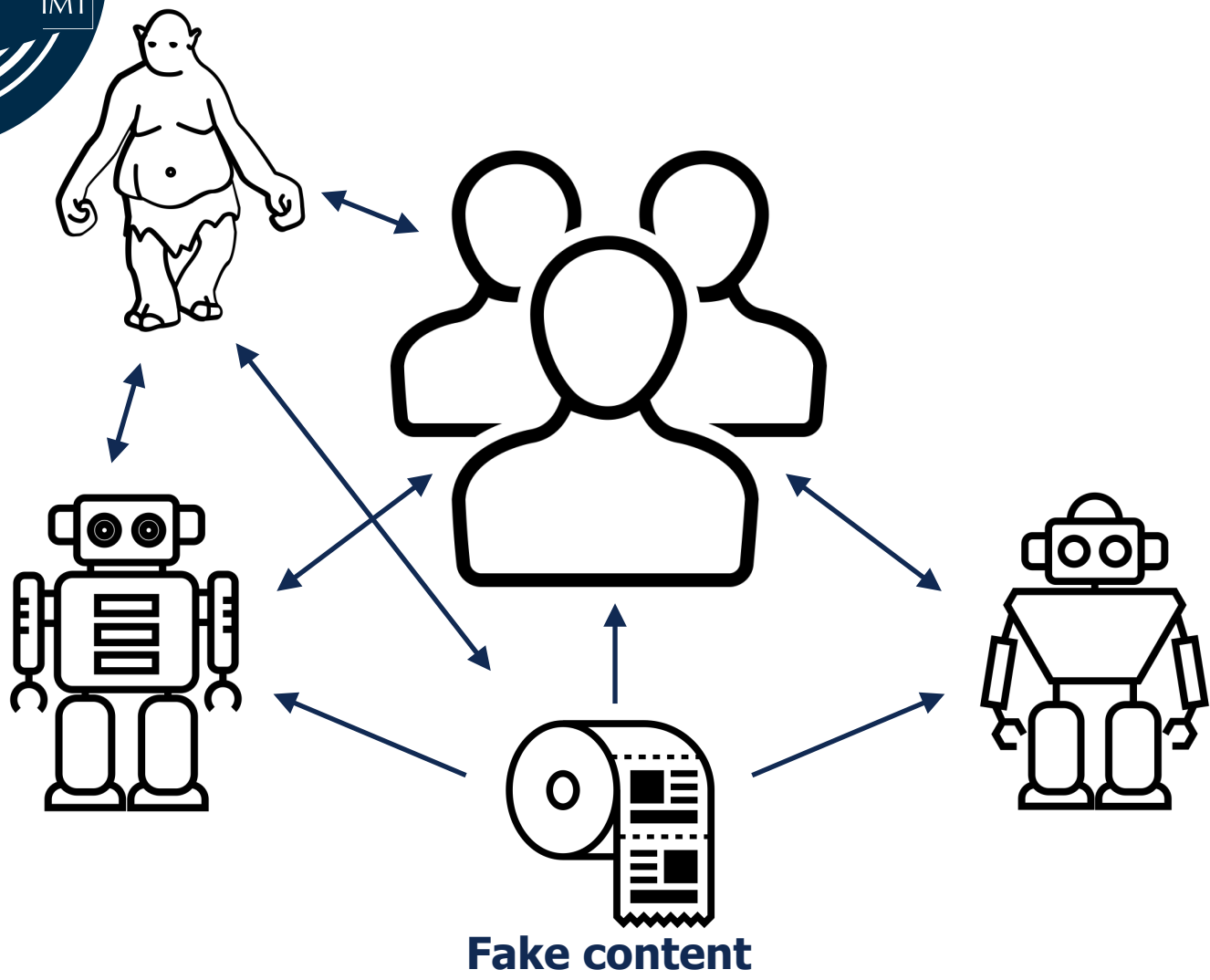
Fake content

TOFFEE in brief

