



International topic distribution in the HCQ controversy on Twitter

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Data

- 35M French tweets
768k Users
Topics: **COVID & HCQ**
Extracted countries from user information (380k users)
Time frame:

Search Question

How international is the controversy on HCQ?

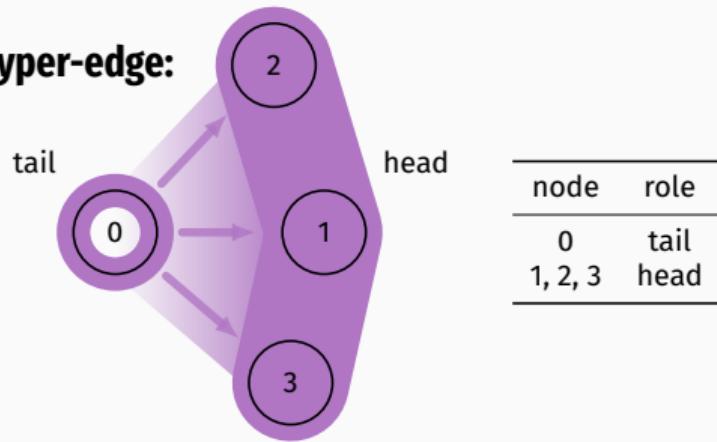
ected using keyword search and stream APIs 💀

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Dynamics on hypergraphs

Hyper-edge:



Hypergraph: $\{N, E\}$: nodes and hyperedges

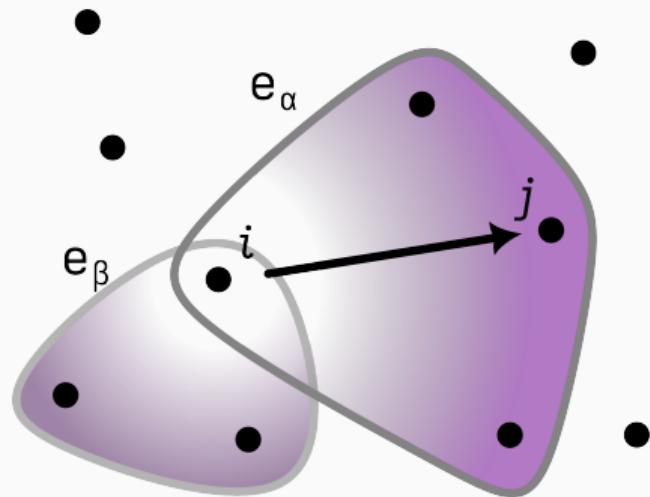
Nodes: same as before

Hyperedges: $e_\alpha = \{\text{tail}, \text{head}\} \in E$

Random walker on a hypergraph

The walker

- sits on a node i
- chooses a hyperedge e_α incident on i in its tail (user i tweeted α) with probability dependant on the hyperedge size (with parameter τ);
- chooses an exit node j from the head of e_α (α get retweeted by user j) with flat probability.



