How Medical Crowdfunding Helps People? A Large-scale Case Study on Waterdrop Fundraising

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Outline

Background

Dataset

Research Question

The Impact of Social Status

The Impact of Social Network

Prediction of Donations

Conclusions and Suggestions

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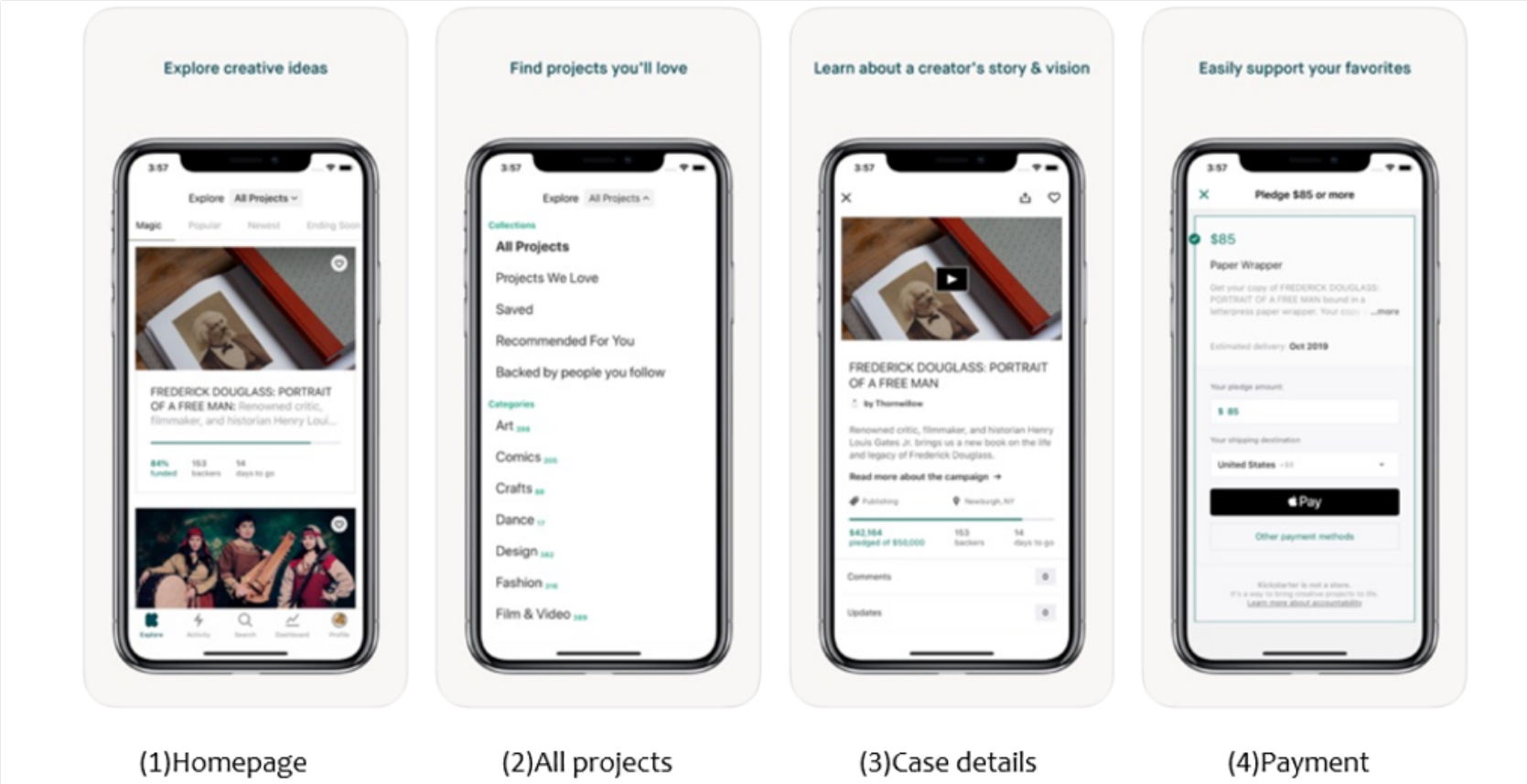
Crowdfunding Models

- Crowdfunding typically contains three participating stakeholders:
  - **the project initiators**: seek funding for their projects
  - **the backers**: back a specific project
  - **the matchmaking crowdfunding platforms**: intermediaries
- Many researchers have discussed and studied the relationship between the three parts, their motivations, benefits, and risks
- Three different crowdfunding models:
  - **Commercial Crowdfunding**
  - **Poverty Alleviation Crowdfunding**
  - **Medical Crowdfunding**s

Commercial Crowdfunding



How Kickstarts Crowdfunding Platform works:

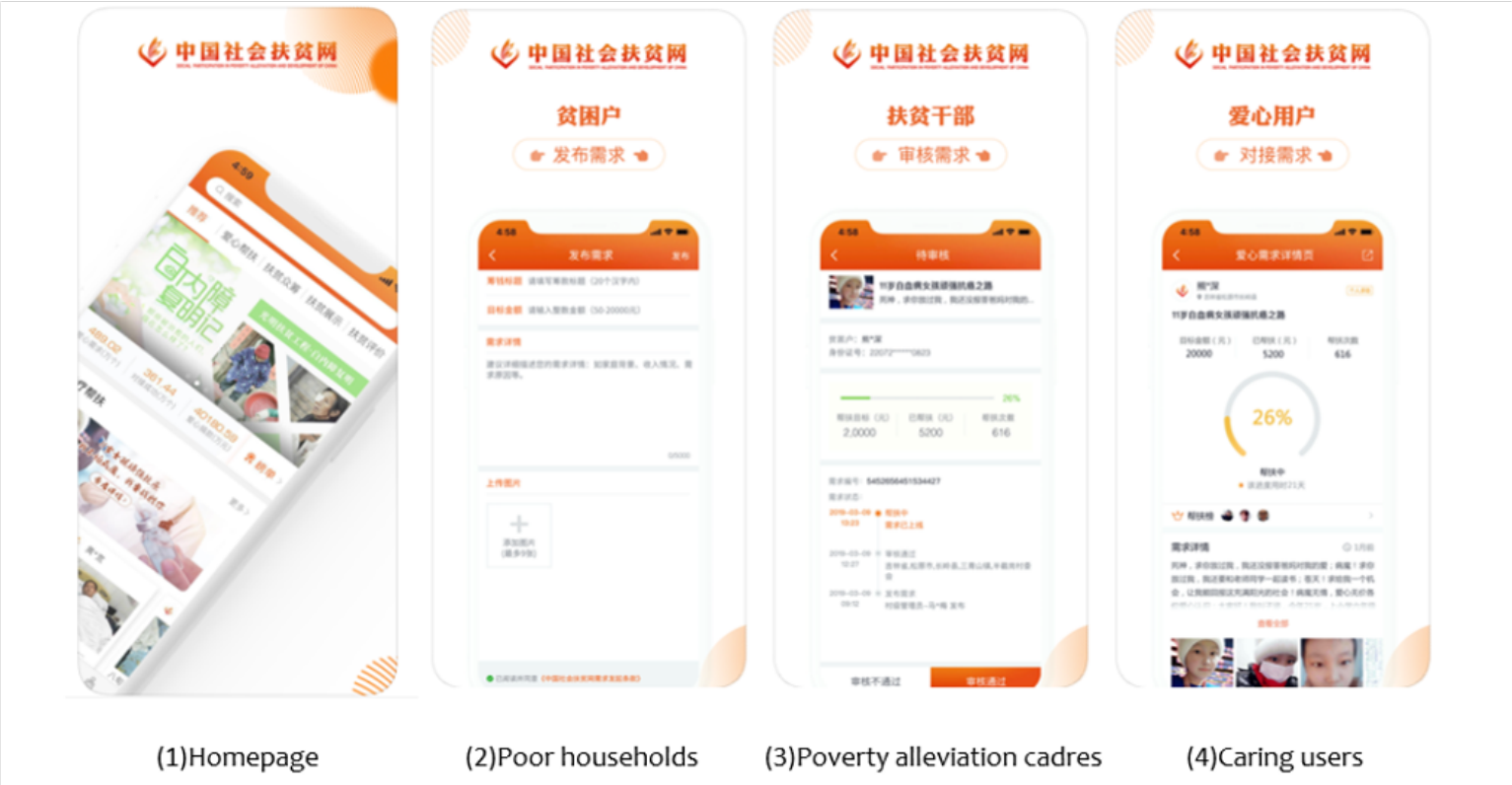
(1) Its homepage includes Magic, Popular, Newest, Ending Soon.

(2) For all projects, users can find a plan based on their interests from a lot of categories.

(3) For a project, users can learn the creator's story and vision.

(4) After learning the details of the project, users can donate to participate in this campaign.

Poverty Alleviation Crowdfunding



(1)Homepage (2)Poor households (3)Poverty alleviation cadres (4)Caring users

How Social Poverty Alleviation-Love Charity Crowdfunding Platform works:

(1) Its homepage includes: Love Support, Crowdfunding for Poverty Alleviation, Poverty Alleviation Exhibition and Poverty Alleviation Evaluation.

(2) For poor households, users can input the title, target amount, detailed demand, and some attachments.

(3) For poverty alleviation cadres, users can review the cases.

(4) For caring users, people can help others.

Medical Crowdfunding

(1)Submit information

(2)Case details

(a)Share in WeChat Moment

(b)Share in WeChat Group

(3)Information diffusion

(4)Love homepage

How Waterdrop Fundraising Platform works:

(1) It includes a fundraiser uses an app to submit some essential information.

(2) After authenticity review, the website will generate a case description detailed page.

(3) In the process of information diffusion, people can spread fundraising information by sharing the message in WeChat Moment or WeChat groups.