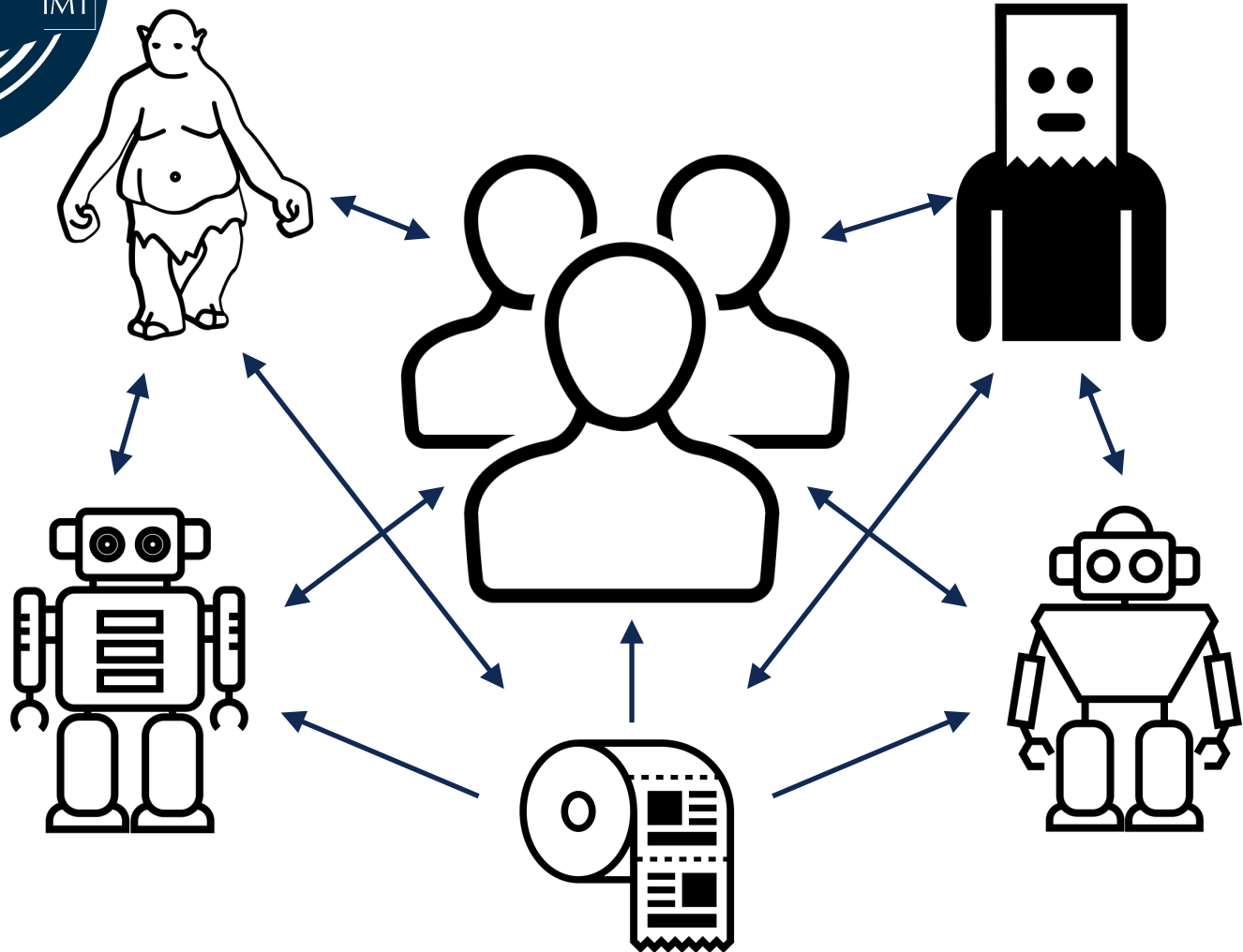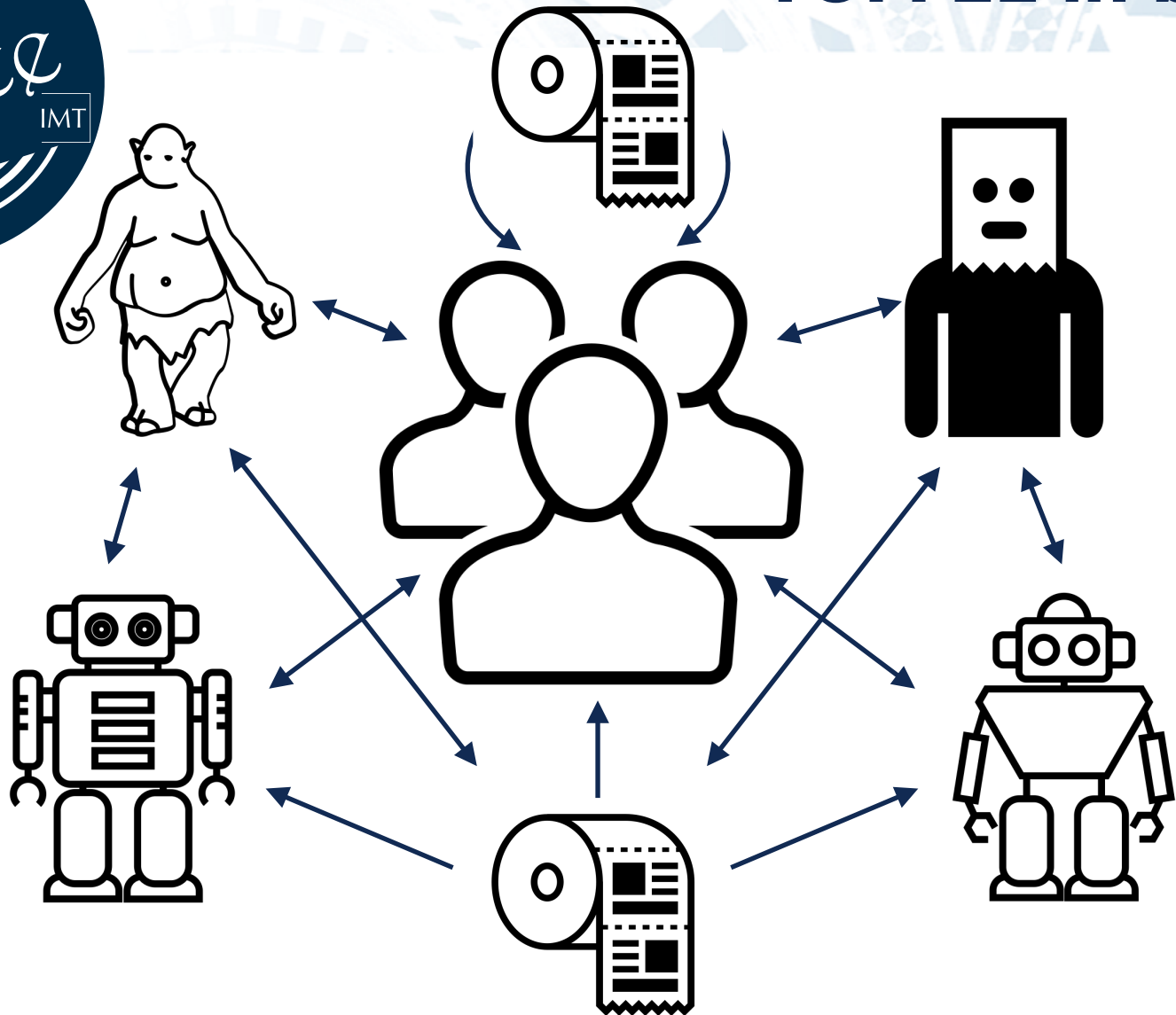Fake content

