



Exploring the Twitch Community

Social Network Analysis Project

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What is Twitch

- **Streaming platform:** Twitch is a platform where users can broadcast live streams (e.g. video-games streams, music broadcasts, creative contents)
- **Extremely popular platform:** 15 million daily active users (February 2020)
- **Underlying social network:** users can follow each other.

Aim of the project

- Explore the characteristics of Twitch networks within and across countries:
 - Does Twitch exhibit the characteristics of a social network?
 - Do the networks of different countries differ?
- Identify the communities
 - Can we identify communities inside same-language-speaking networks?
 - How can we characterize these communities?

Dataset description

- **Largest connected component** of the Twitch social network retrieved through the public API in 2018 (snowball sampling) and divided by countries. For the purposes of this analysis, only the three biggest networks have been compared: UK, Germany, Spain.
- **Filtering of nodes and edges¹**
 - No missing attributes
 - Mutual edges
 - Member of the largest component
- **Vertex attributes:**
 - Mature account (Categorical)
 - Affiliate Status (Categorical)

Networks Description

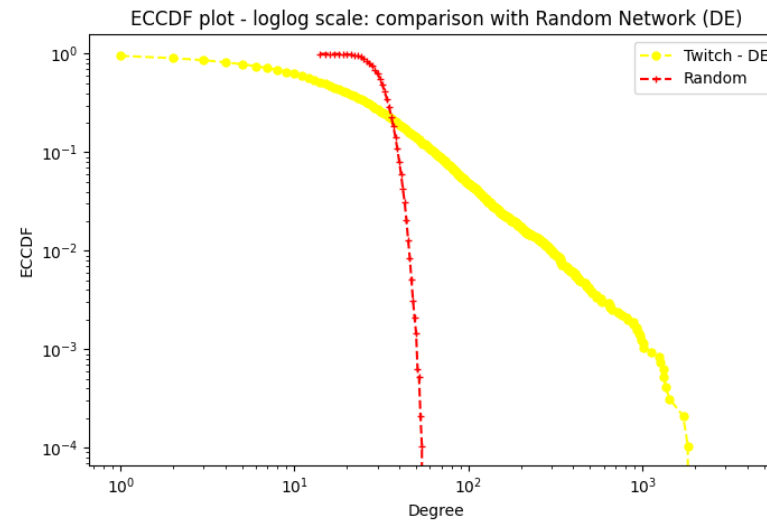
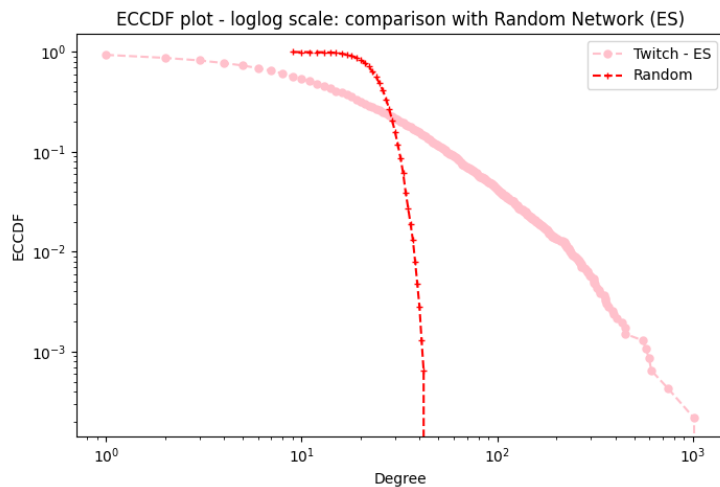
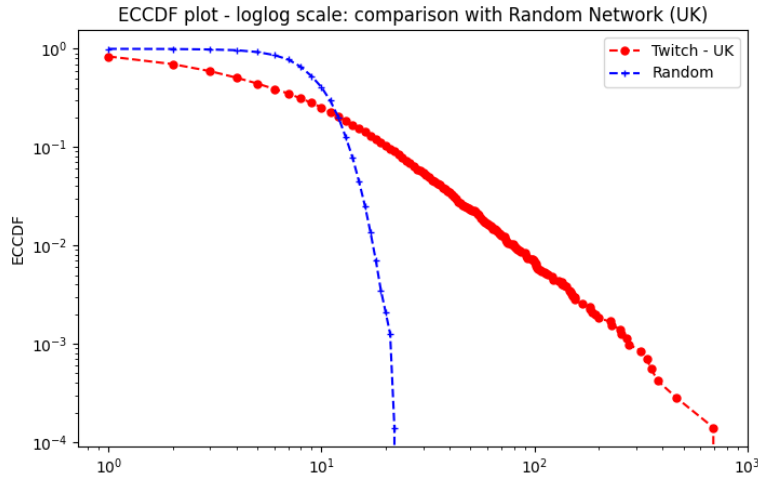
- **Nodes** represent Twitch users
- **Edges** represents mutual following relationships between users

