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# Remix & Review: Networks of Interactions in a Creative Commons Music Community

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## ABSTRACT

Creative Commons (CC) aims to foster creativity through open sharing and use of creative works. Production of creative works in online communities has benefited from the flexible copyrighting framework offered by Creative Commons. The openness in sharing and the transparency of activities in CC-based online communities have made those communities excellent platforms for research on sharing and use behaviors. In this study, we explore patterns of users' interactions on ccMixer.org which is a CC music community. Particularly we focus on remix and review behavior. Our goal is to compare and contrast networks of individuals in two different types of interactions: (1) when a user in the network remixes a piece of music created by another user; and (2) when a user reviews a piece of music create by another user. We compare the two networks with respect to their core contributors, degree of centralization, and the potential links between remix and review activities for the more active or popular nodes. Our initial explorations are presented here and plans for future research are outlined.

## KEYWORDS

Music remix, review, online interactions, creative commons, social network analysis

## PATTERNS OF USERS INTERACTIONS IN A CREATIVE COMMONS MUSIC COMMUNITY

Research studies on knowledge sharing and integration have identified variety of factors which influence knowledge sharing and behavior in groups and communities. Examples of those factors are attention, incentives, familiarity, and diversity of users (Barkhi 2005; Hansen & Haas 2001; Homan et al. 2007; Siemsen et al. 2007). In this study we focus on sharing and remix interactions in a Creative Commons (CC) community. Creative Commons is a licensing framework which aims to foster creativity through more flexible sharing and use permissions. Creative Commons has encouraged creation of open research, educational, and cultural platforms such as collegeopentextbooks.org, GeoCommons, and ccMixer.org . Based on CC copyright framework, those who wish to share their work with the public can choose a license that fits their desires for sharing & use of their work by others. The two different dimensions of the licensing are (1) if/how adaptation of the work can be shared; and (2) if/how commercial use of the work is permitted. This setting leads to several different choices for licensing under CC (<http://creativecommons.org>).

In this study we aim to explore user interactions in ccMixer.org which is a CC-based music remix and sharing community. Previous research studies have examined music remix interactions on ccMixer (Cheliotis & Yew 2009). Prior research also have shown that attention to other people's creative products is an enabler factor in using those creative products; likewise valuing other people's creative product is a motivational factor in using those creative products. Here, in this study, using other people's creative product manifests itself in remix. Furthermore, we use "Review" action as a proxy for attention to other peoples' work; and we use "Rate someone's work" as a proxy for valuing someone else's work. Prior research has mixed result on how attending to and valuing others' works is influenced by the extent of familiarity in the group or community (Gruenfeld *et al.* 1996; Goodman & Lyeden 1991). In this research-in-progress manuscript, we describe our plan for examining potential relationships among review, rating, and remix behaviors. Our goal is to study the structure and

features of the networks of ccMicxter users with respect to remix, rate, and review behaviors. We then plan to compare and contrast the three networks

**DATA PROFILE AND ANALYSIS**

Data on review and remix activities was collected from ccMixer.org by a Python scraper. The data that is used in the current manuscript was collected on January 2013. The collected data, among others, included user, remix, review, and rating tables which are the major reference tables for this study. The data used for social network analysis reported in this manuscript is the result of join queries on user, remix, and review tables.

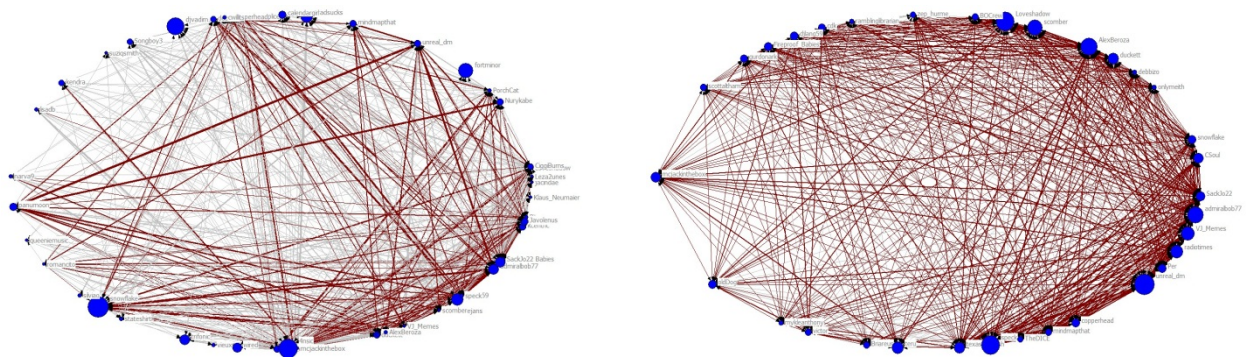
The two types of directed networks examined in this report are: (1) remix network and (2) review network. Below we describe some of the basic properties of the two networks.