Fake content

TOFFEE in brief

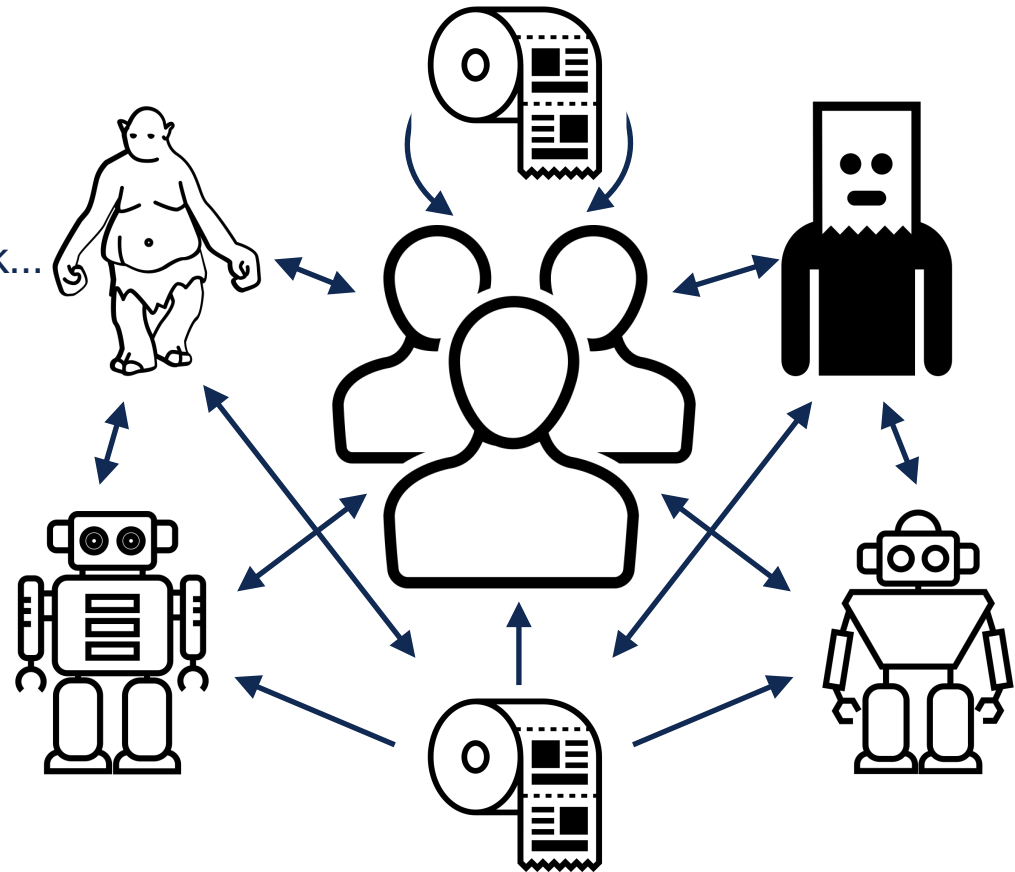Fake content

TOFFEE in brief

Capture the role of every character in the system

From Complex Networks studies:
network filtering from noise,
role of different characters in the network...

From Statistics:
inferring causal relations

From Computer Science:
machine learning detection of
bots, target of fake news...

From Linguistic:
sentiment analysis

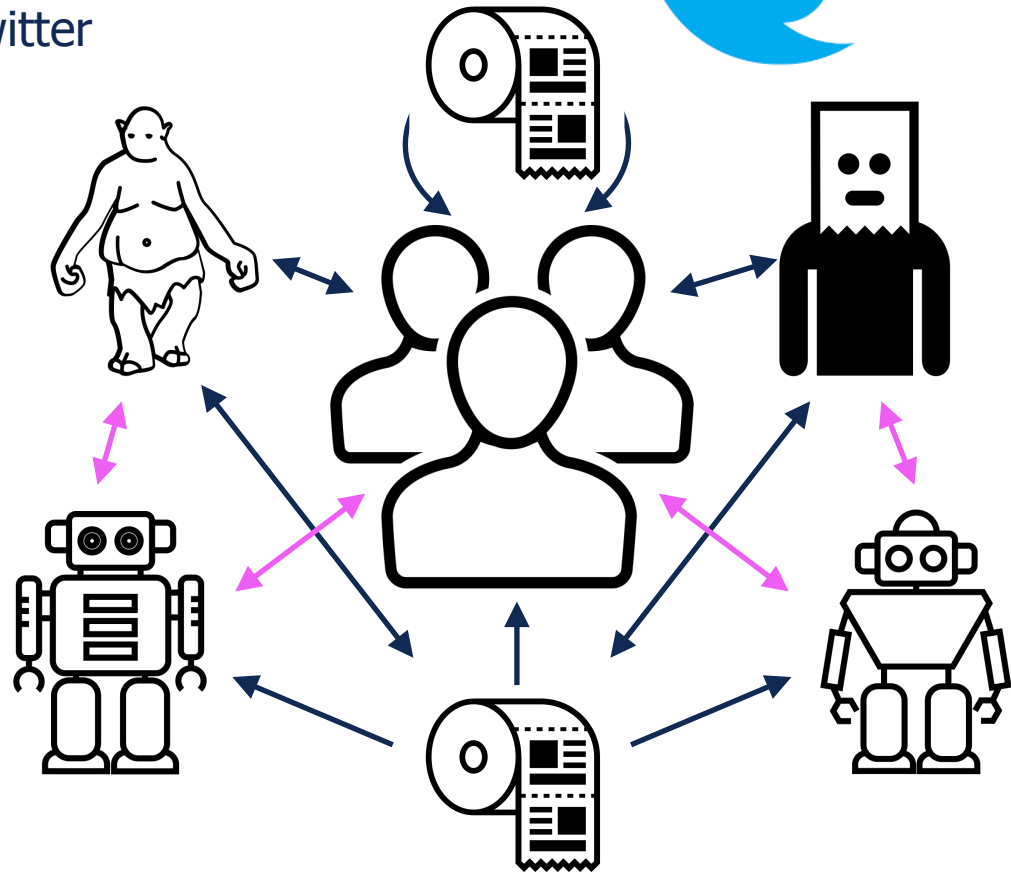# Network validation + bot detection

F. Del Vigna, G.Caldarelli, R. De Nicola, M. Petrocchi, **FS**

Target: the effective role of automated accounts in the political debate on Twitter

Tweets: 23rd January 2019 - 22nd February 2019

Keywords: *immigrati, migranti, scafisti, ong, seawatch, barconi, clandestini, guardia costiera libica, naufragio, sbarco* (in Italian)

Toffee IMT — Tools for Fighting Fakes

Network validation + bot detection

F. Del Vigna, G. Caldarelli, R. De Nicola, M. Petrocchi, **FS**

Inferring political membership directly from data

The intuition: the *membership* of a user to a certain political ideal can be inferred by her/his *connections*.