Language	Nodes	Edges
EN	7126	35324
DE	9498	153138
ES	4648	59382

Key network characteristics

Language	Min degree	Max degree	Mean degree	Std deviation	Median degree	Density	Avg Shortest Path
EN	1	720	9.91	22.19	5	0.00139	4
DE	1	4259	32.25	84.80	15	0.00339	3
SP	1	1022	25.55	49.39	12	0.00549	3

Degree distribution



- The quasi-linear plot of the ECCDF indicates that, differently w.r.t. a random network, the degree distribution follows a **power law**.
- With respect to degree distribution, Twitch seems to be a proper **social network**!

Assortativity

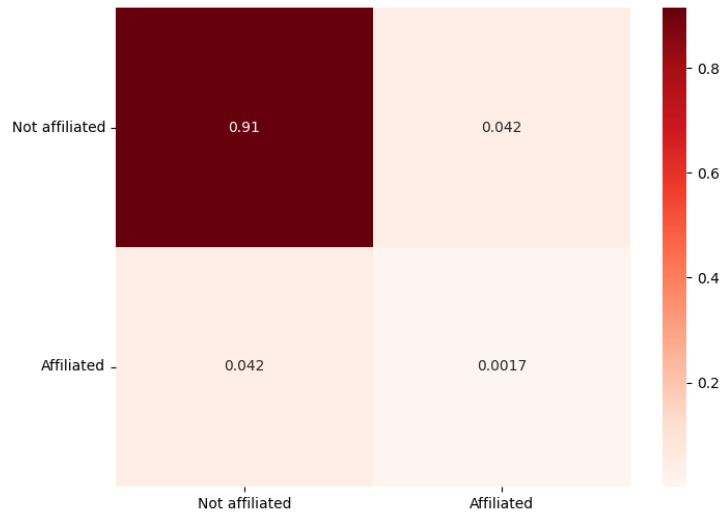
Language	Degree Assortativity	Attribute assortativity - Affiliate	Attribute assortativity - Mature
EN	-0.1219	-0.0048	-0.0114
DE	-0.1152	-0.0015	-0.0032
SP	-0.1890	-0.0013	-0.0031

- **Negative degree assortativity** indicates that popular users are mostly connected to unpopular ones and vice versa. Atypical for social networks (FB: 0.226)²!
- **Negative attribute assortativity** w.r.t. affiliation and maturity attribute
- **Hypothesis**: popular users –who are more likely to be affiliate and mature- do not follow each other, but instead compete in the »streamers market«

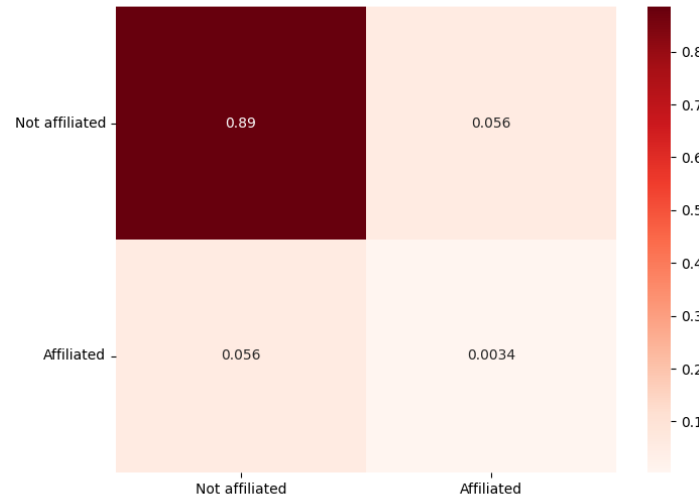
² Ugander, J., Karrer, B., Backstrom, L., & Marlow, C. (2011). The anatomy of the facebook social graph. arXiv preprint arXiv:1111.4503.

