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## **Multi-level donation attribution in social networks**

### **ABSTRACT**

Online fundraising platforms (including social media platforms) encourage donors to publicize their donations via social media to increase visibility for the cause being funded. Credit for social donations is generally given only from one level to the next. For example, credit is given to the user who shares the event of their donation if their sharing led to another donation. However, if the user's share in turn shared the event of their donations, the original user that started the train of donations is not credited for donations originating beyond the first audience. This disclosure provides techniques such that when a consenting user shares a URL of a donation with a first audience, the user is credited for donations generated not only by the first audience but also by any further audiences that the first audience share the URL with. Users are credited with the total sum of donations they have driven.

### **KEYWORDS**

- donation
- multi-level attribution
- social graph
- descendant node
- ancestor node

### **BACKGROUND**

Social media platforms exhibit powerful community-building abilities. A recent trend is to leverage online communities to raise funds towards a cause of interest to the community. Social media companies now offer platforms to facilitate and streamline donations from online communities and users towards causes of interest. Other platforms, e.g., those slanted more

towards entertainment or education, have an electronic equivalent of a tipping jar that enables audiences to contribute towards the performance of an artist.

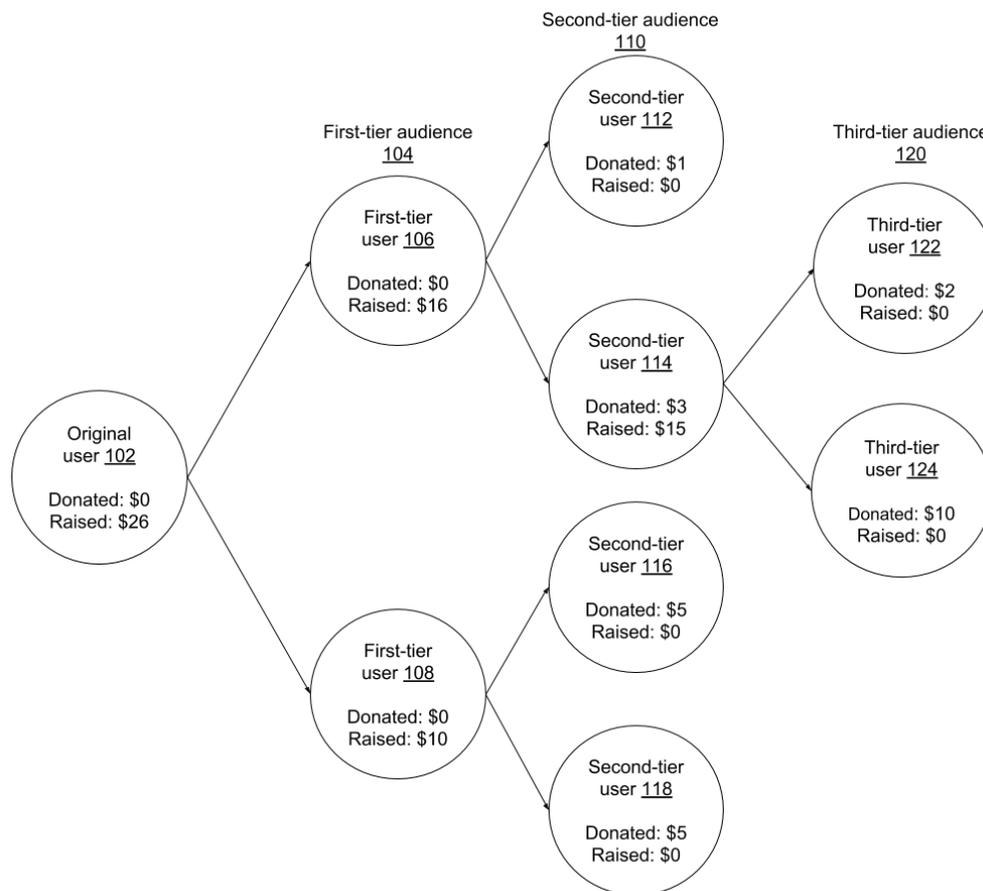
Once a donation (or tip) is made by a user, fundraising or social-media platforms often encourage the user to publicize their donation, e.g., by sharing the URL of the donation campaign. Such sharing of URLs by donors has a cascade effect within the social network of the user, potentially resulting in a successful donation campaign and a strong social graph.

Credit for social donations is currently given only from one level to the next. For example, the user who shares the URL of the donation campaign is credited if their share generated a donation. If the same sharing URL is used by multiple users, then the originator is credited for all shares generated by that particular URL. However, if someone within a user's first audience in turn shares the donation URL with a second audience that resulted in donations from the second audience, the original user that started the train of donations, is not credited for donations arising from the second (and subsequent) audiences. Therefore, current platforms are unable to inform originators of the donation campaign of the total quantum of donations that resulted from their act of sharing.