The problem: we do not have the information about all users, but we have for **verified ones!**

Entropy-based method to project the information of the interaction on the set of verified users set
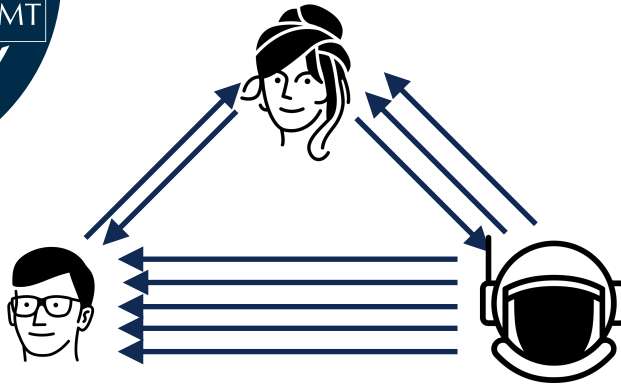
Democratic Party

• Ministers
• Right-wing parties
• Movimento 5 Stelle
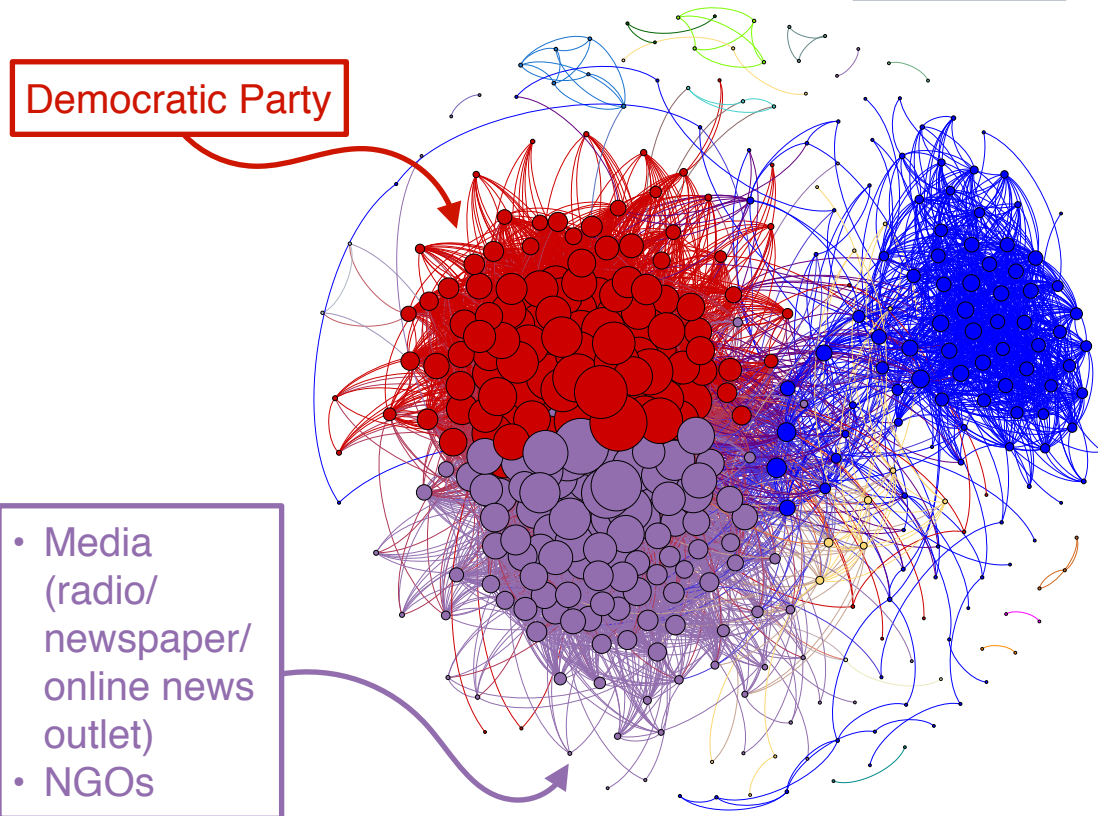
• Media (radio/newspaper/online news outlet)
• NGOs

Toffee IMT
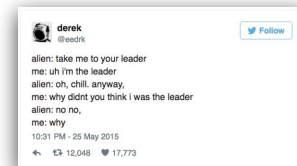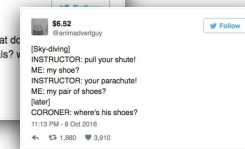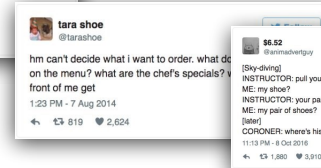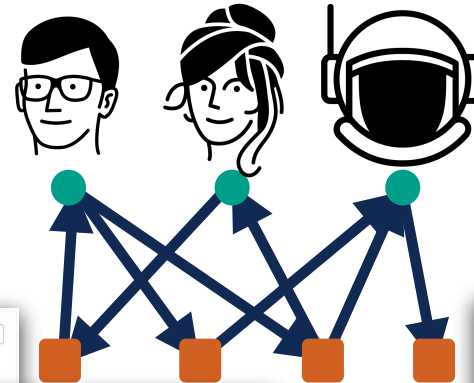Tools For Fighting Fakes

