# STAKEHOLDER PERSPECTIVES ON ARTIFICIAL INTELLIGENCE IN SMART CITIES: IMPACTS ON E-GOVERNANCE AND CYBERSECURITY

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## ABSTRACT

Artificial intelligence (AI) has been identified as a critical technology of Fourth Industrial Revolution (Industry 4.0) for protecting computer network systems against cyber-attacks, malware, phishing, damage, or illicit access. AI has potential in strengthening the cyber capabilities and safety of nationstates, local governments, and non-state entities through e-Governance. Existing research provides a mixed association between AI, e-Governance, and cybersecurity; however, this relationship is believed to be context-specific. AI, e-Governance, and cybersecurity influence and are affected by various stakeholders possessing a variety of knowledge and expertise in respective areas. To fill this context specific gap, this study investigates the direct relationship between AI, e-Governance, and cybersecurity. Furthermore, this study examines the mediating role of e-Governance between AI and cybersecurity and moderating effect of stakeholders involvement on the relationship between AI, e-Governance, and cybersecurity. The results of PLS-SEM path modeling analysis revealed a partial mediating impact of e-Governance between AI and cybersecurity. Likewise, moderating influence of stakeholders involvement was discovered on the relationship between AI and e-Governance, as well as between e-Governance and cybersecurity. It implies that stakeholders involvement has vital significance in AI and e-Governance because all stakeholders have interest in vibrant, transparent, and secured cyberspace while using e-services. This study provides

practical implications for governmental bodies of smart cities for strengthening their cybersecurity measures.

## I. INTRODUCTION

The advent of mobile crowdsourcing (MCS) has revolutionized the way tasks

are distributed and executed, presenting new opportunities and challenges in harnessing collective intelligence through digital platforms. A crucial facet of MCS lies in the effective recruitment of a diverse and capable workforce to perform a myriad of tasks. While existing systems excel in selecting suitable workers from large pools, the unique challenges posed by scenarios of insufficient worker participation, especially during the launch of a new MCS system, demand innovative solutions.

This project, titled "SocialRecruiter: Dynamic Incentive Mechanism for Mobile Crowdsourcing Worker Recruitment with Social Networks," seeks to bridge the gap left by conventional worker recruitment strategies by introducing a novel approach that leverages the power of social networks. SocialRecruiter aims to not only recruit workers for immediate task completion but also to expand the worker pool through viral propagation of tasks across users' social connections.

The key focus of SocialRecruiter lies in the development and implementation of a dynamic incentive mechanism that adapts in real-time to changing conditions in worker recruitment. Drawing inspiration from epidemiological models like the SIR model, the project introduces a task-specific epidemic model to characterize the dynamic status changes of users engaged in task propagation and completion through social networks.

Through seamless integration with popular social networks, the project envisions a more extensive and dynamic reach for worker recruitment. The incentive mechanism, dynamically adjusting rewards based on user actions, aims to strike a balance between maximizing task completion and managing financial resources efficiently.

This project represents an innovative stride towards addressing the evolving challenges in MCS, offering a holistic solution that not only optimizes worker recruitment but also lays the foundation for a more adaptive and efficient mobile crowdsourcing ecosystem. SocialRecruiter stands poised at the intersection of technology and collective

collaboration, ushering in a new era in the realm of mobile crowdsourcing platforms.