Assortativity – Further analyses

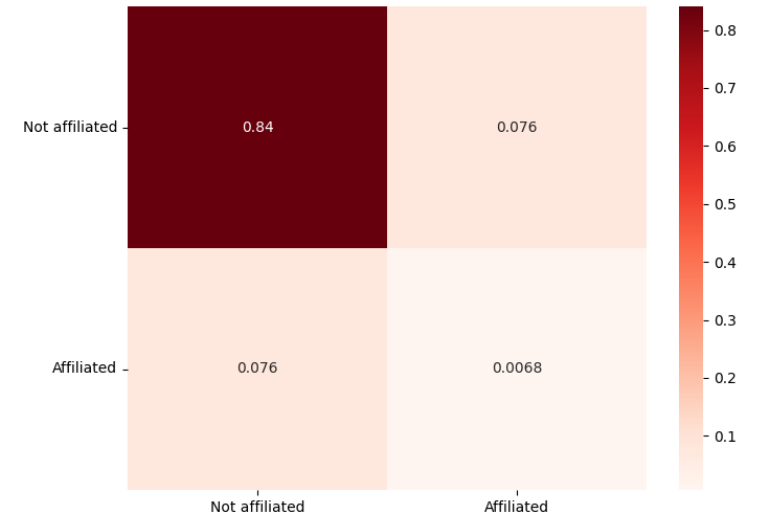
Mixing Matrix - Affiliate - UK



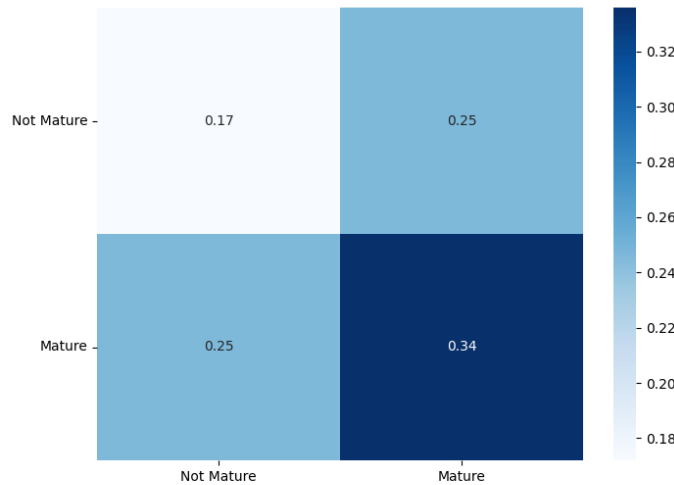
Mixing Matrix - Affiliate - DE



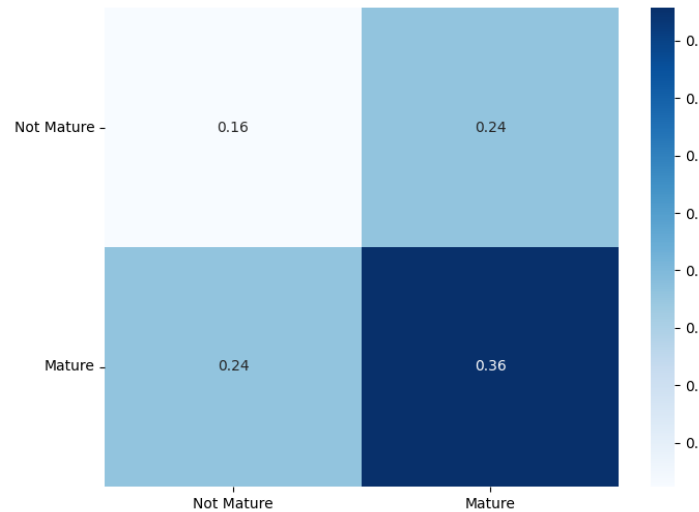
Mixing Matrix - Affiliate - ES