The effective flow of contents

Standard analysis

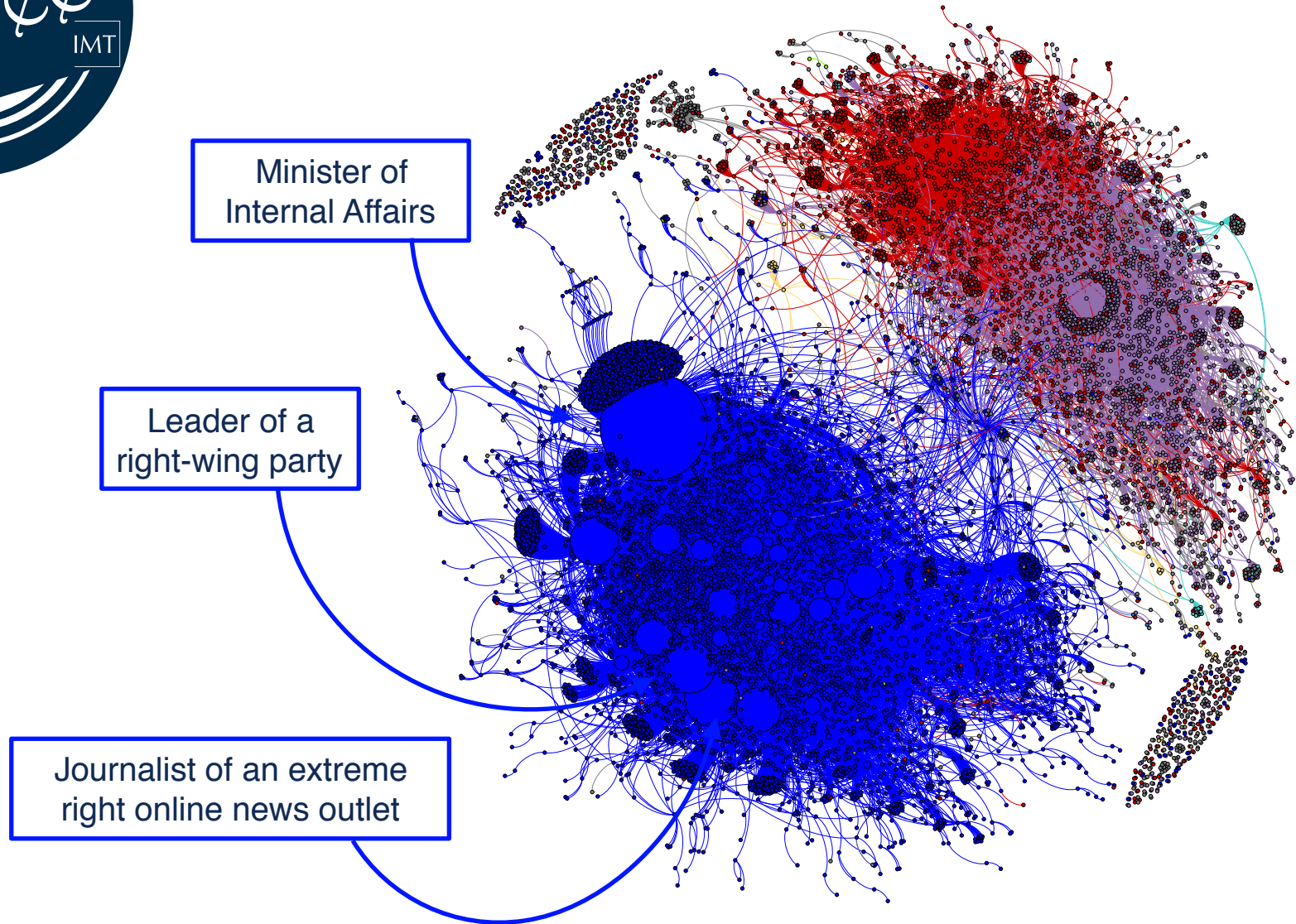- Directed monopartite network among users
- The weight is give by the number retweets