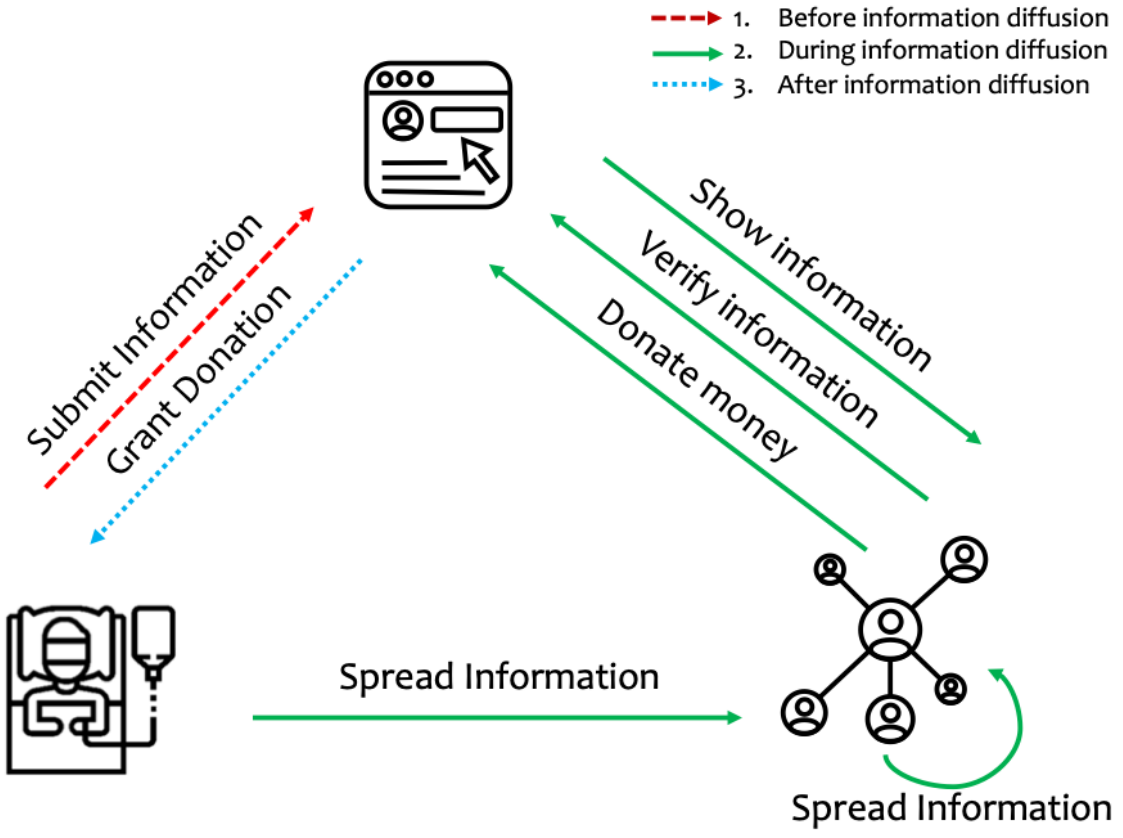
(4) Its love homepage will show some cases in process which may attract some caring people.

Comparison for Different Crowdfunding Models

- Comparison for different crowdfunding models:

	Medical crowdfunding	Poverty alleviation crowdfunding	Commercial crowdfunding
Target	Healing disease	Poverty alleviation	Accomplishing plan
Time	In a short time	In a long time	In a longer time
Platform Organizer	Companies	Goverments	Companies
Reward	No reward	No reward	Reward based on donations
Fundraiser	Patient	The poor	Organization/Individual
Fee	No fees	No fees	Some fees (e.g., 5%)
Risk	No risk	No risk	High risk
Utility of information diffusion	Important	General	General
Relationship with fundraiser	Close relationship	Strange relationship	Based on interest

Medical Crowdfunding Mechanism



Medical fundraising on the web can be divided into three phases:

(i) Before the information diffusion, a fundraiser proposes a new case to the platform to conduct a preliminary review.

(ii) During the information diffusion, users use their social networks to spread the crowdfunding information and call for donations. The platform collects verified information and donations from social networks.

(iii) After the information diffusion, the platform grants the donations to the fundraiser.