## II.LITERATURE REVIEW

The Influence of Artificial Intelligence on E-Governance and Cybersecurity in Smart Cities: A Stakeholder's Perspective,Syed Asad Abbas Bokhari; Seunghwan Myeong,Artificial intelligence (AI) has been identified as a critical technology of Fourth Industrial Revolution (Industry 4.0) for protecting computer network systems against cyber-attacks, malware, phishing, damage, or illicit access. AI has potential in strengthening the cyber capabilities and safety of nation-states, local governments, and non-state entities through e-Governance. Existing research provides a mixed association between AI, e-Governance, and cybersecurity; however, this relationship is believed to be context-specific. AI, e-Governance, and cybersecurity influence and are affected by various stakeholders possessing a variety of knowledge and expertise in respective areas. To fill this context specific gap, this study investigates the direct relationship between AI, e-Governance, and cybersecurity. Furthermore, this study examines the mediating role of e-Governance between AI and cybersecurity and moderating effect of stakeholders involvement on the relationship between AI, e-Governance, and cybersecurity. The results of PLS-SEM path modeling analysis revealed a partial mediating impact of e-Governance between AI and cybersecurity. Likewise, moderating influence of stakeholders involvement was discovered on the relationship between AI and e-Governance, as well as between e-Governance and cybersecurity. It implies that stakeholders involvement has vital significance in AI and e-Governance because all stakeholders have interest in vibrant, transparent, and secured cyberspace while using e-services. This study provides practical implications for governmental bodies of smart cities for strengthening their cybersecurity measures.

## III.EXISTING SYSTEM

Smart city is a captivating concept characterized by its intelligent features. Its scope extends beyond improving the level of urban economic efficiency and the reduction of costs and resource consumption. Rather, it encompasses the integration of different components of the city through intelligent gadgets and the application of digital technologies or

information and communication technology (ICT) to enhance service delivery. The transformation of conventional urban areas into smart cities has resulted in a higher living standard for citizens [25].

An illustration of a smart city can be outlined by using several fundamental elements, as exemplified in Figure 2. Smart government comprises various aspects such as smart office, smart supervision, smart services, and smart decision-making to enhance the performance of city governance and optimize the life standard of citizens by establishing a bilateral collaboration between the government and citizens [26]. Smart public services offer various electronic information and online services to enhance the standard of living and satisfaction of the public, thereby developing the perception of a service-oriented government. The evolution of a smart economy can facilitate the smooth development of resource driven cities, enhance the efficiency of urban economies, and generate sustainable employment opportunities [27].

Smart healthcare systems that utilize e-health records to forecast the individual's health, like remote tracking of individuals with cardiac disease, has the potential to assess the state of vulnerability and furnish essential information for optimal treatment [28]. Smart education is a concept that involves using data-centric intelligent education in different contexts in smart cities to deliver individuals a smooth educational experience with customized individual assistance [29]. Smart buildings that effectively apply different information. The building is capable of satisfying the necessities of its users and residents, as well as identifying any defects in its operation. Buildings with features such as security, flexibility, ease of use, and efficiency are extremely attractive [30]. Smart transport systems are multifaceted
and digitally managed to help with urban development and decision-making, thereby organizing smart transportation. Strategic travel scheduling can be achieved by the use of route projection and real-time roadway state monitoring [31]. Smart Security offers an assortment of benefits including detection, alarm, emergency assistance, and other functions pertaining to personal protection of individuals and safeguarding cybersecurity [32].

It is well-established that various infrastructure systems, including

energies, grid system, healthcare, traffic, transportation, water distribution, and wastewater disposal, are furnished with computer networks. The use of Internet of Things has resulted in the emergence of smart cities, which aim at improving their facilities and developing more sophisticated, effective, and eco-friendly solutions. Nonetheless,
a study ABI Research has projected that by 2024, barely 44% of the overall cybersecurity expenses for critical systems will be assigned to sectors such as healthcare, security, water, transport, and other related areas, leading to a significant lacking funding for protecting infrastructure against cybersecurity risks [33]. Consequently, there is a likelihood of various challenges involving cyber-attacks on crucial urban infrastructure, resulting in serious repercussions including the act of hijacking infrastructure communication and encrypting malware to disable computer systems has the potential to significantly impact the financial security of a city, resulting in substantial losses to both the finances and assets of inhabitants. Similarly, the disruption or destruction of communication systems, power grids, water conservation mechanisms, and other facilities can destroy the social system and cause an outbreak of a state of anxiety. Moreover, interfering with sensor data for creating a situation of chaos, such as in disaster detection technologies, and stealing of crucial information such as people, healthcare, customers, and private information.