Bovet, Makse, Nature Communications, 2019
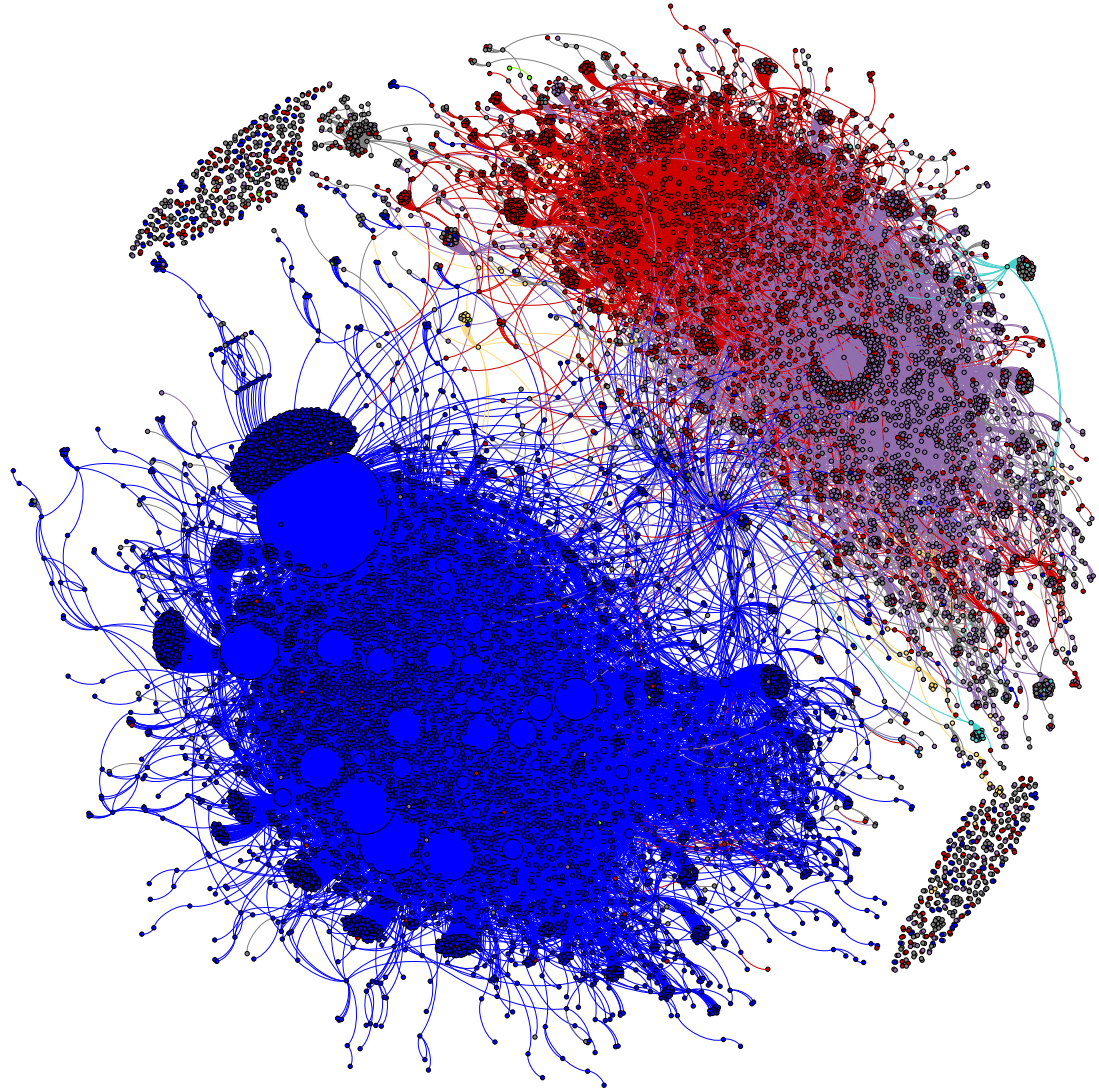
Our analysis

- Consider even the *virality* of tweets

The effective flow of contents

Minister of Internal Affairs

Leader of a right-wing party
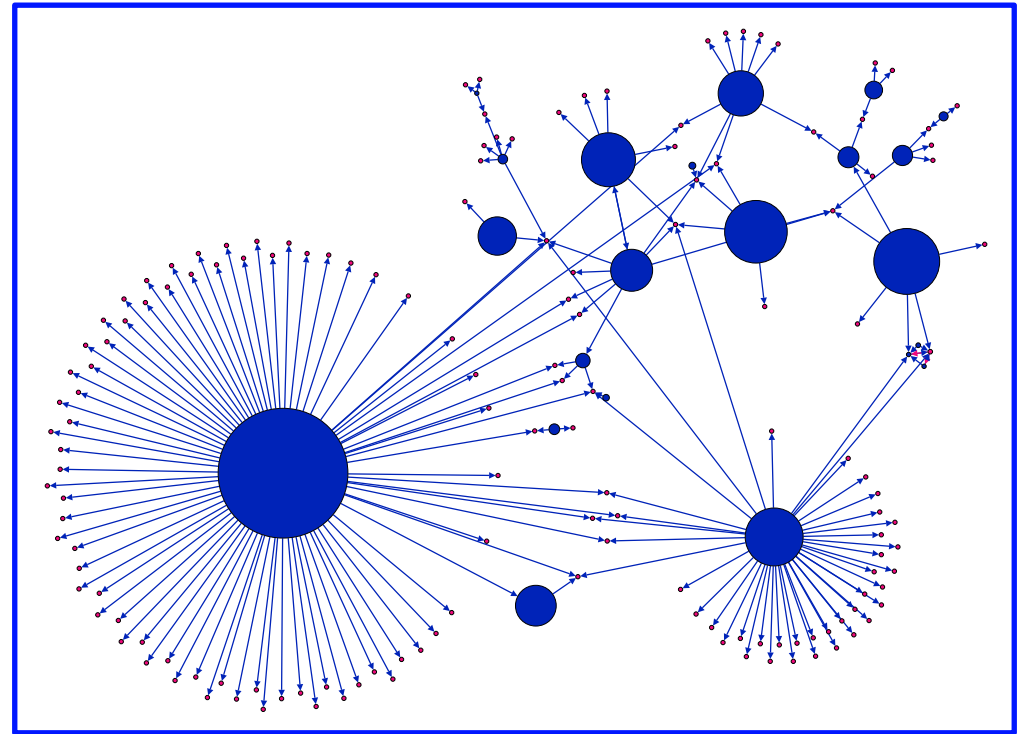
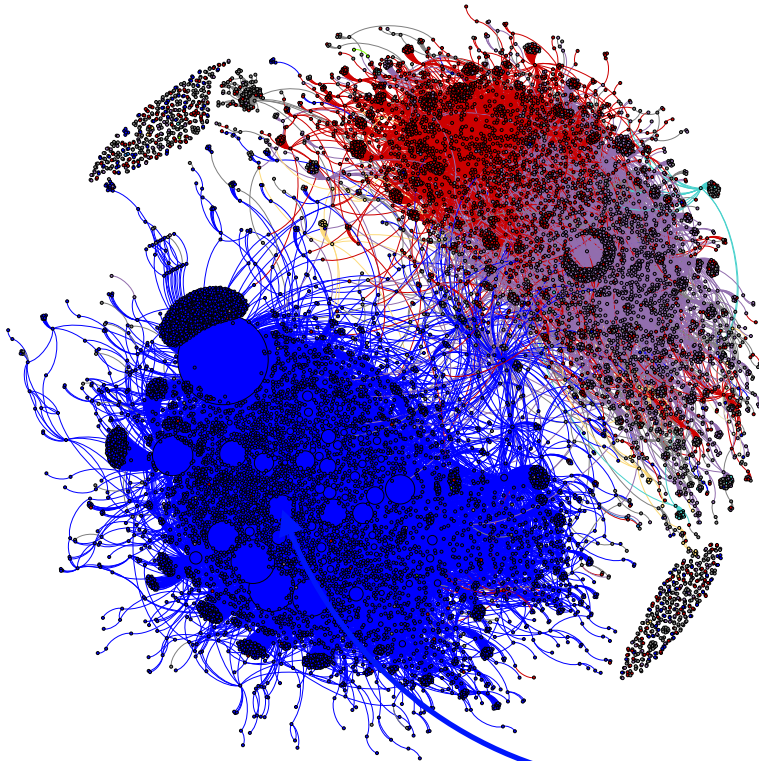Journalist of an extreme right online news outlet

But so, the bots?