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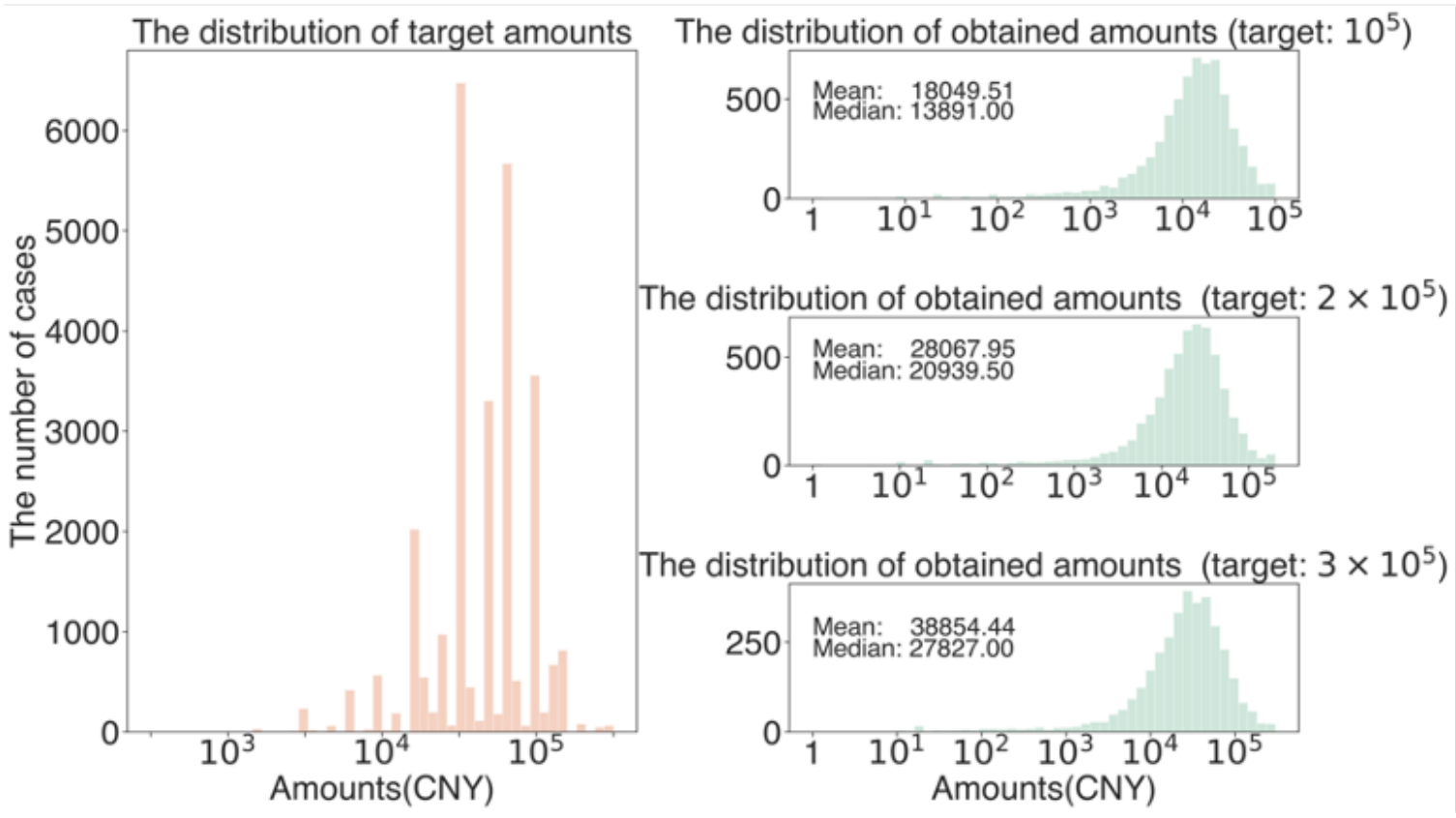
- Dataset Source:
  - Our dataset is randomly selected from logs spanning a month in March of 2019, including a total of 28,000 cases.
- Inequality in Donations



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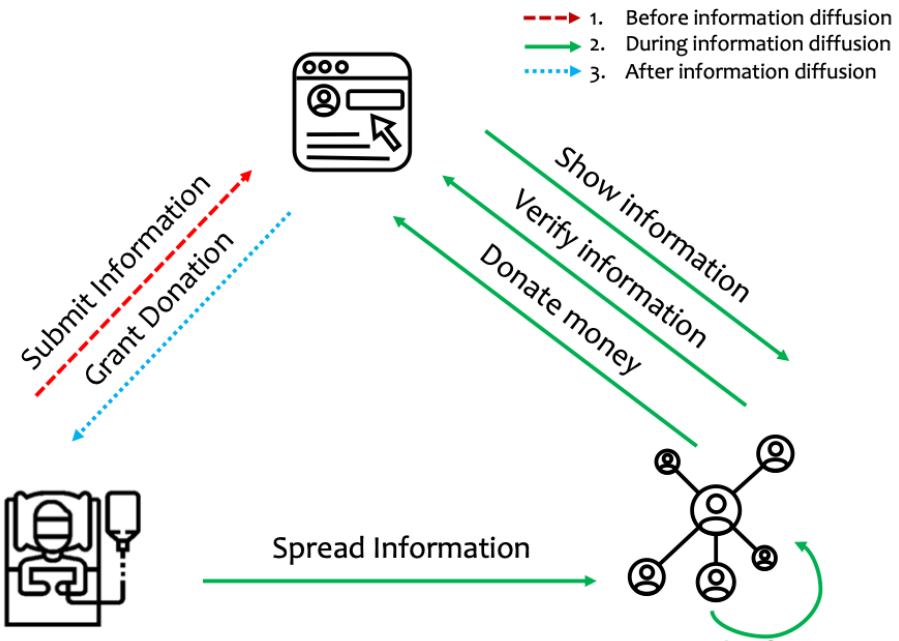
1. What factors affect fundraising campaigns at different phases of **information diffusion**?
   - Before the information diffusion, what **social status factors** will affect the fundraising campaign?
   - During the information diffusion, what **social network factors** will affect the fundraising campaign?
2. Based on social status factors and social network factors, can we build **a predictive model that predicts future fundraising result in the early stages of information diffusion**?



