

5.2 Case study: Using homophily for social network marketing

One of the most common observations when analysing social networks is that people who are connected with each other tend to be similar (McPherson, Smith-Lovin and Cook, 2001), whether this is because those who are similar connect with each other or because those who are connected become similar. Depending on the types of data that companies have access to, the homophily principle can be used for marketing purposes in a variety of ways.

Table 5.1 Customer-related knowledge by industry.

		Knowledge about social network	
		No/limited	Yes/a lot
Knowledge about item-item relationships	Yes/a lot	Online retailers such as Amazon; traditional retailers such as Tesco/Walmart	Online social networks such as Facebook
	No/limited	Traditional retailers without sophisticated loyalty/ till receipt analysis	Mobile phone carriers

Table 5.1 illustrates what data are typically available for different company categories: the two key dimensions to fully leverage homophily are social network and item or product network data. Whereas mobile phone carriers typically have very detailed data on the social networks of their user base, they have much less knowledge of the item-item network of what users are consuming in conjunction. On the other side, online retailers, such as Amazon, or traditional retailers with sophisticated loyalty or till receipt analysis know what products customers buy together at the same time (till receipt analysis) or over time (loyalty programme) and can use this information to recommend products to their customers. Some online social networks, such as Facebook or Google+, are able to combine information from both types of sources, as they have both detailed knowledge on product and social networks.

5.2.1 Mobile phone carriers

As previously discussed, mobile phone companies have very good social network information based on actual interactions between peers and they have some information on what products/services a subscriber is using. For example, mobile carriers have information on the mobile handsets that their customers are using. Analysing this data typically shows that friends are much more likely to use the same handset than would be expected at random. Figure 5.1 shows the expected (based on observed handset market share in the customer base) and the actual percentage of two peers using the same handset. These percentages can then be used to calculate a multiple between the actual to expected value which gives an indication of the level of homophily of various handsets. Such handset homophily can be very significant and handsets such as the iPhone tend to be used in the region of 10 times more commonly amongst friends than would be expected at random. More exciting and fashionable handsets tend to be much more homophilous than ordinary handsets. This also suggests a promising strategy for handset makers to try to optimise features that drive network effects and homophily in their user base (e.g. like Apple did with FaceTime).

One of the ways this type of information can be used for marketing is by targeting customers based on information that the companies have about their friends. For example, if a person has already subscribed to a particular service, say an international

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Same handset model as your friend			
Handset model	Actual	Expected	Multiple
iPhone	12%	2.5%	8x
Samsung C450	10.8%	2.7%	4x
NOKIA N95	3.6%	2.3%	1.3x



Figure 5.1 Illustrative levels of handset homophily. To preserve the confidentiality and anonymity of the mobile phone carriers, the figures in the table are illustrative only, but based on typically observed values from analysing data from a variety of mobile phone carriers.

calling plan, then his friends are much more likely to be also interested in this service. This is because friends share certain characteristics with each other, some of which an operator might know in principle (e.g. gender, place of residence) and some of which might be unobservable to the carrier (e.g. sports preferences of the subscriber or ethnicity for a lot of subscribers).

The homophily principle can also be used to ‘fill the gaps’ in a carriers’ data on their subscribers. In Figure 5.2, a carrier has information on ethnicity for some subscribers (maybe from an analysis of their last names) and wants to predict ethnicity

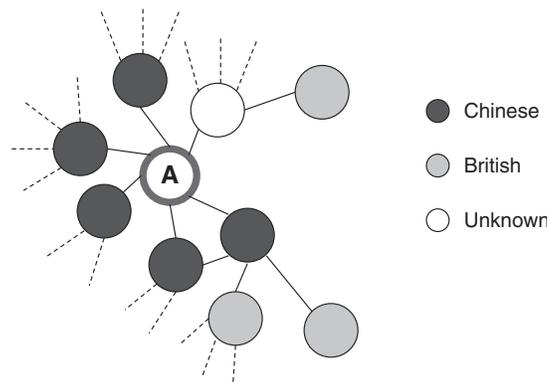


Figure 5.2 Predicting user characteristics in a social network. (Please see plate section for color version of the figure.)

for subscribers for whom it does not have this type of information. In this case, the homophily principle can be used to predict that subscriber A is Chinese, as the majority of his peers are Chinese and he might therefore be a good candidate for an international calling offer.

