International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 02 | Feb 2020 www.irjet.net p-ISSN: 2395-0072

# ONLINE DONATION BASED CROWDFUNDING USING CLUSTERING AND K-NEAREST NEIGHBOUR ALGORITHM

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**Abstract -** *Crowdfunding is a practice of raising funds from people to support your project which has bought new life to charity, i.e, making it easy to donate any amount of money to help across the globe. Donation-based crowdfunding is the most preferred mode of fundraising. Crowdfunding through online platforms knows no boundaries, and has the potential to travel viral. The problem of high donor attrition i.e, many donors donate just one occasion or only a few times within a rather short lifecycle then leave. Thus, it is an urgent task to analyze the factors of and then further predict the donor behavior. In this paper, we present a focused study on analysis of donation recurrence and donor retention to predict the donor's interest in donation. Specifically, we proposed a model, which has the details of recipient, actual donor and the verifying person. After the donation process, every donor will get a proper donation certificate approved by the government. The experimental results will clearly demonstrate the individual's interest for donation and to appreciate them to donate more in their future with a proper secured transaction with the support of the government.*

***Key Words***: **Crowdfunding, Donation recurrence, Donor retention, Transaction, Attrition.**

## 1. INTRODUCTION

Crowdfunding is an emerging Internet-based fundraising mechanism soliciting small monetary contributions from crowd donors to help others in trouble or with dreams [1]. Recent years have witnessed the fastest development of crowdfunding platforms among which the donation-based ones are becoming increasingly very popular [1], [2], such as Kiva.org 1 [3], and DonorsChoose.org 2 [4]. Leveraging Internet, crowdfunding has brought new life to charity, i.e., making it is very easy to donate any amount of money even every people to help others across the globe. For example, Kiva.org is an international nonprofit platform, founded in 2005, with a mission to connect people through lending to reduce poverty. The accessing donors crowdfund these projects in increments of $25 or more. Donors may act as individuals or teams. The critical component for the success of crowdfunding communities is the recruitment and continued engagement of donors [4]. However, because of the non-profit nature, the situation relating to donor retention for donation-based crowdfunding as well as traditional charities is extremely serious, i.e., usually, the donor attrition rate is above 70% [4]. Actually, customer attrition/churn [5], [6] is crucial and highly focused on in many commercial scenarios, such as E-commerce, finance and services. However, for a quite long time, relevant studies on analyzing donor retention in charity have been rather limited in the literature. Fortunately, with the accumulation of large-scale user behavior data in crowdfunding platforms, many data-driven studies which focus on analyzing the user behaviors have been conducted [7], [8]. For example, Liu, et al. [7] studied the donation motivation classification in Kiva.com. Especially, Althoff, et al. [4] penetrate various factors impacting donor retention in DonorsChoose.org from the statistical perspectives which was inspiring for our research. However, how to comprehensively analyze the heterogeneous factors affecting and then further predict the donor retention or attrition, are still largely unexplored areas, both in the charity and in other domains. In addition to these heterogeneous factors, according to our observation and analysis, donors' own behaviors (i.e., donation recurrence) could particularly reflect their decision on retention. In fact, donation recurrence prediction is an unavoidable intermediate goal for forecasting the donor retention. Thus, in this paper, we try to track this problem by jointly predicting the donor retention and also the intermediate goal (predicting donation recurrence). Although it is necessary to construct the predictions of donation recurrence and donor retention, as they can alert platforms that they need to do something before they lose donors, this is a very challenging task. First, donor behaviors, e.g., donation recurrence, donor retention or attrition, are influenced by various factors [4], such as their motives and preferences, their social contacts in crowdfunding communities, and the characteristics of the projects to which they have recently donated. How to comprehensively analyze the heterogeneous features and integrate them for accurate prediction is not a trivial issue. Second, according to our data analysis, the behaviors of donors, especially the donation recurrence, are highly correlated with their retention or attrition. How to model the relations of donation recurrence and donor retention and further synchronously predict these two behavioral events with a joint model are quite open problems. Finally, the presence of a large amount of censored data [9], [10], i.e., the exact attrition outcomes of some donors are unobservable or they do not perform any behaviors (donation or attrition) during our monitoring periods, imposes important challenges in

relation to this problem. Because many donors may be still in the platform in our data and most lost donors do not explicitly close their accounts when leaving, the censoring phenomenon is an inescapable concern.