### DESCRIPTION

Per techniques of this disclosure, when a user shares a URL of a donation campaign with a first audience, and members of that audience donate to the campaign, donations from the first *and* subsequent audiences are attributed to the original sharing user, provided the original sharing user has granted consent and permission to do so. The organizers of the campaign then not only know the funds donated by an individual user, but also the full extent of funds generated their sharing of the fundraising URL.

For example, if members of the first audience share donation-campaign URLs to a second audience, then donations arising from the second audience are also attributed to the first sharing event. Users are thereby credited with the total sum of donations that they have driven, including their own, that of their first audience, and those of subsequent expanded audiences. Knowing the full quantum of funds generated in donations incents users to share further, leading to a strong social graph, which in turn ties well into nonprofit and for-profit products related to that social graph.



**Fig. 1: Multi-level donations attributed to an ancestor node**

Fig. 1 illustrates multi-level donations attribution. An original user (102) shares a URL for a donation campaign with an immediate (first-tier) audience (104), comprising other users

(106-108). The first-tier audience members in turn share the donation URLs with a second-tier audience (110) that includes further users (112-118). A second-tier audience member (114) shares the donation campaign URL with a third-tier audience (120) that includes additional users (122-124).

A user is attributed with not only the amounts they donated, but also the sum total of donations they drove through all their descendants. For example, since users 122 and 124 respectively contributed \$2 and \$10, the immediate ancestor 114, who donated \$3, is noted as having raised  $\$2+\$10+\$3=\$15$ . The immediate ancestor of 114, who is 106, has donated \$0; however, the descendants of 106, namely 112 and 114, have respectively donated \$1 and raised \$15. Therefore 106 is noted as having raised  $\$1+\$15=\$16$ . As another example, user 108 has donated \$0, but immediate descendants 116 and 118 have each donated \$5. Therefore, user 108 is noted as having raised  $\$5+\$5=\$10$ . The original user 102, who started sharing the URL of the donation campaign, is noted as having raised the sum of the monies raised by his immediate descendants *and their descendants*, namely  $\$10+\$16=\$26$ .

Data regarding contributions by individual users are utilized for attribution to ancestor users upon specific permission from the contributing users and other intermediate users. If one or more users deny permission or provide limited permission, contributions from such users are excluded from attribution. Further, anonymous contributions are not utilized (or utilized selectively, in a manner that preserves anonymity) in the process of attribution.

The techniques of this disclosure track multi-level donations within a social graph by appending, with user consent and permission, unique tokens into the donation campaign URL each time it is shared. These tokens are used to attribute multi-level downstream monetary donations for a particular campaign to originating sharers or curators. The tokens are generated

either at the time of sharing, or when a user first visits the campaign's page. Generating the token at the time of sharing is a simple implementation that results in relatively few token creations. However, generating the tokens at the time of user visit to the page allows the addition of the token to the URL that appears in browser bars, and therefore, allows capture of the copy-paste method of sharing URLs.

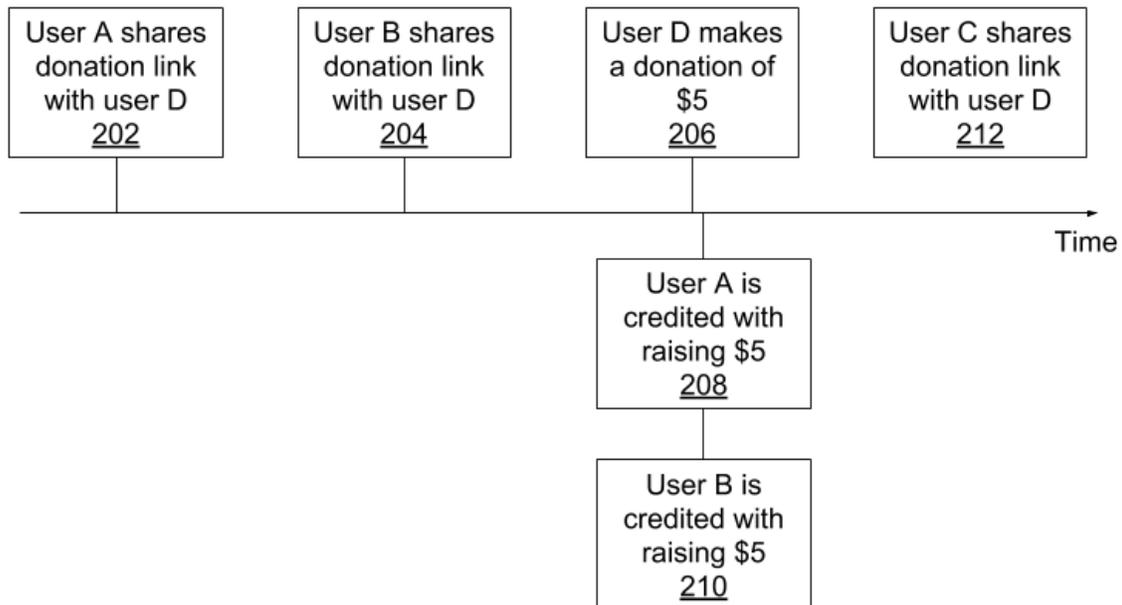
Once generated, a token is logged with user consent and permission to a database along with metadata binding the token, including user or visitor ID, parent URL token, campaign identifier, etc. The metadata also includes a list of counters for downstream events, e.g., counters that tally a sum of downstream interactions, or references to each downstream token, etc.