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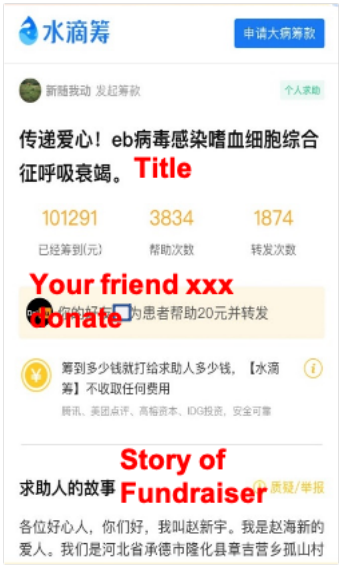

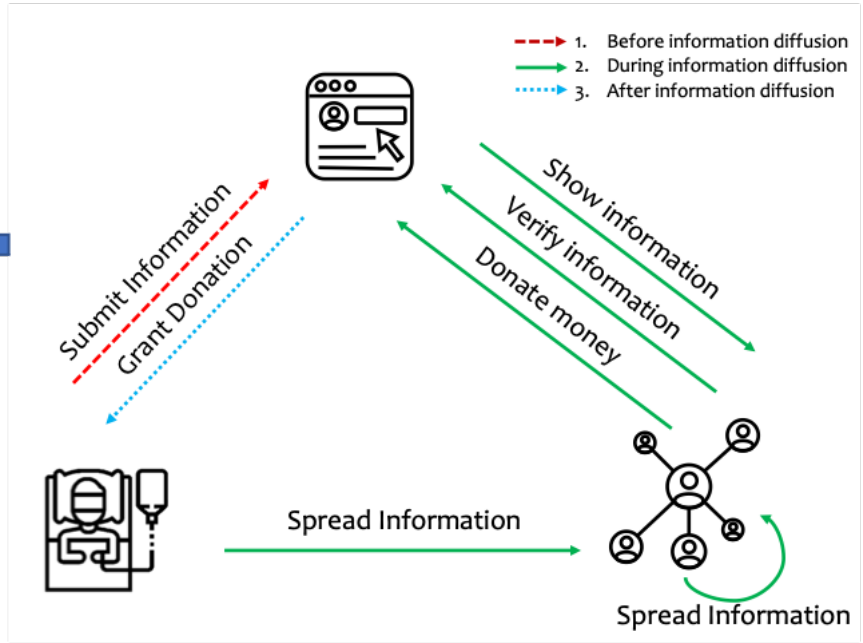

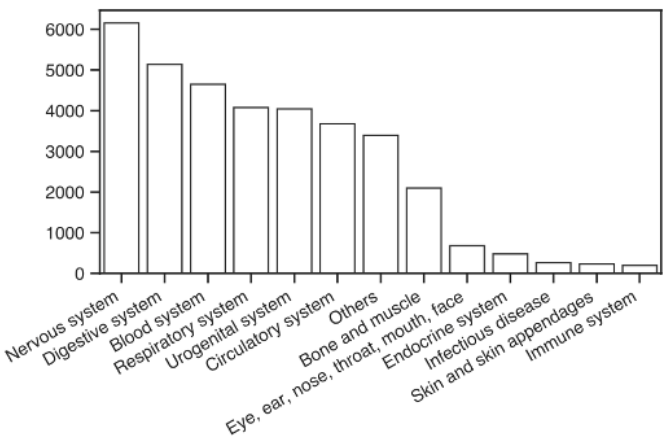

Disease Classification

Variable	Total	Top10%	Bottom10%	R
Gender	Male (61.3%) Female (38.7%)	Male (61.5%) Female (38.5%)	Male (61.1%) Female (38.9%)	0.002
Age	46.96 (±17.02)	35.97(±17.11)	48.60 (±17.97)	−0.155**
Target amount	$10^{5.131(\pm 0.327)}$	$10^{5.401(\pm 0.220)}$	$10^{4.947(\pm 0.426)}$	0.342**
Text content length	445.70 (±225.62)	572.15 (±286.73)	358.36 (±209.28)	0.228**
Title content length	20.18 (±4.59)	20.47 (±4.45)	19.44 (±5.34)	0.055**
# Diseases	1.50 (±1.14)	1.58 (±1.12)	1.03 (±1.05)	0.145**
# Locations mentioned (Province)	1.77 (±0.89)	1.90 (±0.97)	1.62 (±0.93)	0.084**
# Locations mentioned (City)	1.79 (±1.36)	2.12 (±1.58)	1.47 (±1.17)	0.120**
Negative score	0.32 (±0.32)	0.36 (±0.29)	0.33 (±0.36)	0.021**