## 2. RELATIVE WORKS

"A Sequential Approach to Market State Modeling and Analysis in Online P2P Lending." Hongke Zhao, Qi Liu, Hengshu Zhu, Yong Ge, Enhong Chen, Yan Zhu, and Junping Du,2018.Online peer-to-peer (P2P) advance is an emanate wealth-management service for individuals, which allows lenders to directly bid and invest on the listings created by borrowers without going through any traditional financial intermediaries. As a nonbank financial platform, online P2P advance tends to have both high volatility and liquidity. Therefore, it is of significant importance to comprehend the hidden market states of the listings (e.g., hot and cold), which open venues for intensify business analytics and investment decision making. However, the problem of market state modeling remains fetching open due to many technical and domain provoctions, such as the dynamic and sequential characteristics of listings. To that end, in this paper, we present a focused study on market state modeling and analysis for online P2P advance. Specifically, we first propose two enhanced sequential models by enlarge the Bayesian hidden Markov model (BHMM), namely listing-BHMM (L-BHMM) and listing and marketing-BHMM (LM-BHMM), for learning the latent semantics between listings' market states and lenders' bidding behaviors. Furthermore, we demonstrate various stimulate applications enabled by ourmodels, such as bidding prediction and herding detection. Finally, we construct substantial experiments on two real-world data sets and make some deep analysis on bidding behaviors, which clearly validate the potency of our models in terms of different applications and also disclose some interesting business findings.

## 3. PROPOSED SYSTEM

In this work, the client and the donor have to fill their personal details which will be verified by the third party, the verifying agent appointed by the government. The verifying agent will accept the details proceeds secured transaction from the donors to the clients. This system uses the clustering algorithm to filter the data from large scale of datasets and uses K-Nearest neighbor algorithm for clustering, which will cluster the similar data items from large dataset according to the user preference. This system will automatically notifies the donors on any particular day, for example, on their birthday, and appreciate the donors to further improve their sequence of donation. This system will make a secure transaction from the donors to the clients only after verifying whether the donors and the clients are authorized persons. And also this will improve the eagerness of donors for donation.

## 4. SYSTEM DESIGN

The recipient has to fill the registration form with required mandatory input fields and the personal details completely. These details will get further verified by the government authority or the verifying agent appointed by the government. The donor has to fill the registration form with required mandatory input fields and the personal details completely. These details will get further verified by the government authority or the verifying agent appointed by the government. By using the token, generated after the completion of verifying recipient's details by the government authority. The recipient will log in only suing the unique token to request money. Their request contains the details of the category for which the recipient needs money.

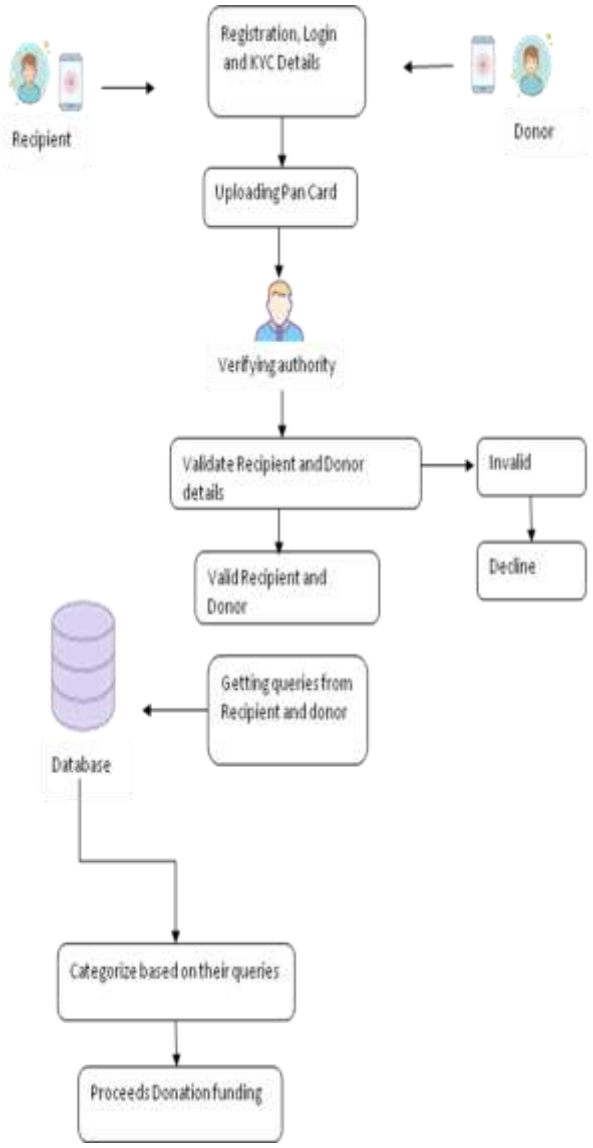


Figure 1: System Architecture

The recipient can view their request details and status of donation for their requests. By using the token, generated after the completion of verifying donor's details by the government authority. The donor will log in only using the unique token to donate money. Their request contains the details or the category for which the donor is willing to donate. The donor can view the history of their donations. After verifying all the details of donor and the recipient, the verifying person will approve the details of recipient and the donor and further allows the process of funding. After the funding process, the donor will be provided a certificate by the government. The donor will get notifications automatically to appreciate their donation funding.