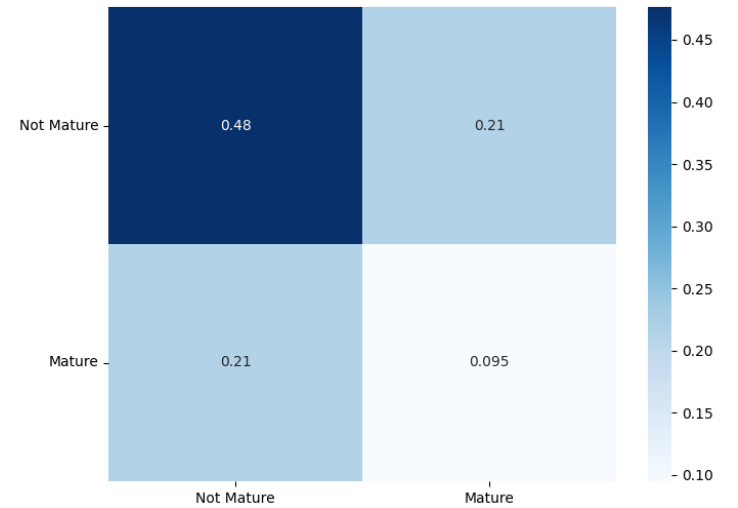
Mixing matrix - Mature - UK



Mixing matrix - Mature - DE



Mixing matrix - Mature - ES

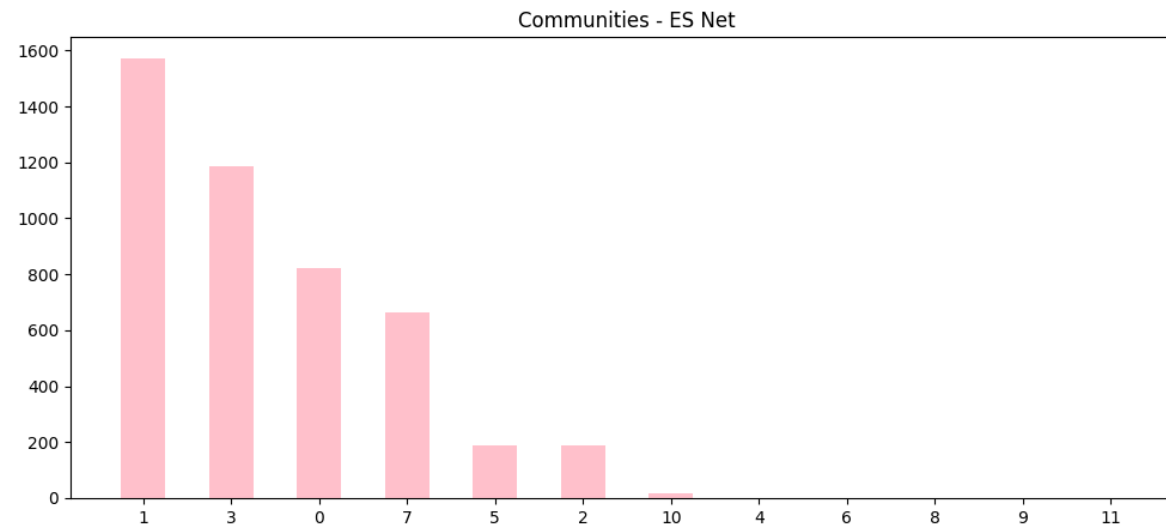
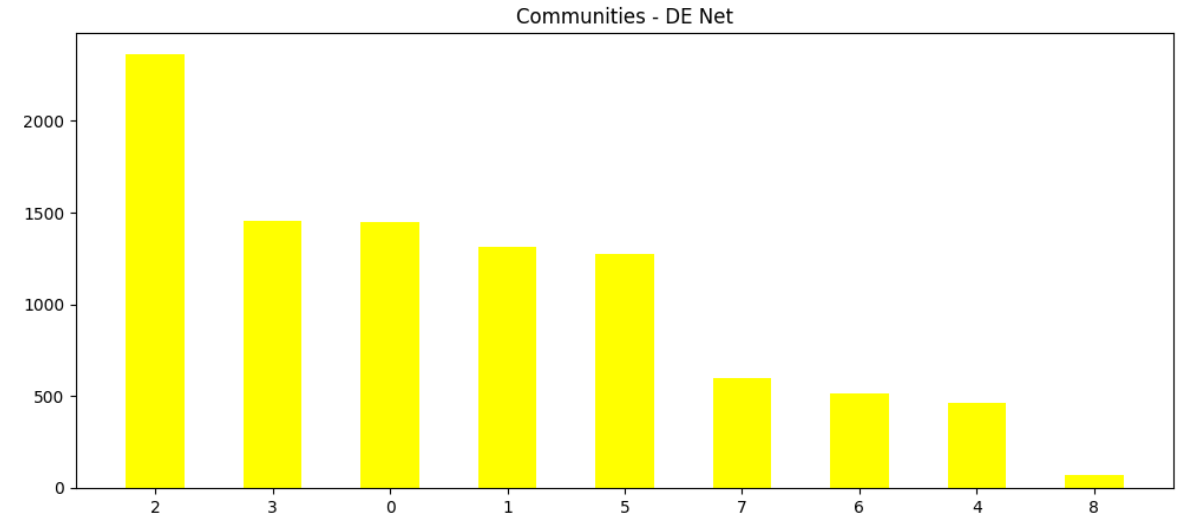
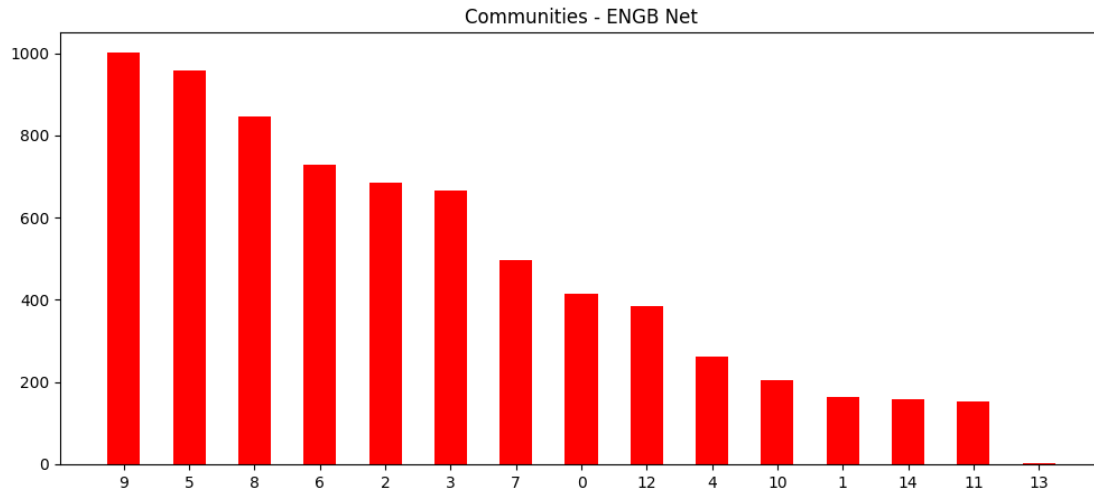