Analysis of the Factors on the Fundraising Information

Outline

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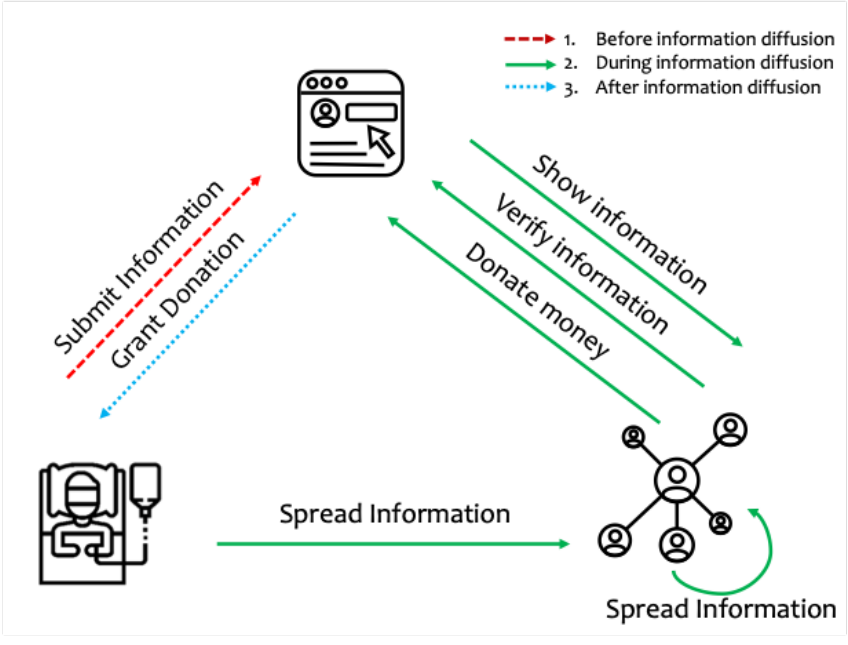
Social Network Verification