Structural Measures	Remix Network	Review Network
Network centralization (In-degree)	0.360	0.298
Network centralization (Out-degree)	0.336	0.532
Average degree	5.39	8.82
Density	0.002	0.002
Compactness	0.147	0.076

**Table 1: Structural Measures for Remix and Review Networks**

As shown in Table 1 Remix network is a more centralized network in the “remixing someone’s music” direction; and a less centralized network in the other direction. The opposite is true for Review networks. The Review network is more centralized in the “being reviewed by someone else” direction and less centralized in the other direction. This means that a small group of users receive the bulk of reviews; and when it comes to reviewing, this activity is done by a larger group of users. Average number of links (In-degree and Out-degree) is higher in Review network. This is because review is a less creative task when compared to remix. The density measures for the two networks are not significantly different but Remix network is a more compact network.

For the preliminary analysis of the two networks, we chose to work with the top performers. At first, we looked at those users with the higher in-degree and out-degree. We used normalized value of in-degree in each network. For lack of a better instrument for making networks visually comprehensible, we set a threshold of 0.05 for the remix network and 0.075 for the review network. We then performed analysis on users in those subgroups (Borgatthi et al. 2002).



**Figure 1: Nodes with High In-Degree in (a) Remix & (b) Review Networks**

Figure 1 (a) shows nodes in the remix network which had in-degree measure higher than 0.05. These are users whose music files were remixed by others more than 160 times. The red ties indicated reciprocity in the network which means that the two side of the relationship have remixed each other’s works. The thickness of ties shows the strength of the ties between the

nodes and the node size is proportionate to the value of in-degree measures. Figure 1 (b) shows nodes with in review network which had in-degree higher than 0.075. These users received reviews from others on their music creations at least 695 times. Although the networks cannot be discerned visually, it is clear that the review network among top review receivers is very dense and with higher degree of reciprocity. In contrast, reciprocity is less present in the remix network of top “remixed” users.

We did further analyses on the nodes normalized in- and out- degrees greater than 0.05. Out of 46 nodes with high out-degree in the remix network ( $>0.05$ ), 28 of them are also present in the more active group of reviewers with out-degree  $> 0.05$ . This is a 60% commonality among the highly active users in the two networks. The 28 common nodes in the two highly active subnetworks, gives us around 50% prediction power for highly active remixers among reviewers. Also, out of 54 with high in-degree in the remix network ( $>0.05$ ), 37 are also present in the more popular group of reviewers with in-degree  $> 0.05$ . This is a 68% commonality between the highly popular users in the two networks. The common nodes, give us around 49% prediction power for highly popular remixers among reviewers.

This is a short summary of our initial efforts for immersing in data and for exploring potentials of several different analyses to extract insights from the Review and Remix networks. The full examination of these networks remains a work-in-progress.

## CONCLUSION

In this research-in-progress manuscript, we reported the setup, data collection and plans for the research on user behavior in music remix community. The plan is to conduct comprehensive analyses on the three networked data sets that have been scraped from ccMixter.org. In the current report, we explored some initial explorative efforts to compare Remix and Review networks. Comprehensive network analysis is required to examine networks of interactions for users within each network; then a more informed and meaningful comparison of Remix and Review networks will become possible. Within-network patterns of interaction will provide insight on whether or not particular clusters of remixes or reviewers across the two networks show similar behaviors in their remix and review activities.

A second dimension of this study is examining if and how remixes behavior and ratings relationships correlate. The data on remix ratings are available in the scraped dataset. We hope we will present this work and MWAIS 2014 for feedback from researchers in the area to further development the work.

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