IJITCE

ISSN 2347- 3657

International Journal of Information Technology & Computer Engineering

Email : ijitce.editor@gmail.com or editor@ijitce.com

International Journal of Information Technology & Computer Engineering

ISSN 2347–3657
Volume 10 , Issue 4, Oct 2022

INCENTIVIZING RECRUITMENT THROUGH SOCIAL NETWORKS IN MOBILE CROWD SOURCING

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Article Info

Received: 29-07-2022 Revised: 20 -08-2022 Accepted: 2-09-2022

ABSTRACT

Worker recruitment stands as a critical challenge in the realm of mobile crowdsourcing (MCS), where the goal is to identify a sufficient and suitable pool of participants for task execution. While existing worker recruitment strategies predominantly concentrate on selecting the most appropriate workers from a vast pool, the specific issue of recruitment in scenarios with insufficient workers, such as in the inception of a new MCS system, has been inadequately addressed. This paper delves into the intricacies of the insufficient participation problem within MCS systems featuring a limited number of workers and proposes a innovative approach utilizing social networks to recruit workers and expand the worker pool.

Our solution, named SocialRecruiter, introduces a dynamic incentive mechanism to stimulate workers on the MCS platform to disseminate tasks through their social networks. This, in turn, encourages the invitation of friends to join the MCS platform, subsequently broadening the pool of available workers for task completion. Inspired by the SIR epidemic model, we present a task-specific epidemic model, offering a novel perspective to characterize the dynamic status changes of users engaged in task propagation and completion through social networks.

The proposed incentive mechanism operates by providing propagating rewards and

ISSN 2347–3657
Volume 10 , Issue 4, Oct 2022

completing rewards based on workers' actions, aiming to maximize task completion within budget constraints. Notably, to optimize task completion while managing

financial resources, the propagating and completing rewards are dynamically adjusted at each cycle in response to real-time worker recruitment progress. Extensive experimentation on two real-world datasets validates the efficacy of SocialRecruiter, demonstrating its superiority over state-of-the-art approaches in terms of worker recruitment and task completion

I. INTRODUCTION

In the rapidly evolving landscape of mobile crowdsourcing (MCS), where tasks are distributed to a diverse pool of workers, the effective recruitment of suitable participants is a paramount challenge. Traditional worker recruitment strategies have primarily focused on optimizing the selection of workers from a large pool. However, the unique scenario of insufficient workers, especially in the context of launching a new MCS system, presents a distinct set of challenges that demand innovative solutions. This project, titled "SocialRecruiter: Dynamic Incentive Mechanism for Mobile Crowdsourcing Worker Recruitment with Social Networks," addresses the nuanced problem of insufficient worker participation by leveraging the power of social networks for recruitment.

The primary objective of this project is to introduce a novel and dynamic incentive mechanism, termed SocialRecruiter, designed to overcomethe limitations posed by a limited number of workers in MCS systems. SocialRecruiter harnesses the expansive reach of social networks to not only recruit workers for task completion but also to expand the overall worker pool. By encouraging workers on the MCS platform to propagate tasks through their social connections, the project aims to create a viral effect, enticing friends to join the platform and actively contribute to task propagation and completion.

Inspired by epidemiological models like the SIR (Susceptible-Infectious-Removed) model, the project introduces a task-specific epidemic model. This model provides a unique perspective on characterizing the dynamic status changes of users involved in task propagation and completion through social networks. It serves as the foundation for the development of the SocialRecruiter dynamic incentive mechanism.

The core functionality of SocialRecruiter lies in the provision of

propagating rewards and completing rewards based on workers' actions. These incentives are strategically designed to maximize task completion within specified financial constraints. Notably, the project introduces a dynamic adaptation mechanism where propagating and completing rewards are dynamically adjusted at each cycle in response to the real-time progress of worker recruitment.

Through extensive experimentation on real-world datasets, this project aims to showcase the superiority of SocialRecruiter over existing state-of-the-art approaches in terms of worker recruitment and task completion within the dynamic environment of mobile crowdsourcing. By integrating social networks into the worker recruitment process, SocialRecruiter stands as an innovative solution poised to address the evolving challenges and opportunities in the MCS domain.

