

The birth of retweeting conventions in Twitter

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Abstract Observing the emergence of social conventions and the processes by which one comes to be adopted by an entire community has been very difficult until recent technological advances. In this study we examine the birth of a social convention on the microblogging platform Twitter: the token signifying that one is forwarding someone else’s message—an act commonly known as *retweeting*. Based on longitudinal data that spans a two-year period, we describe properties of the adopter network for seven popular variations of the retweeting convention and discuss how and when these variations emerged.

1 Introduction

In complex social systems, there is almost always a need to establish regularized patterns of behavior in social interactions in order to establish common ground and to decrease conflicts and promote cooperative behavior [Shoham’99]. Some of these rules are designed and agreed upon ahead of time (e.g., traffic laws), while others emerge as social conventions in a dynamic fashion (e.g., language, currency). The latter is common because the specific need for a common ground is often not known or unknowable in advance. Research on the emergence of conventions has typically treated it as the outcome of a coordination game [Shoham’99]. In such a setting, individual agents interact with the goal of efficient communication, and with repeated interactions come to learn mappings between behaviors and signals. Unfortunately, there is very little work on the natural emergence of social conventions because of

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the inherent difficulties involved in gathering detailed information about the social relationship of users and their interactions that lead to the birth of a convention.

In this work, we use large-scale online data gathered from a popular microblogging platform, Twitter, and study the birth process of a message forwarding convention that arose within the system over a two-year period.

Many different conventions were developed to indicate “retweeting”, with the most typical form being “marker @username message” [Boyd’10]. Using a complete set of data crawled since the launch of the Twitter service in 2006, we examined the occurrences of seven popular retweeting markers. We focused on the first 500 adopters for each of these seven conventions, and extracted networks that represent the following network and sequence of adoptions, so that an edge exists if a user adopts a convention after it is adopted by someone they are following. Table 1 summarizes some features of the seven convention spreading networks.

Table 1 Network properties of the first 500 adopters for seven retweeting conventions in Twitter

Convention	First usage	#CC	LCC (%)	In-degree* Avg(Med)	Out-degree* Avg(Med)	Diameter*	Clustering* coefficient
via	2007.03.16	139	70.8%	8008.91(611)	658.67(96)	10	0.205
HT	2007.10.22	124	72.4%	2060.19(729)	1296.06(567)	9	0.225
retweet	2007.11.01	116	74.6%	5059.23(959)	2299.87(855)	8	0.277
retweeting	2008.01.03	171	64.6%	1942.58(2121)	1073.36(767)	12	0.180
RT	2008.01.25	63	87.2%	1456.85(788)	917.17(237)	9	0.329
R/T	2008.02.03	65	86.2%	1648.43(856)	943.69(482)	9	0.296
recycling icon	2008.06.16	58	87.8%	4236.03(1262)	855.94(519)	10	0.307

Fields marked with (*) sign indicate statistics for the largest connected component (LCC).

The early adopter networks had different shapes. The first 4 conventions yielded over 100 connected components of adopters, while the other three networks had fewer components. Existence of small components imply that some users started using these conventions without the influence of their Twitter friends, either because (1) they independently created the convention or (2) they saw the convention through other means (e.g., external website, browsing Twitter).

There are some of the important questions that remain unanswered: How does the network of each convention evolve over time? Do they collide? Can these different conventions coexist or will one convention drive out the others in the long run? These are questions that we try to answer in our future work.

References

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