USECASE DIAGRAM

Unified Modeling Language (UML) may be a systematized general-purpose modeling language within the field of software engineering. The standard is managed and was created by the thing Management Group. UML includes a group of graphic notation techniques to make visual models of software intensive systems. This language is employed to specify, imagine, modify, build and document the artifacts of an object oriented software intensive system under development.

Use case diagram consists of two parts:

Use case: A use case describes a sequence of actions that provided something of quantifiable value to an actor and is drawn as a horizontal ellipse.

Actor: An actor could also be an individual , organization or external system that plays a task in one or more interaction with the system.

CLASS DIAGRAM

A Class diagram shows how the dissimilar entities interconnected to each other in the Unified Modeling Language was a type of static structure diagram that illustrate the structure of a system by demonstration the system's classes, their attributes, operations (or methods), and the relationships among objects.

COLLABORATION DIAGRAM

UML Collaboration Diagrams illustrate the link and interaction between software objects. They necessitate use cases, system operation contracts and domain model to already exist. The collaboration diagram embellished messages being sent between classes and objects.

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SEQUENCE DIAGRAM

A Sequence diagram is a kind of interaction diagram that shows how procedure manage with one another and in what order. It is a build of Message Sequence diagrams are sometimes called event diagrams, event scenarios and timing diagram.

ACTIVITY DIAGRAM

Activity diagram is a graphical representation of workflows of gradual activities and actions with support for possibility,looping and consistency.

The most important shape types:

- Rounded rectangles represent activities.
- Diamonds represent decisions.
- Bars represent the start or end of consistent activities.
- A black circle represents the start of the workflow.
- An encircled circle represents the end of the workflow.

DATA FLOW DIAGRAM

The Data Flow Diagram is a graphical representation of the "flow" of data through an information system, modeling its point. It is a preliminary step used to create an overview of the system which can later be elaborated Data Flow Diagram can also be used for visualization of data processing.

**5. MODULES**

The system module is categorized into four modules namely,

1. Recipient Authentication
2. Donor Authentication
3. Recipient's Requests
4. Donor's Donation Funding

I. RECIPIENT AUTHENTICATION

The recipient has to fill the registration form with required mandatory input fields and the personal details completely. These details will get verified by the government authority or the verifying agent appointed by the government as same as the donor's verification. After successful verification, the recipient will get the notifications regarding their donation with secured authentication. The recipient's chatbot contains the details or the category for which the recipient needs donation.

II. DONOR AUTHENTICATION

The donor has to fill the registration form with required mandatory input fields and the personal details completely. These details will get verified by the government authority or the verifying agent appointed by the government. After successful verification, the donor will get the registration and the authenticated mail.

III. RECIPIENT'S REQUESTS

By using the token, generated after the verification of recipient's details by the government authority. The recipient will log in only using the unique token to request money. The request contains the details of the category for which the recipient needs money. Recipient can view their request details and status of donation for their requests.

IV. DONOR'S DONATION FUNDING

After verifying all the details of donor and the recipient, the verifying person will approve the details of recipient and the donor and further allows the process of funding. The donor will be displayed with the recipient details in the category for which the donor is willing to donate. The donor will select the recipient and further donates. After the funding process, the donor will be provided by a certificate by the government.

## 6. CONCLUSION

We presented a focused study on prospecting the donation careers in crowdfunding. By collecting and analyzing large-scale real-world data, we specifically formalized predicting tasks by automatically generating notifications to the donors, in order to appreciate their process of donation funding. Then, using a clustering algorithm and K-Nearest neighbor algorithm, we proposed a model which could integrate heterogeneous features to jointly model the donor activities in predicting their donation interests. Additionally, we designed multiple innovative constraints and incorporated them into objective functions for modeling the censoring phenomenon and dependence relations of different behaviors. In experiments, we analyzed the donations in crowdfunding and validated the prediction performances from various aspects. The experimental results clearly demonstrated the effectiveness of our proposed models for analyzing and predicting the donors and appreciating them for further more donations with a trustworthy funding.

## 7. FUTURE ENHANCEMENT

Our study may bring some new insights from the application view of crowdfunding and the technical view of exploiting deep learning for survival analysis to the research communities. In the future, we will apply and improve our models for other scenarios, such as traditional charity activities, especially applied to survival data with modeling collaborative tasks in some other domains, such as a device failure in engineering, predicting student dropout, and prospecting the career development.

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