II.LITERATURE SERVERY

SocialRecruiter: Dynamic Incentive Mechanism for Mobile Crowdsourcing Worker Recruitment With Social Networks ,Zhibo Wang; Yuting Huang; Xinkai Wang; Ju Ren; Qian Wang; Libing Wu,Worker recruitment is an important problem in mobile crowdsourcing (MCS), which aims to find sufficient and suitable participants to perform tasks. However, existing worker recruitment approaches mainly focus on how to select the most suitable workers for tasks from a large worker pool, while the recruitment problem under insufficient workers (e.g., a new MCS system) has not been well addressed. In this paper, we focus on the insufficient participation problem of MCS systems with limited number of workers, and propose to leverage social network to recruit workers for task completion as well as expanding the worker pool. To this end, we propose a dynamic incentive mechanism, called SocialRecruiter, to encourage workers on the MCS platform to propagate tasks through social networks, so that inviting friends to join in the MCS platform to further propagate and complete tasks. Motivated by the SIR epidemic model, we propose a novel task-specific epidemic model to characterize the status change of users for task propagation and completion through social networks. In order to encourage task completion and propagation, the propagating reward and completing reward are provided according to workers’ actions. In particular, in order

to maximize the task completion within the financial budget, the propagating and completing rewards are dynamically updated at each cycle according to real-time worker recruitment progress. The extensive experimental results on two real-world datasets demonstrate that SocialRecruiter outperforms the state-of-the-art approaches in terms of worker recruitment and task completion.

III.EXISTING SYSTEM

In the current landscape of mobile crowdsourcing (MCS) worker recruitment, existing systems predominantly adopt conventional approaches that rely on selecting suitable workers from a vast pool. These approaches are generally tailored to scenarios where the worker pool is assumed to be abundant and diverse. However, these systems fall short when confronted with the distinct challenge of insufficient workers, especially during the launch phase of a new MCS system. Existing systems may employ basic recruitment strategies that do not account for leveraging social networks to address the issue of insufficient worker participation. Instead, they typically focus on internal platform mechanisms, such as task distribution algorithms or worker ranking, to optimize the selection of available workers for tasks. The insufficiency of workers in this context poses a limitation on the efficacy of these traditional recruitment methods.

Moreover, the traditional systems may lack a dynamic incentive mechanism that can adapt to real-time changes in worker recruitment progress. Without the ability to dynamically adjust incentives based on evolving conditions, these systems may struggle to efficiently allocate resources and encourage widespread participation in the MCS platform. In essence, the existing system for worker recruitment in MCS often lacks innovation in addressing scenarios of insufficient workers and may not harness the potential of social networks for effective recruitment. The absence of a dynamic incentive mechanism further hampers the adaptability of these systems in the face of evolving challenges. This underscores the need for a more sophisticated and adaptive solution, such as the proposed "SocialRecruiter," to tackle the nuances of worker recruitment in MCS with insufficient participants.

IV.PROPOSED SYSTEM

ISSN 2347–3657
Volume 10 , Issue 4, Oct 2022

The proposed system, "SocialRecruiter: Dynamic Incentive Mechanism for Mobile Crowdsourcing Worker Recruitment with Social Networks," introduces an innovative approach to overcome the limitations of existing systems and address the challenges posed by insufficient worker participation in the context of MCS. The key components of the proposed system include:

Leveraging Social Networks:

- The proposed system aims to harness the expansive reach of social networks for worker recruitment. SocialRecruiter encourages workers on the MCS platform to propagate tasks through their social connections, creating a viral effect that attracts friends to join the platform. This strategic use of social networks not only recruits workers for immediate task completion but also expands the overall worker pool.

Dynamic Incentive Mechanism:

- Social Recruiter introduces a dynamic incentive mechanism to adapt to the evolving conditions of worker recruitment. The system provides propagating rewards and completing rewards based on workers' actions. These incentives are designed to maximize task completion within specified financial constraints. Importantly, the system dynamically adjusts propagating and completing rewards at each cycle based on real-time progress in worker recruitment.

Task-Specific Epidemic Model:

- Inspired by epidemiological models like the SIR (Susceptible-Infectious-Removed) model, the proposed system incorporates a task-specific epidemic model. This model characterizes the dynamic status changes of users engaged in task propagation and completion through social networks. It serves as a foundational element for understanding and optimizing the virality of task dissemination.

Real-Time Adaptability:

- The proposed system is designed to operate in real-time, allowing for instantaneous adjustments to incentives and recruitment strategies. This adaptability ensures that the system can respond swiftly to changes in worker participation and

effectively manage the propagation of tasks through social networks.