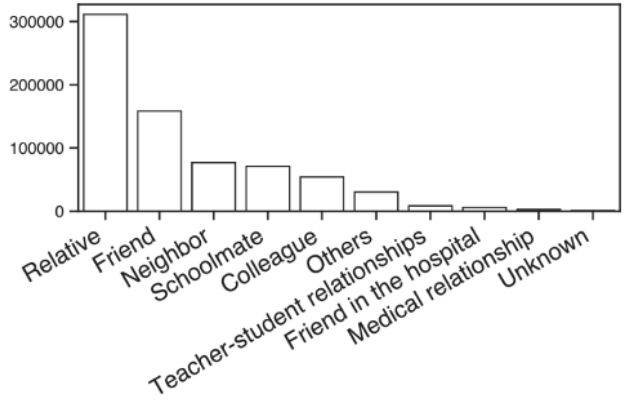


The brother of the classmate is seriously ill, I hope everyone can help

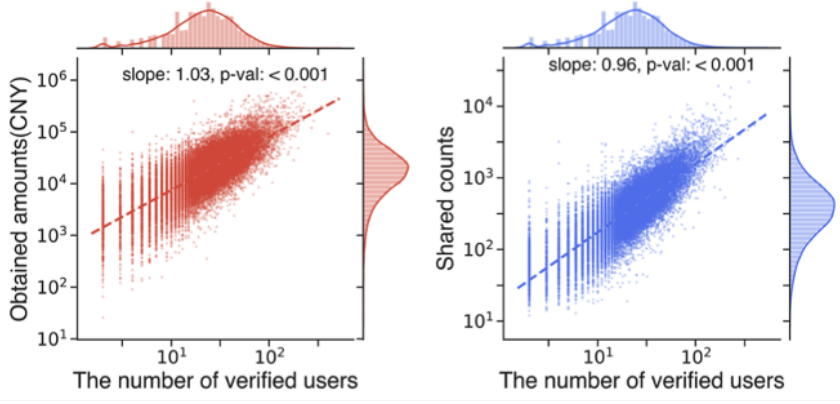
(a)Share in WeChat Moment

My friend's brother, I hope everyone can help

(b)Share in WeChat Group

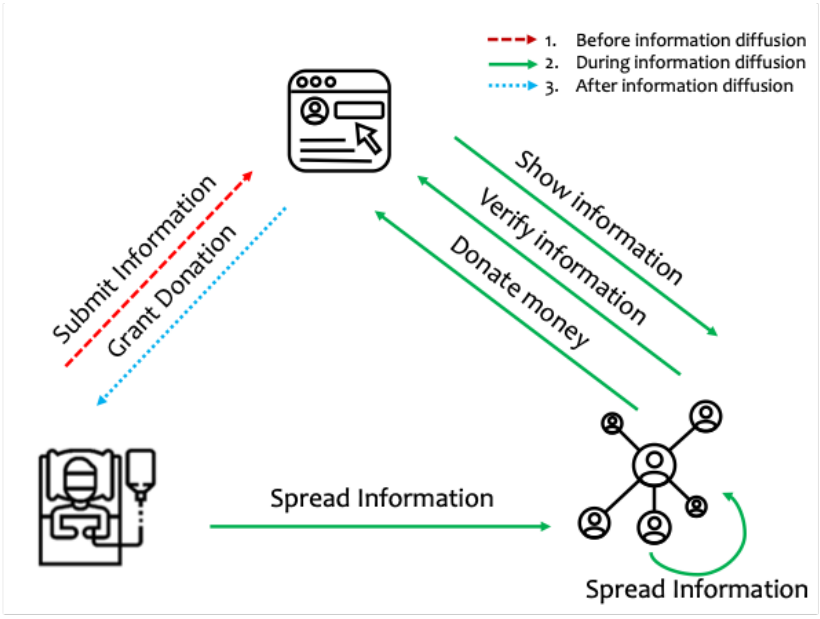


Relationships between Verified Users and Fundraisers



Verifed Users Analysis

Social Utility of the Platform



(a)Share in WeChat Moment

(b)Share in WeChat Group

Love Homepage

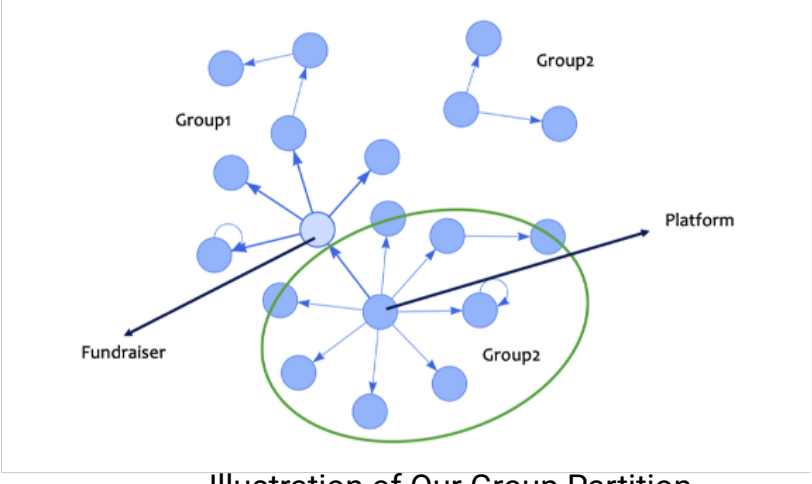
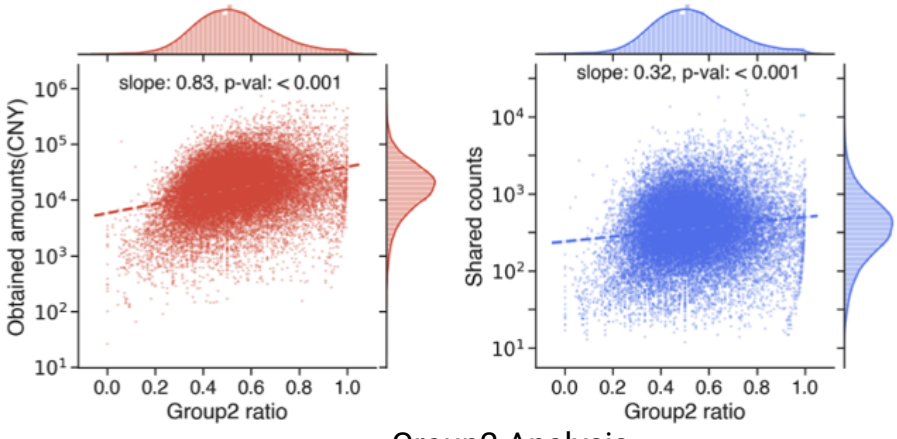


