Topological Properties of Music Collaboration Networks

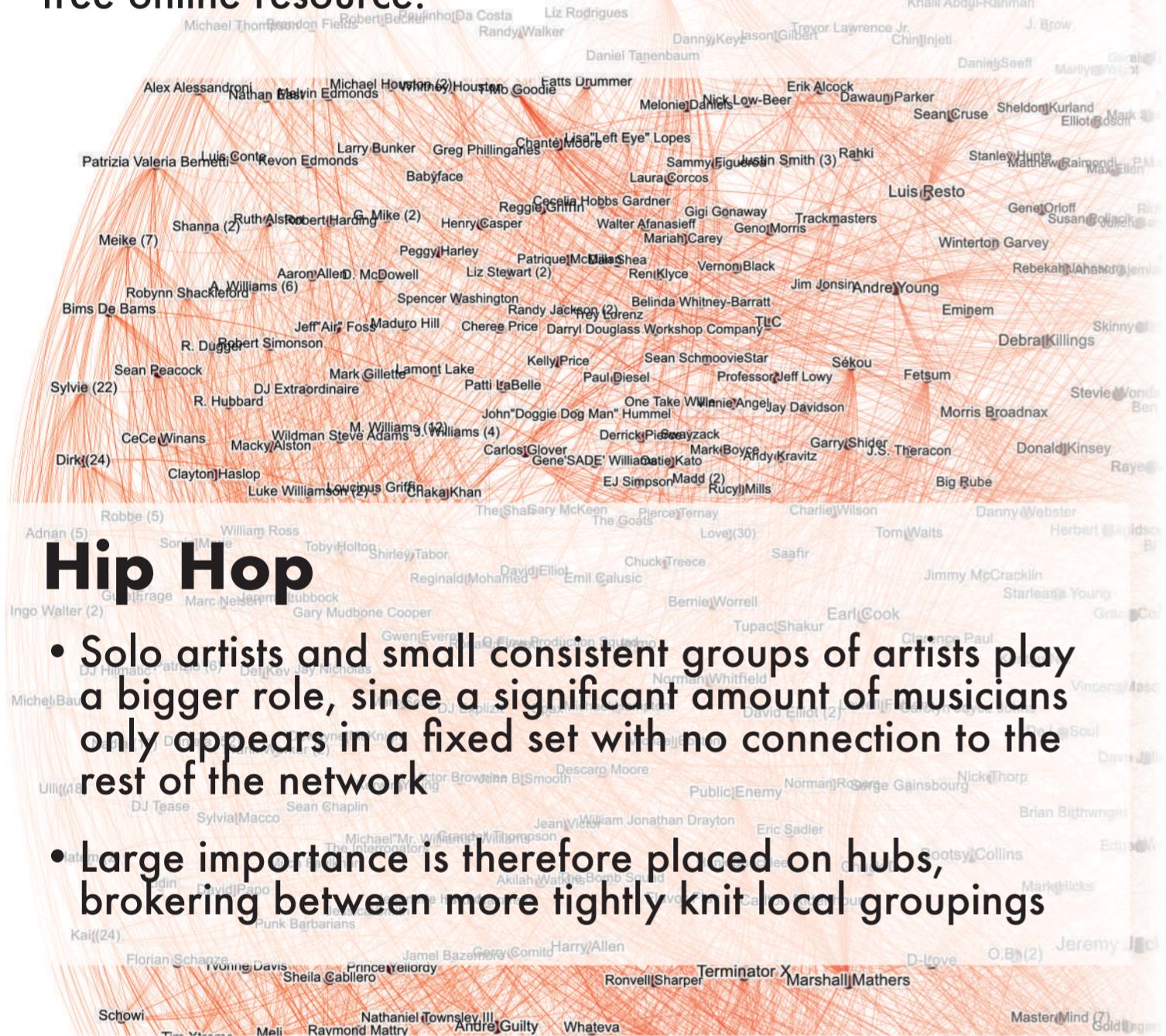Clara Kruckenberg, Lukas Gienapp

Motivation

In music, collaboration is vital. In the past, however, numerous studies have shown that musicians of different genres tend to form different types of collaborations. While in there have been studies on the cooperative structure of individual genres such as Jazz or Hip Hop, only a few comparative studies on the structural differences between the genres have been carried out.

Our contribution is building a comprehensive dataset, that allows a direct, network-based comparion of music genres.