Is Twitch a social network?

- **Yes** with respect to some metrics – e.g. ECCDF
- **No** with respect to other – e.g. assortativity
- **Hypothesis:** Twitch exhibits some characteristics both of a social network and »information/infotainment network«. People may use Twitch not only as a social network, but also as a platform for entertainment and information. Similarity with Twitter³.

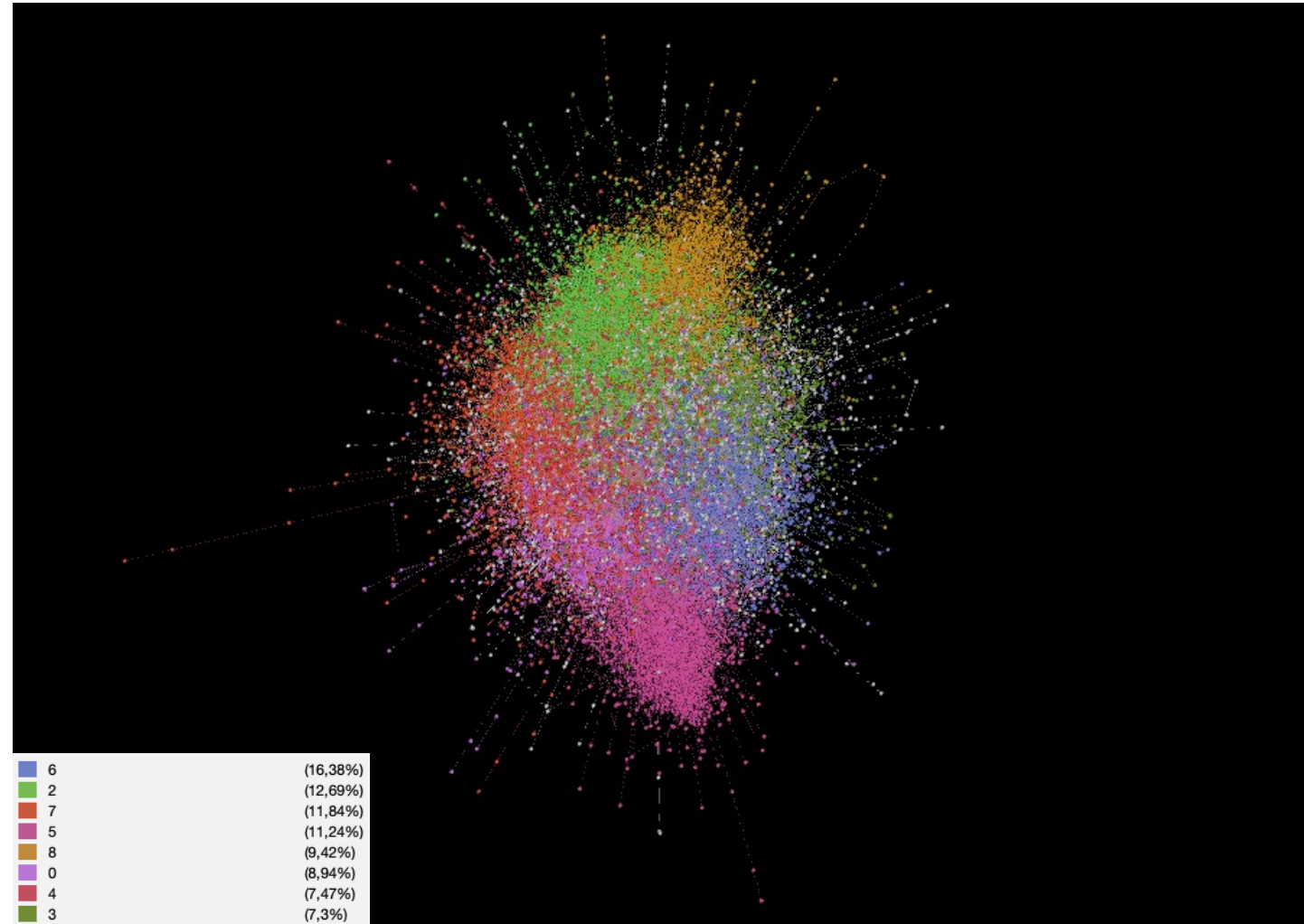
³ Ugander, J., Karrer, B., Backstrom, L., & Marlow, C. (2011). The anatomy of the facebook social graph. arXiv preprint arXiv:1111.4503.