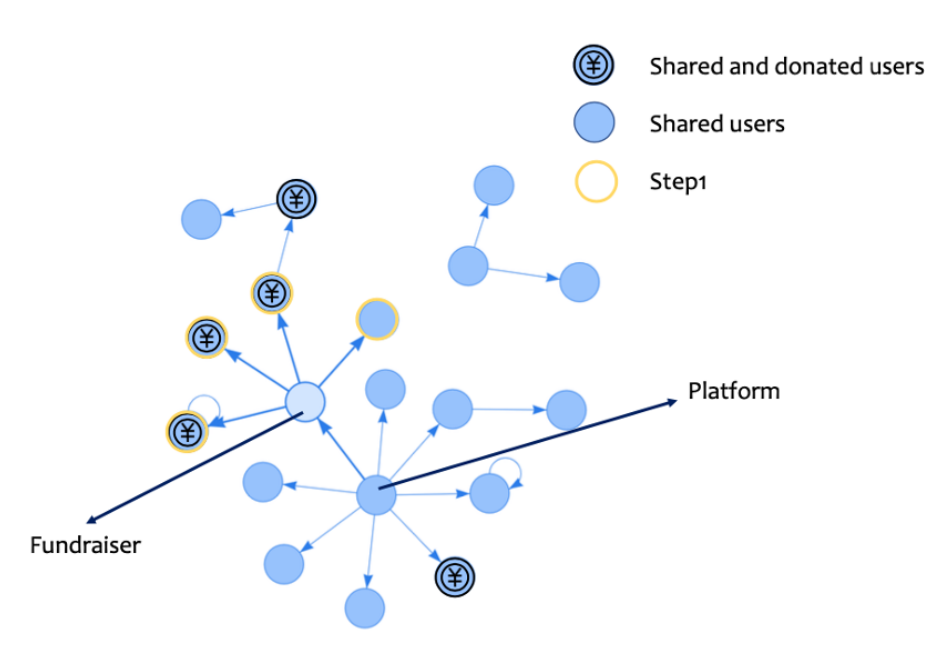
Illustration of Our Group Partition



Group2 Analysis

Donation in the Information Cascade

- We define users who share the fundraising case from the fundraiser as the ‘step1’. We define other users as ‘other’.



- The proportion of donation in ‘step1’(0.647) is significantly lower than ‘other’(0.679), which p-Val < 0.001.
- But the average donation(101.9) is significantly higher than ‘other’(60.5), which p-Val < 0.001.

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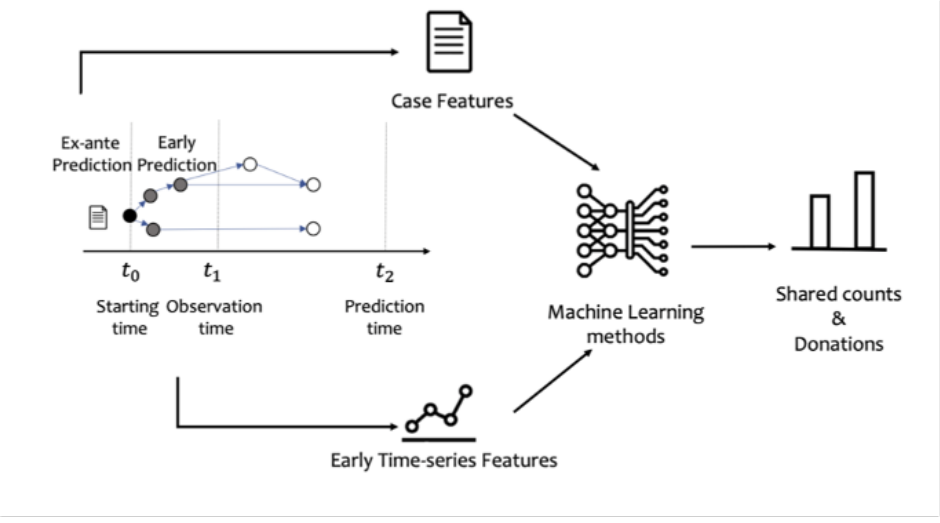
Prediction of Donations

- Machine learning methods on popularity prediction
  - Ex-ante prediction: only information available before a given cascade
  - Early prediction: the progression of a cascade for some time before making a prediction



Problem Definition

Prediction of donations in Waterdrop Fundraising

Prediction	Shared Counts			Donated Amounts		
Obeservation Time	1 day	2 day	3 day	1 day	2 day	3 day
ANN($X_{content}$)		0.9289			0.9925	
SH(X_t)	0.1414	0.0694	0.0436	0.1254	0.0058	0.0338
ML(X_t)	0.1247	0.0636	0.0446	0.1136	0.0533	0.0363
ANN(X_t)	0.1246	**0.0583**	**0.0383**	0.1134	0.0493	0.0308
ANN($X_t + X_{content}$)	**0.1218**	0.0584	0.0388	**0.1110**	**0.0489**	**0.0307**

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Conclusions

- Differences between different crowdfunding models.
- Most people can’t finish their goals.
- For social status impact, we find that some **personal information** affect the fundraising campaign.
- For social network impact, we analyze the **utility of the platform, the social network verification mechanism, and the one-hop neighborhood**.
- Last but not least, we adopted some popularity prediction methods for **predicting the shared counts and donation**.

Suggestions

- For fundraisers:
  - We can guide the fundraisers to **describe their situation**.
  - They should ask more friends to **verify their cases and call for more sharing**.
- For platforms:
  - They can develop some **monitor systems** to make more early decision to promote the campaigns.
  - Their **social network verification mechanism** can be helpful for fundraising campaigns.
  - Besides, **the utility of the platform** is important for medical crowdfunding.
  - The platform should add **user privacy, user fairness, and social responsibilities** to the design of the platform.