5.2.2 Online retailers

As can be seen in Table 5.1, (online) retailers normally do not have access to social network information, but do have detailed information on which items are purchased together by their customers. This type of information can be used to construct a network graph with items that are purchased together. Such homophily-related principles are heavily used in recommender systems which are deployed by many online retailer websites, such as Amazon, Netflix and so on. The basic idea behind these recommender systems is to identify purchases of similar people and items which are typically purchased together. Based on this information, recommendations are calculated for each prospective purchaser, with a recommendation being more likely for items that similar customers have previously purchased and that have been previously purchased together with items which have already been viewed. These basic principles can then be enhanced by emphasising diversity, serendipity and including basic business rules (Konstan and Riedl, 2012):

- **Serendipity** means that recommendations should not only be obvious, but should also include ‘unexpected’ items which the user nevertheless values. This is similar to the value of weak ties outside of the core network, which have, for example, been shown to be particularly useful for job search (Granovetter (1973)).
- **Diversity** of results means that, for example, results from the same author might not be displayed even if they are highly linked, as such a recommendation would be an obvious one that the user could have arrived at without the help of a recommendation algorithm.
- **Business rules** might, for example, disregard recommendations from loss leaders. However, only pushing high margin products might also be a risky business rule strategy, as the commercial effectiveness of recommender systems ultimately relies on the trust of their users which would be eroded if the recommendation system too obviously pushes a company’s agenda.

5.2.3 Online social networks

Online social networks populate the bottom right quadrant of Table 5.1 as they have access to both social network and item network data. The social network data come from the stated links and actual interactions between two users, while the item network data stem from the large number of actions that users can carry out on a social network such as Facebook. It would, therefore, be possible to construct an item-to-item network based on, for example, user ‘Likes’ and one could analyse which entities are typically ‘liked’ together.

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Like mobile phone carriers, online social networks can make use of the fact that a connection between two people means that these two people are likely to be more similar to each other than two randomly chosen people, thus encoding unobserved characteristics and helping advertisers to better target their ads. In addition, online social networks have the advantage over mobile phone carriers that they can use social cues to inform peers of each other's brand and product preferences, thereby providing information and exerting peer pressure (see Section 3.3).

Like online retailers, online social networks can also use recommender engines to suggest new friends or other items that are of interest to the user, which can further increase the reach and attractiveness of their service. In future, such recommendations could also be increasingly used to drive revenue from cross-selling products and services.

Finally, there have been moves by retailers, such as Amazon, to connect with a user's Facebook account in order to leverage the social network information available there.

Case-related questions & problems

1. Discuss what mobile handset features might influence the level of homophily observed amongst handsets in a mobile carrier's user base (e.g. design of handset, communication features such as Apple's FaceTime, ways of operating a phone, such as pinching, swiping and flicking of screens, availability of apps etc.). Why do you think the level of homophily is so much higher for iPhones than for other mobile handsets?
2. Discuss in which way traditional retailers such as Walmart or Tesco can use loyalty and till receipt data to derive customer recommendations. What marketing messages could they put on till receipts, what messages could they put on loyalty card communications? Think for example of differences between regular and one-off purchases. In which ways does the ability of traditional retailers to recommend certain products to their customers differ from the ability of online retailers such as Amazon?
3. Discuss in which ways online social networks such as Facebook could use recommender systems to increase the revenue from their network? Think in particular about how the newsfeed, on-page advertising and the making available of data to third parties could be used. Also discuss potential drawbacks and data protection challenges of using such social network marketing approaches.