Community Detection – Louvain Algorithm



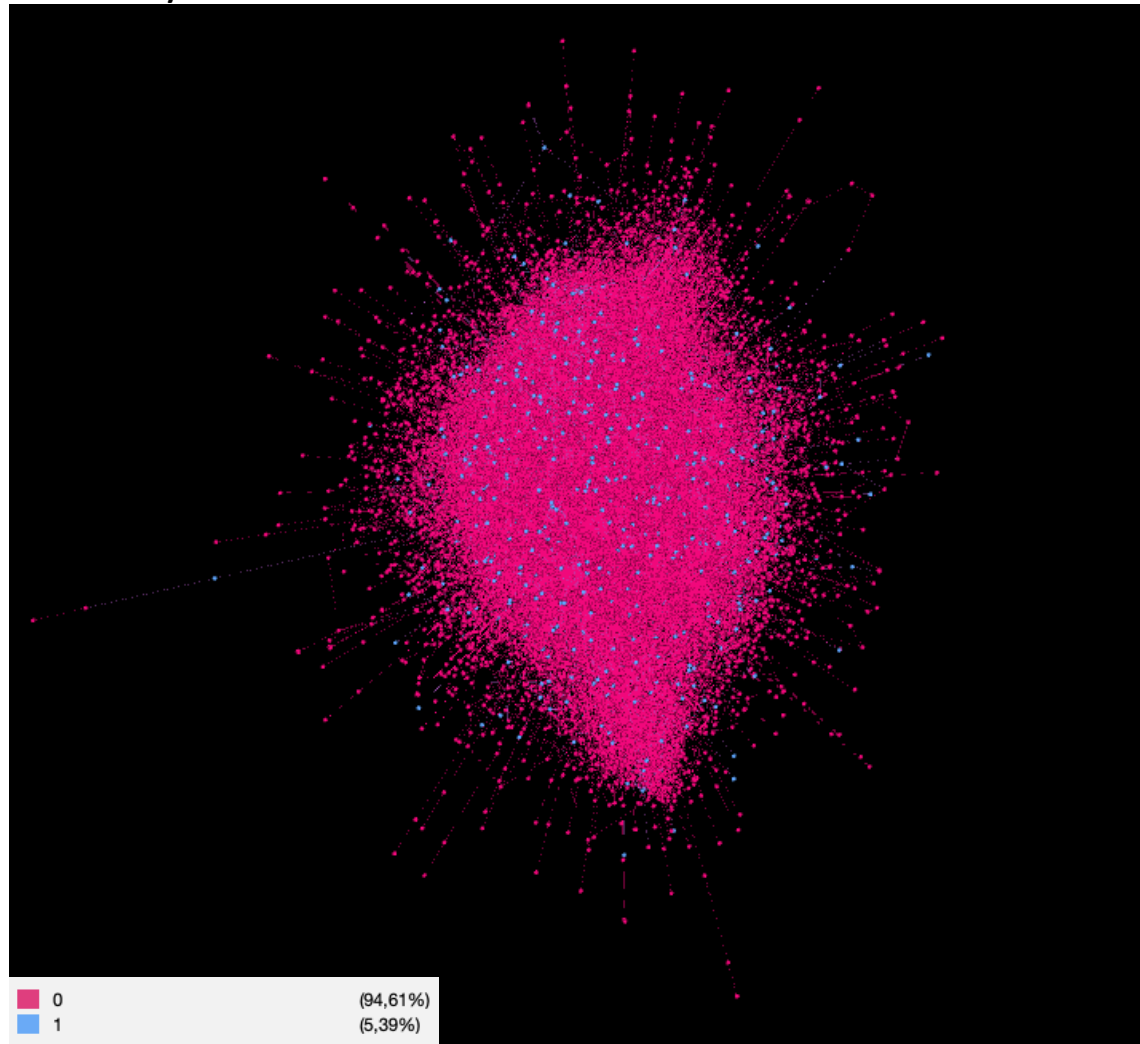
Community detection - Viz. of the UK network