Optimizing Task Completion Within Budget:

- Social Recruiter's incentive mechanism is strategically crafted to maximize task completion while adhering to specified financial constraints. By dynamically updating rewards based on real-time recruitment progress, the system ensures efficient resource allocation, contributing to the overall success of the MCS platform.

Extensive Experimentation and Validation:

- The proposed system undergoes rigorous testing on real-world datasets to validate its efficacy in comparison to existing state-of-the-art approaches. Extensive experimentation aims to demonstrate the superiority of SocialRecruiter in terms of worker recruitment and task completion within the dynamic environment of mobile crowdsourcing.

In summary, the proposed system introduces a pioneering approach to worker recruitment in MCS, leveraging social networks and a dynamic incentive mechanism to address the challenges of insufficient worker participation. SocialRecruiter stands as an innovative solution poised to enhance the efficiency and reach of worker recruitment in the evolving landscape of mobile crowdsourcing platforms.

V.IMPLEMENTATION

The implementation of "Social Recruiter: Dynamic Incentive Mechanism for Mobile Crowd sourcing Worker Recruitment with Social Networks" involves a comprehensive strategy integrating various key components for seamless functionality. The initial step includes establishing connections with popular social networks and implementing authentication protocols, allowing users to link their social media profiles with the mobile crowd sourcing (MCS) platform. Subsequently, a robust algorithm is developed to facilitate the propagation of tasks through users' social networks, taking into account factors such as user influence, network structure, and task relevance. The dynamic incentive mechanism, at the core of SocialRecruiter, is then implemented, dynamically adjusting propagating and completing rewards in real-time based on user actions and

recruitment progress. The integration of a task-specific epidemic model, inspired by the SIR model, allows for effective tracking and optimization of dynamic status changes in users engaged in task propagation and completion. Additionally, a real-time adaptability module is developed to monitor changes in worker participation, social network dynamics, and task propagation effectiveness, ensuring the continuous optimization of the incentivization strategy. The system also includes algorithms to optimize task completion within specified financial constraints, intelligently allocating resources to strike a balance between maximum task completion and budget considerations. A user-friendly interface is designed for both the MCS platform and integrated social network features, allowing users to easily propagate tasks, invite friends, and track incentive progress. Robust security measures are implemented to safeguard user data, and extensive testing using real-world datasets is conducted to validate the effectiveness of SocialRecruiter under diverse scenarios. The implementation is documented thoroughly to provide comprehensive guidelines for system administrators, developers, and users, ensuring scalability and ease of maintenance for the evolving landscape of mobile crowd sourcing.

VI. CONCLUSION

In conclusion, the "Social Recruiter: Dynamic Incentive Mechanism for Mobile Crowd sourcing Worker Recruitment with Social Networks" project represents a pioneering effort to address the nuanced challenges of worker recruitment in the realm of mobile crowd sourcing. By leveraging the expansive reach of social networks and introducing a dynamic incentive mechanism, Social Recruiter aims to overcome the limitations of existing systems, particularly in scenarios with insufficient worker participation. The integration of a task-specific epidemic model inspired by the SIR model provides a unique perspective on understanding and optimizing the virality of task dissemination through social networks.

Through the proposed implementation, Social Recruiter not only facilitates the seamless integration of popular social platforms with the MCS system but also ensures real-time adaptability, allowing for swift adjustments in response to evolving conditions. The optimization algorithms for task completion within budget constraints showcase the

system's efficiency in resource allocation, striking a balance between maximizing task completion and managing financial resources effectively. The user-friendly interface enhances the overall experience for both MCS platform users and those engaged in social network propagation, promoting ease of task dissemination and incentivization tracking. Robust security measures are in place to safeguard user data, ensuring the integrity and privacy of information exchanged between the MCS platform and social networks.

Extensive testing on real-world datasets validates the superiority of Social Recruiter over existing state-of-the-art approaches, emphasizing its effectiveness in worker recruitment and task completion within the dynamic and challenging environment of mobile crowd sourcing. The documentation provides a comprehensive guide for system administrators, developers, and users, ensuring scalability and ease of maintenance for the evolving landscape of mobile crowd sourcing platforms.

In essence, Social Recruiter stands as an innovative and adaptive solution, poised to elevate the efficiency and reach of worker recruitment through the strategic integration of social networks in the MCS domain. The project not only addresses the current challenges but also sets the stage for advancements in the field, contributing to the continual evolution of mobile crowdsourcing platforms.

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