Data

We build a network by defining an edge between two musicians if they appeared on a music release together. Release data is taken per genre from the Discogs Database, a comprehensive, crowdsourced, and license-free online resource.

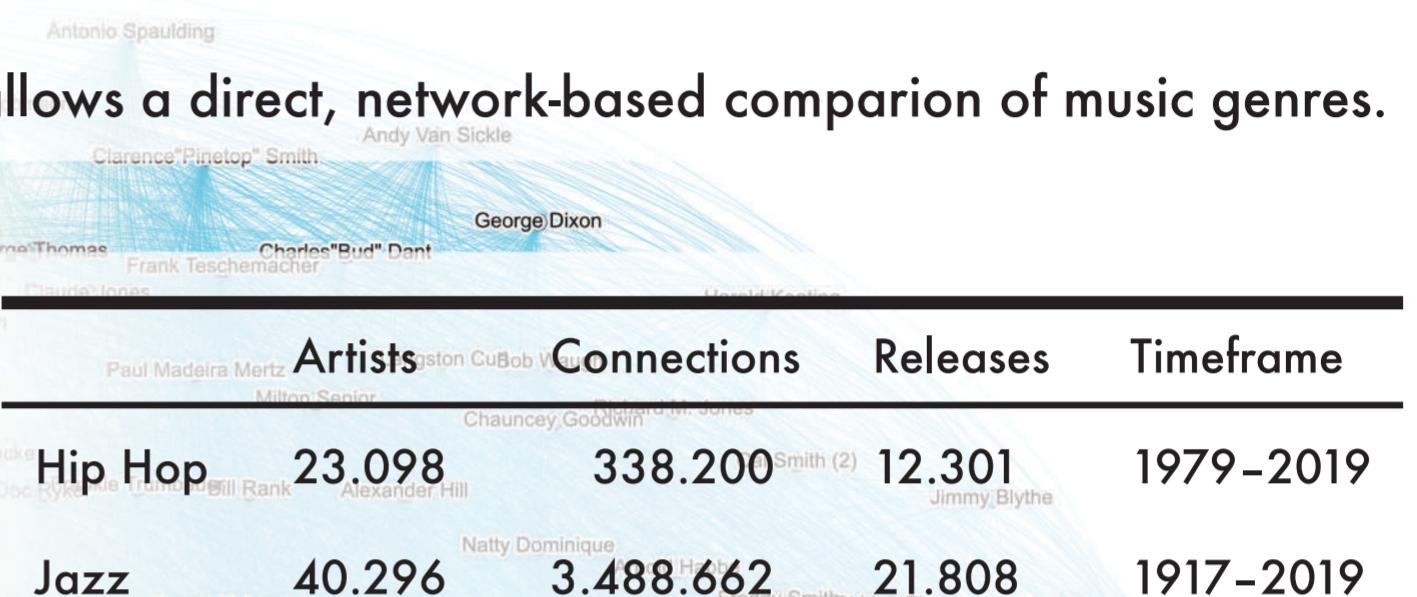|	Artists	Connections	Releases	Timeframe
Hip Hop	23.098	338.200	12.301	1979–2019
Jazz	40.296	3.488.662	21.808	1917–2019

Table 1: Dataset Description

Jazz

- Highly collaborative genre, resulting in a densely connected network, as indicated by high mean degree a local clustering coefficient

- Most artists are included in one large network component – however, in contrast to previous studies, small independent groupings play an increased role

Hip Hop

- Solo artists and small consistent groups of artists play a bigger role, since a significant amount of musicians only appears in a fixed set with no connection to the rest of the network

- Large importance is therefore placed on hubs, brokering between more tightly knit local groupings

- **d** – Mean Degree
- **c** – Mean Local Clustering Coefficient
- **C** – Transitivity
- **p** – Degree Correlation
- **a** – Power Law Scaling Exponent

	d	c	C	p	a
Hip Hop	7.07	0.73	0.63	0.45	1.58
Jazz	28.27	0.80	0.32	0.26	1.53

Table 2: Network Metrics

Conclusion

Both networks are scale-free. As a result, great importance is attributed to a limited number of nodes with a very high degree – the so-called hubs – which in our case are the most popular musicians in each genre. A positive degree correlation can be observed in both networks, indicating that highly connected musicians tend to collaborate with other musicians of a similar degree.

Future work: The rich metadata included in the data enables a broad set of future research, for example historical development of genres, community detection or interrelating network position (i.e. centrality) with popularity metrics from other sources.

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