International flow

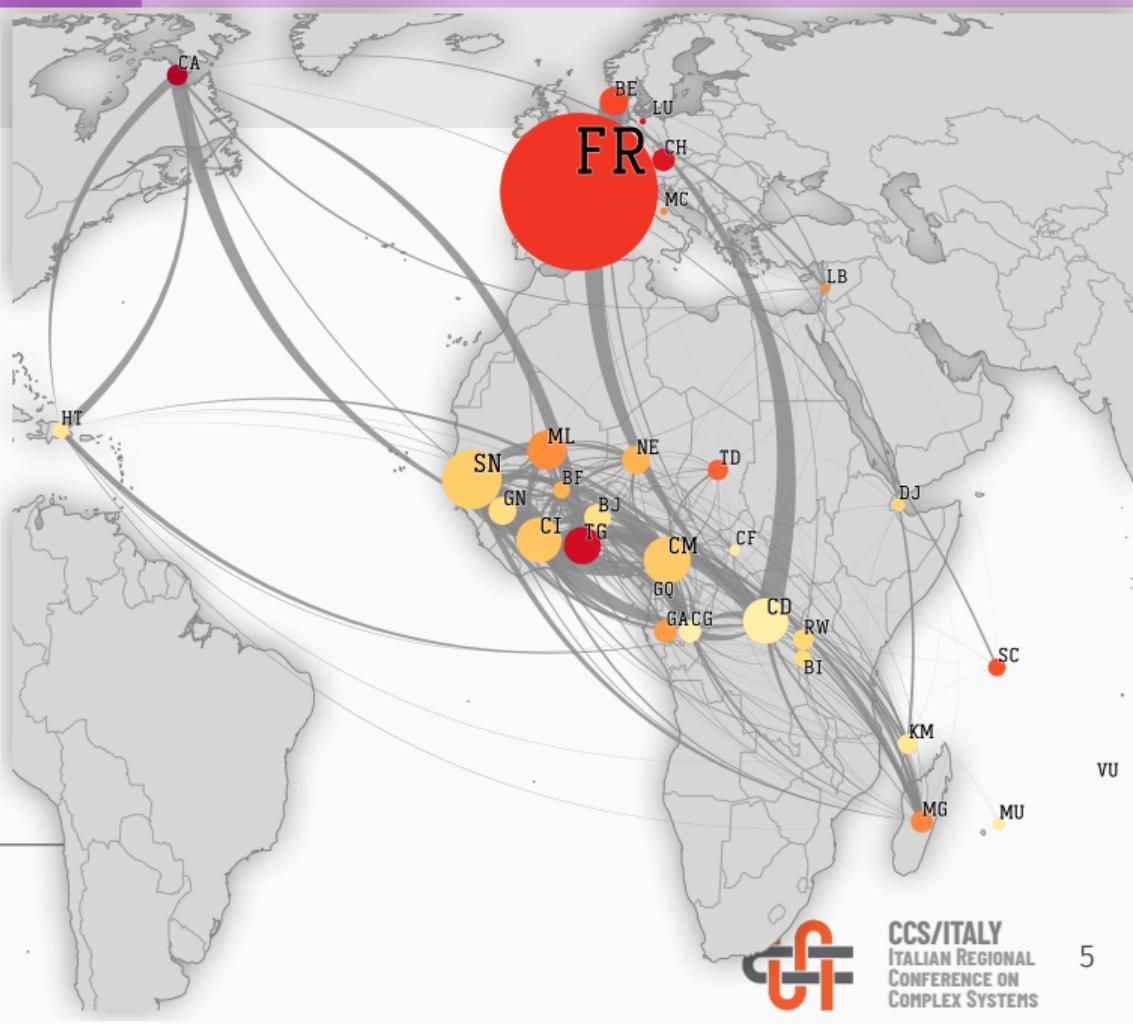
Transfer probability
between countries in the
hypergraph model.

Only **HCQ**.

Relative strength of the HCQ
component: *where we speak
about HCQ?*

Only links with more than expected strength.

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Trapping probability

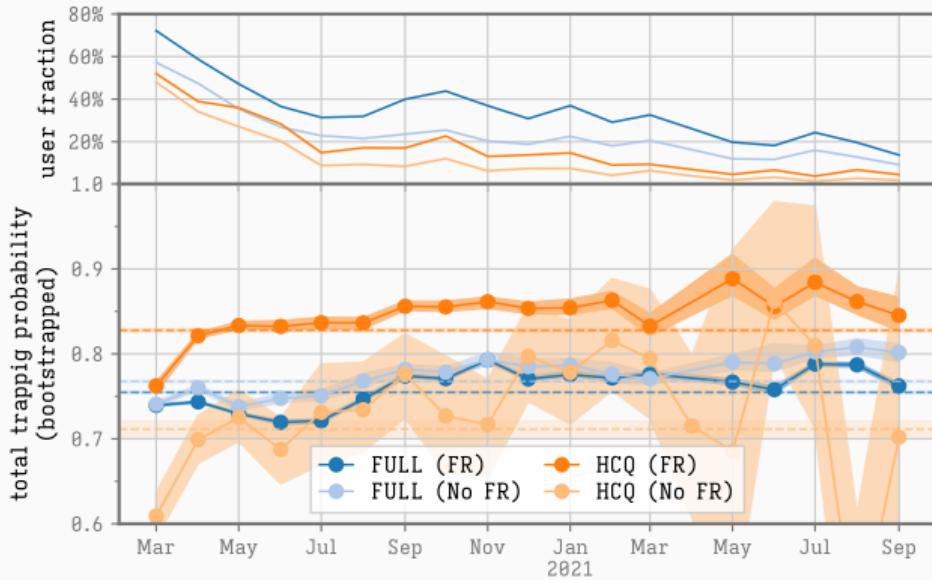
Probability that a tweets diffuse to the **same country**; in different scenarios.

$$p_{\text{trapping}} = \sum_c p(C_{t+1}|C_t)$$

HCQ trapping probability

HCQ have a higher trapping probability when including tweets from France.

French tweets do not diffuse to other countries.



Topic dynamics.

Non-negative Tensor factorization

Dataset: **COVID** \cup **HCO**.

Tensor: **hashtag co-occurrence**
disaggregated by **time** or **space**.

Approximate to **R** components:

$$t_{ijk} \approx \sum_{r=1}^R a_{ir} b_{jr} c_{kr}$$

$a_{ir} \rightarrow N_H \times R$ hashtag

$b_{jr} \rightarrow N_H \times R$ hashtag

$c_{kr} \rightarrow N_D \times R$ time or space

A set of non-negative matrices that account for the strength of association to a component.

