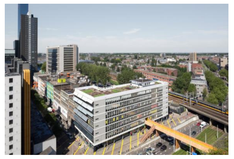
INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY
HYDERABAD

R&D SHOWCASE 2021

Civic Crowdfunding

Wooden Pedestrian Bridge in Rotterdam



Solar Panels Installation in Memphis

Civic Crowdfunding.
The process of arranging large amounts of small donations from lots of people - to produce shared goods that have value to communities

Provision Point Mechanism (PPM)

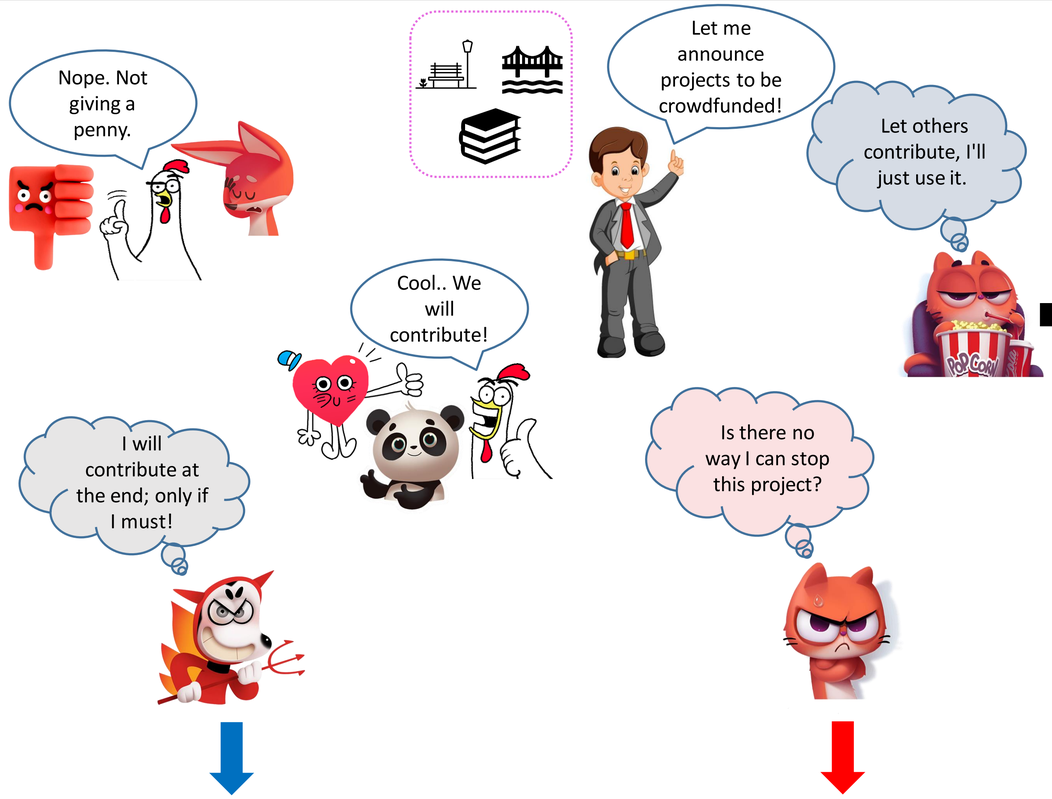
- Project comprises target value (T) and a deadline (D)
- Agents contribute depending on their valuations
- If T is collected by the deadline, the project is funded and implemented, else the contributions are returned

Crowdfunding Platforms

KICKSTARTER
FAIRCENT — EVERY % COUNTS
gofundme
FUEL A DREAM — THE CROWDFUNDING PLATFORM

Publications

1. Sankarshan Damle, Moin Hussain Moti, Praphul Chandra, and Sujit Gujar. "Designing Refund Bonus Schemes for Provision Point Mechanism in Civic Crowdfunding." 2nd Games, Agents, and Incentives Workshop at AAMAS 2020 (GAIW@AAMAS '20).
2. Sankarshan Damle, Moin Hussain Moti, Sujit Gujar, and Praphul Chandra. "Civic Crowdfunding for Agents with Negative Valuations and Agents with Asymmetric Beliefs" IJCAI, 2019
3. Sankarshan Damle, Moin Hussain Moti, Sujit Gujar, and Praphul Chandra. "Designing Refund Bonus Schemes for Provision Point Mechanism in Civic Crowdfunding" AAMAS, 2019
4. Praphul Chandra, Sujit Gujar, and Y. Narahari. "Referral-Embedded Provision Point Mechanisms for Crowdfunding of Public Projects." AAMAS, 2017
5. Chandra, Praphul, Sujit Gujar, and Y. Narahari. "Crowdfunding public projects with provision point: A prediction market approach." Proceedings of the Twenty second ECAI, IOS Press, 2016

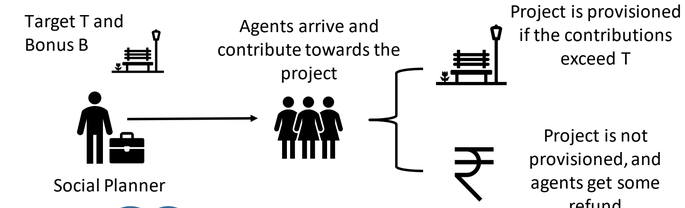


Mechanism to avoid free riding

In public projects, since players cannot be excluded from enjoying its benefits, strategic players may not contribute – *free riding*

PPR introduces the concept of a *refund bonus scheme*

Provision Point Mechanism with Refunds (PPR)



Mechanisms for sequential games and avoiding race condition

Chandra et al. [5] observe that the refund bonus scheme introduced is PPR is *independent* of time
- Agents *delay* their contributions until the deadline
- May lead to *race condition*!

PPS [5]: Refund's agents such that it *decreases* with time

For blockchain-based platforms (like Ethereum) – which does not require trust – one needs to develop computationally efficient solutions
- PPRG [1] with refunds through *geometric progression*

These mechanisms comprise *subgame perfect equilibria* [1,5]

Mechanisms for agents with asymmetric beliefs and negative preferences

Agents with asymmetric beliefs require additional incentives

Damle et al [2,3] present a *two-stage* mechanism to incentivize asymmetric agents to contribute proportionally to their beliefs
- For e.g., PPRx (over PPR) and PPSx (over PPS)

For agents with negative valuation for the project, the social planner sets up two *separate* markets, one for and one against provisioning [2,3]
- For e.g., PPRN (over PPR) and PPSN (over PPS)

The incentive structure uses *common refund schemes*

Mechanisms for multi-project case

The social planner may deploy multiple projects *simultaneously* for provisioning. In such a case, it is rational to assume that agents are *budget-constrained*

We look to develop constraints that a refund mechanism must satisfy for provisioning of a subset of projects

We show that existing refund mechanisms will not work in a multi-project environment with budgeted agents, i.e., multi-project civic crowdfunding is a challenge

We also aim to develop *Reinforcement-learning* (RL) based simulators that mimic rational agents to derive equilibrium contributions

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