A map between the pair (user ID, campaign ID) and the sharing event token is created. This map may be implicit, e.g., by using the pair (user ID, campaign ID) to construct the sharing event token as user ID plus campaign ID. Alternatively, the map may be explicit, e.g., by having a table that lists sharing events by row and is keyed by the pair (user ID, campaign ID). An explicit map, e.g., via table, is useful for quickly accessing sharing events associated with a particular user. In each row of the table there are two lists, one for outbound sharing events and another for inbound sharing events. Whenever a user visits a URL, either in a web browser or via an application deep-link, the token is extracted from the URL and a visit-count in a database incremented. The aforementioned mapping table is also updated to add the sharing event to the user's list of inbound sharing events. These may be counted in an online process or an asynchronous offline job that reads a list of visit events.

A background synchronous job processes visit events and builds the downstream attributions. For each donation, the (user ID, campaign ID) pair is used to look up the list of

inbound sharing events. Each of these inbound sharing events is updated to reflect the donation, and the funds raised by each of their consenting ancestors are updated.

In some cases, a single user may have arrived at a campaign URL from multiple different shared events from different users. In such cases, the user’s outbound shares and donations may be attributed to one or more parent sharing events. From a perspective of incentivizing users, it is useful to double count accreditation of shares and donations by accrediting them to all parent events, with the consent of parent nodes. If thus attributed to all parent events, users are made more aware of the impact of their shares.



**Fig. 2: Attributing donations from multiple shared events**

This is illustrated in Fig. 2, where user A (at 202) and user B (at 204) each share a donation link with user D. Next, user D makes a contribution of \$5 (at 206). Both user A (at 208) and user B (at 210) are each credited with raising \$5. Following the donation from user D, user C (212) forwards a donation link to user D. However, since user D made a donation prior to receiving link from user C, user C gets no credit for user D’s donation.

Nonprofit crowdfunding companies have traditionally been dependent on social media platforms for traffic, and are now investing in building their own social communities. Donation technologies, in particular accrediting downstream donations and re-shares as described herein, are thus of importance to social media platforms as well as crowdfunding companies.

Moreover, the techniques described herein find application not only in nonprofit fundraising but also in the domain of content creator monetization, where donations are an increasingly important, even major, component of revenue. The techniques described herein help content creators build their audience, community and content-distribution graphs by enabling them to thank not only users who contribute directly but also users who drive contributions. Content creator monetization is a key factor in content creators' choice of content distribution platforms for syndicating their content. By engaging their audiences, per techniques described herein, content creators are kept invested in their platforms.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control

over what information is collected about the user, how that information is used, and what information is provided to the user.

## CONCLUSION

This disclosure describes mechanisms for attributing multi-level downstream monetary donations for a particular campaign to originating sharers or curators. Per techniques of this disclosure, a user shares a URL which points to a page with a donation campaign to a first audience of other users. When members of that first audience donate funds to the donation campaign, such donation events are attributed to the original sharing event. The funds donated by an individual user are credited as also the funds raised by the sharing of the URL. Further, when members of the first audience share URLs featuring the same donation campaign to a second audience, the donations from the second-tier are also attributed to the first sharing event. Users are thus credited with the total sum of donations they have driven. Crediting downstream donations and re-shares generates social value for the purposes of curation and non-fiscal contributions to campaigns. The techniques apply to a variety of domains, e.g., nonprofit crowdfunding companies, social media platforms, content platforms, etc., where they enable donor or audience engagement, content monetization, and the building of a strong social graph.