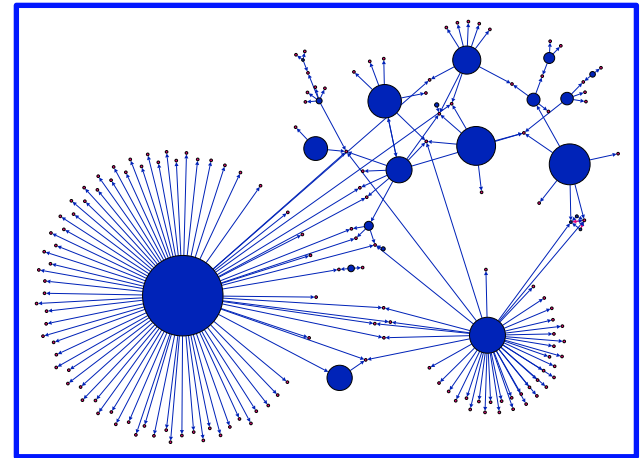# The effective flow of contents
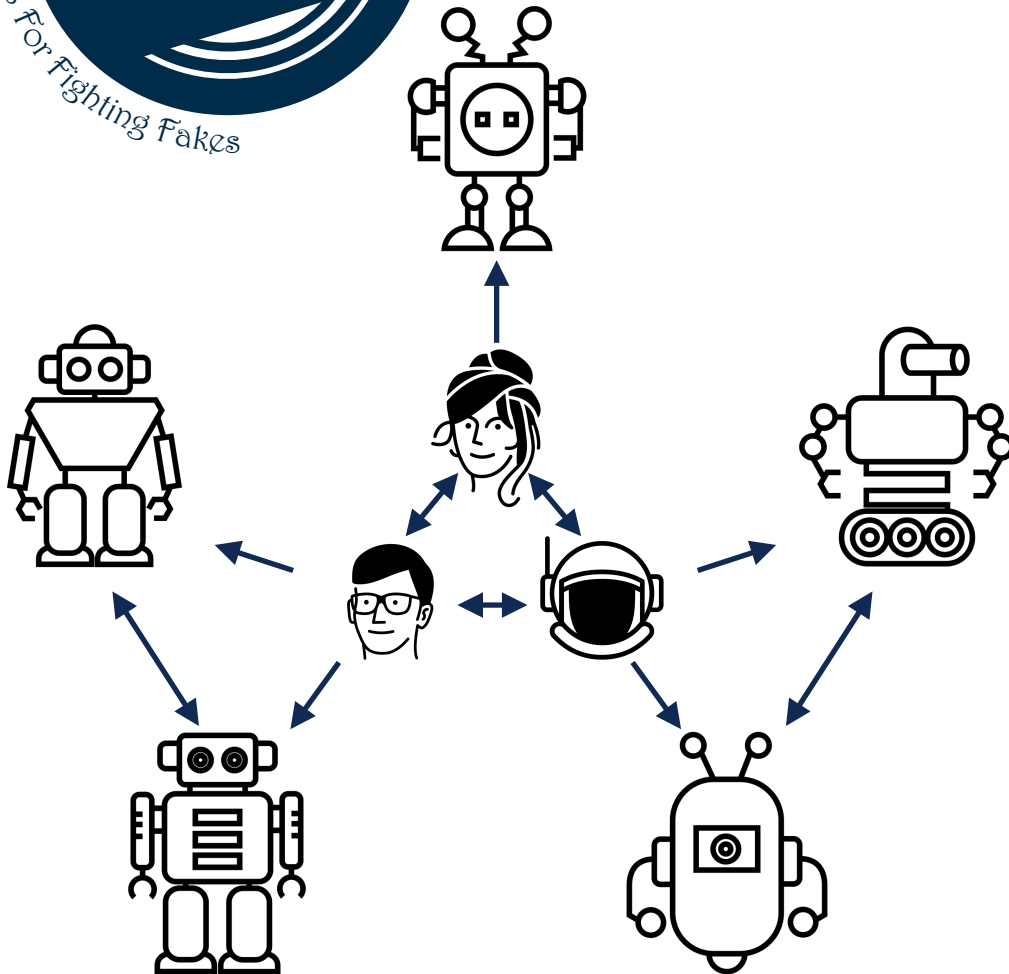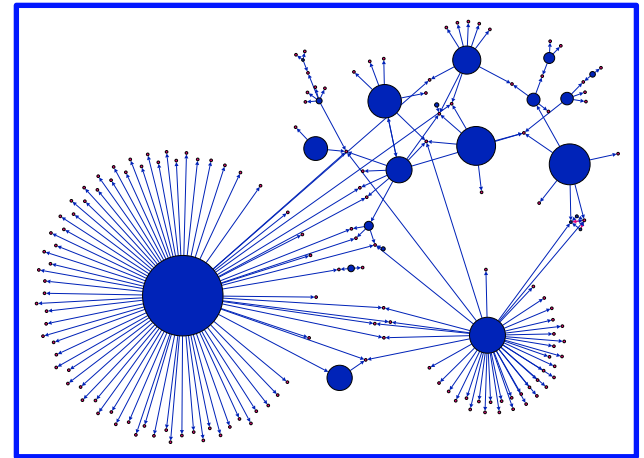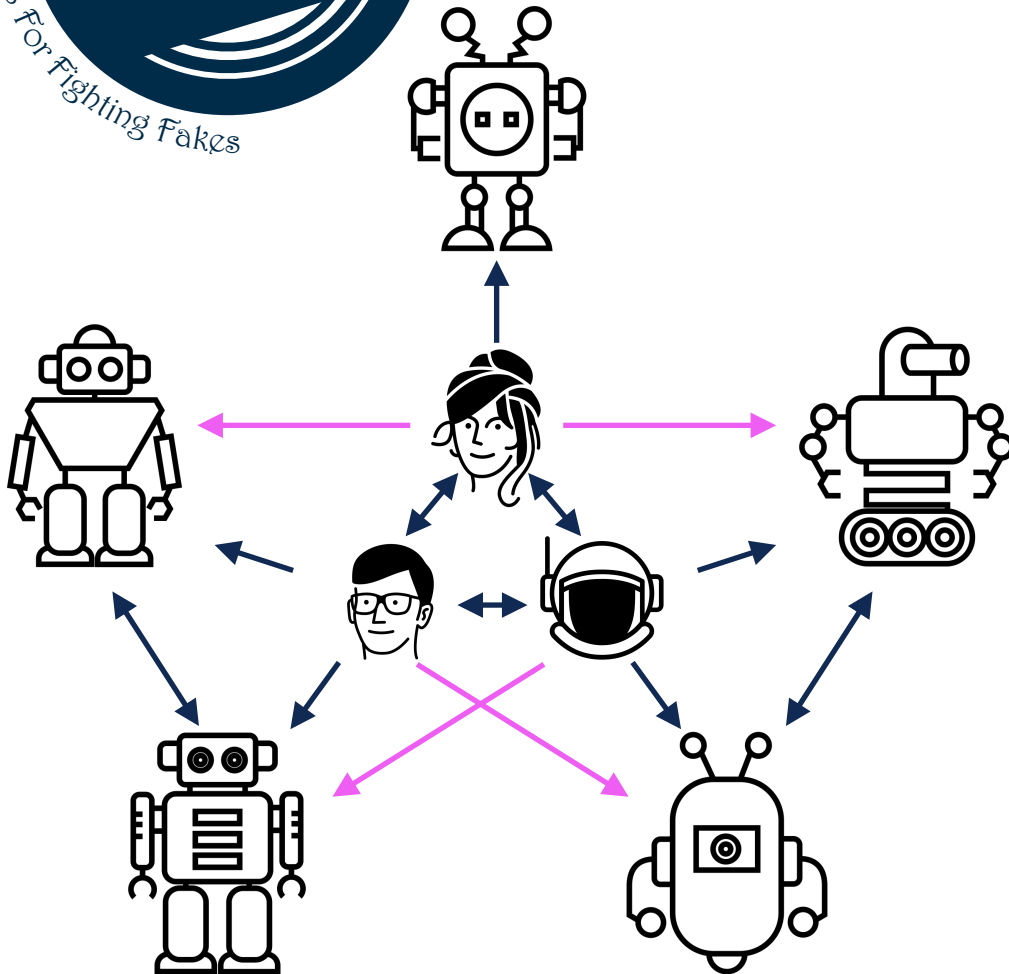
But so, the bots?