- 18 communities detected by the Louvain algorithm
- 7 large communities (>500 nodes)
- 4 medium-sized communities (>100 nodes)
- The other communities do not have significant size

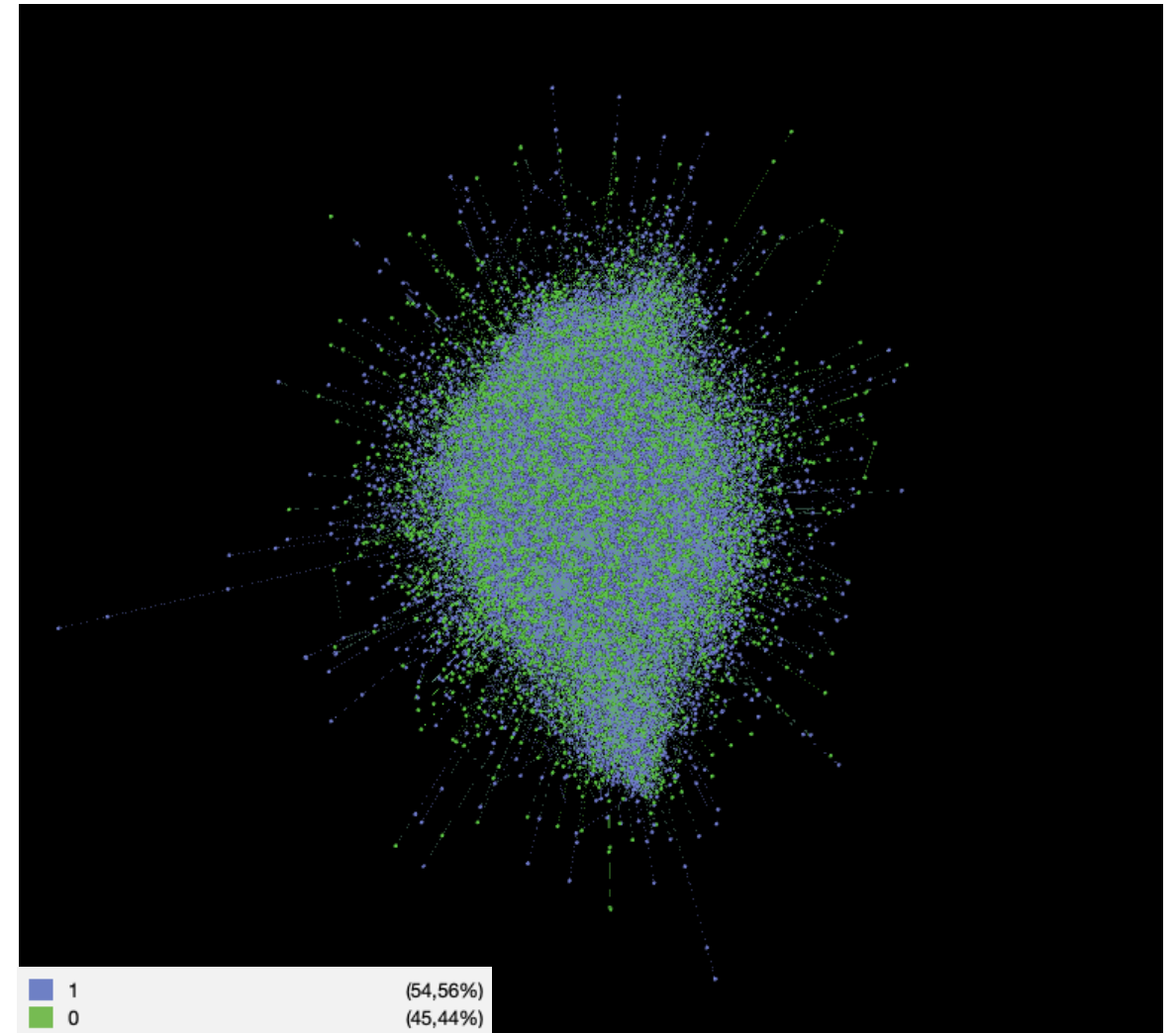


Community detection - Viz. of the UK network

Maturity



Affiliation

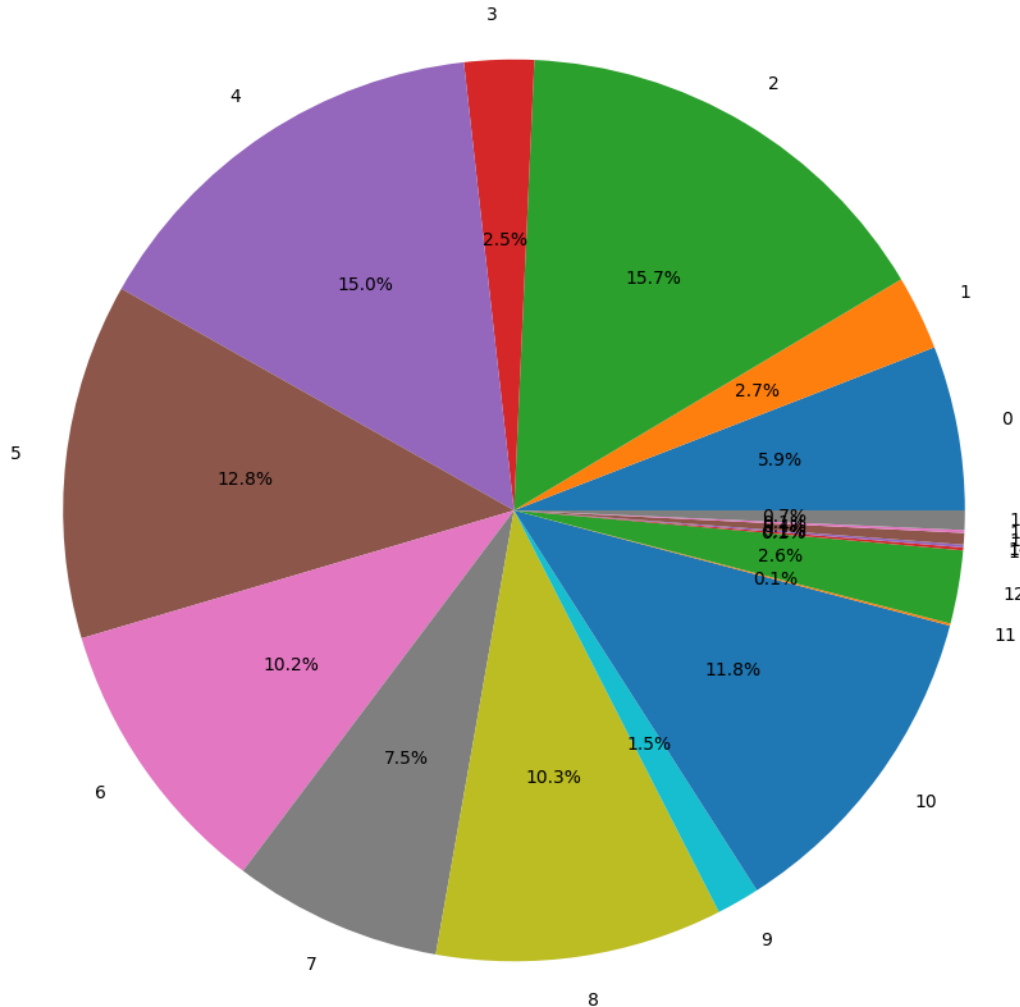


Community detection - Viz. of the UK network

- Both affiliate and mature users seem to be **proportionally spread** across the communities (see next slide)
- **Hypothesis**: mature users, which are more likely to become affiliate, create a community of people who follow them and watch mainly their contents or contents of similar streamers
- Communities are more likely to be centred around highly **popular and affiliated streamers**

Community detection - Viz. of the UK network

Distribution of mature users across communities



Distribution of affiliate users across communities