Temporal decomposition

The three dimensions are
hashtag, hashtag and time.

A3 the only HCQ related
topic/component

No France no HCQ related
topic/components (many
component related to local
events)



Space decomposition

The three dimensions are
hashtag, **hashtag** and **country**.

C2 C4 D1 D3 HCQ related
components

countries most involved : France,
Canada, Switzerland
Luxembourg, Belgium

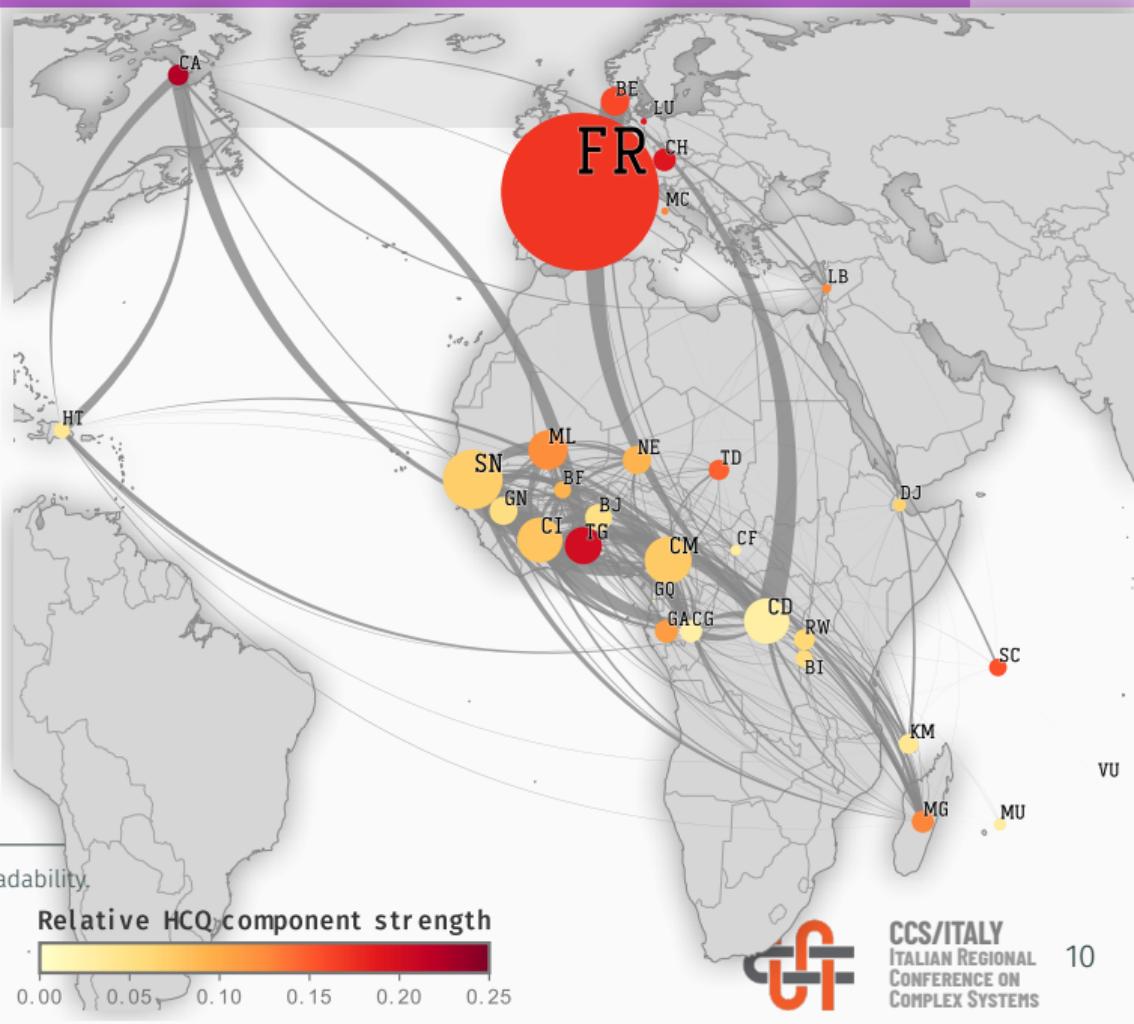


Is HCQ debate international?

HCQ components distribution

HCQ components are mainly localized in Europe and Canada

Some West African countries, e.g. CD, include HCQ into the public health protocols.



 Finally...

Questions?

Joint work with:



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Jeremy Ward



Emilien Schultz



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Data at:

↗ <https://github.com/maurofaccin/DataCovHCQ>

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