A "squad" of common bots
shared among the most effective nodes
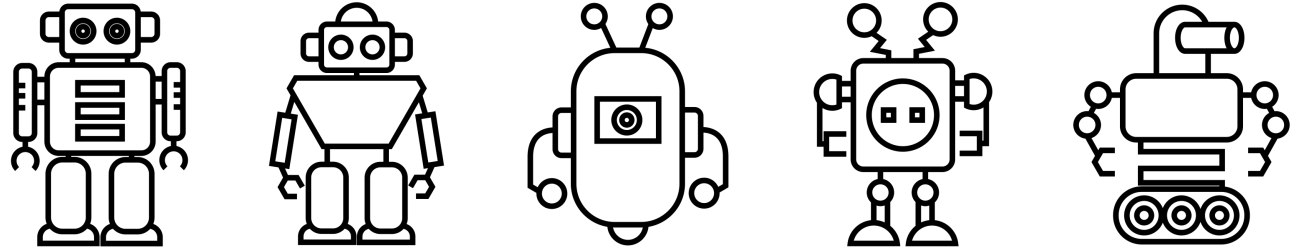
The effective flow of contents

But so, the bots?

A "squad" of common bots
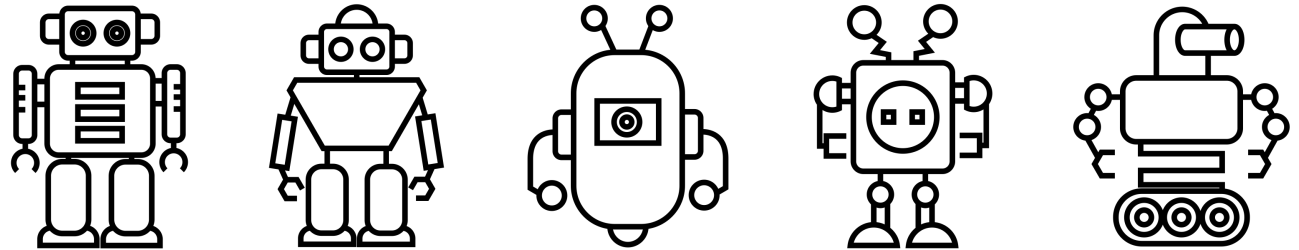shared among the most effective nodes

The effective flow of contents

But so, the bots?

A "squad" of common bots
shared among the most effective nodes

- Extend the analysis to **other subjects** and **other countries**;
- **Sentiment analysis** on the exchanged messages;
- Analysis of the **trustfulness of retwitted sources**;
- Inference of **causal ties** between effectiveness and bot presence…

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- **Sentiment analysis** on the exchanged messages;
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Thanks for the attention!