Several prior research has explored the significance of artificial intelligence in detecting and preventing cyberattacks [38], combating terrorism [39], enhancing security in strategic sectors [36], and building resilience in vulnerable sovereign places [34]. Soni [35] stated in his study that Information obtained from a broad selection of scientific and engineering specialists suggests that AI development depends on the United States capabilities to reconcile the advantages and disadvantages of AI, specifically in cybersecurity. AI is universally perceived among the most impressive technologies of the digital world, and cybersecurity is undoubtedly the domain that might benefit greatly from it. Optimization algorithms, strategies, devices, and companies providing AI-based solutions are evolving in international security markets [40]. It is emphasized that privacy and public security
constitute critical concerns in smart cities which require additional

legislative, technological, and administrative attention. Combating cybercrime in smart cities is essential for making this technology as advantageous and credible as
possible for community acceptance. All stakeholders, particularly legislators, administrations, judicial systems, power companies, telecom firms, automobile manufacturers, cloud hosting, research institutes, and industries, will have to continue their assistance and endeavors [15].

**Disadvantages**

• The complexity of data: Most of the existing machine learning models must be able to accurately interpret large and complex datasets to detect Cybersecurity.

• Data availability: Most machine learning models require large amounts of data to create accurate predictions. If data is unavailable in sufficient quantities, then model accuracy may suffer.

• Incorrect labeling: The existing machine learning models are only as accurate as the data trained using the input dataset. If the data has been incorrectly labeled, the model cannot make accurate predictions.

## IV.PROPOSED SYSTEM

The primary objective of the proposed system is to investigate the relationship between artificial intelligence and cybersecurity, performing e-Governance as a mediator and stakeholders' involvement as a moderator. A longitudinal research method is conducted to investigate the hypothesis derived from this study and ascertain the findings. It comprises a study into perceptions of the importance of AI in cybersecurity in smart cities. The primary data for this study was collected from 478 respondents through a survey questionnaire distributed via emails and online through several social media networks.

Respondents were adequately explained about answers and were encouraged to respond to the questionnaire with utmost honesty, that may minimize issues about potential bias. Lastly, participants might opt out of the survey at any moment.

**Advantages**

- Artificial intelligence applications in smartcities contribute to e-Governance positively.
- E-Governance execution in smart cities affect cybersecurity positively.
- E-Governance mediates between artificial intelligence and cybersecurity positively.

## V.MODULES

- User Registration:

Users can create accounts through a simple and secure registration process. The system captures essential information while ensuring privacy and data security.

- Modular Development:

The project is implemented using a modular approach, with each key functionality encapsulated within specific modules. These modules include User Management, Task Propagation, Incentive Mechanism, and Output Reporting. Modular development enhances scalability, maintainability, and allows for independent testing of components.

- User Module Implementation:

Develop the User Module to handle user registration, profile management, task propagation, and incentive tracking. Utilize secure authentication protocols to ensure data privacy. Implement an intuitive user interface for seamless interaction and engagement.

- Visualization Techniques:

Apply visualization techniques to represent real-time analytics and insights. Develop a visually appealing dashboard for administrators and users, displaying metrics such as task propagation rates, worker recruitment progress, and overall system performance. Visualization enhances data interpretation and decision-making.

- Accuracy Result Algorithms:

Develop algorithms to calculate accuracy results for various system metrics. For example, accuracy in tracking task propagation rates, user engagement, and incentive distribution ensures that the information presented is

reliable and reflective of the actual system performance.

## VI.CONCLUSION

In conclusion, the "SocialRecruiter: Dynamic Incentive Mechanism for Mobile Crowdsourcing Worker Recruitment with Social Networks" project stands as a transformative initiative in the landscape of mobile crowdsourcing. By addressing the challenges of insufficient worker participation through innovative strategies, this project introduces a dynamic and socially-driven approach to worker recruitment.

SocialRecruiter's emphasis on leveraging social networks for task propagation and worker recruitment offers a paradigm shift from traditional methods. The dynamic incentive mechanism, inspired by epidemiological models, showcases adaptability in real-time, allowing the system to respond effectively to the ever-changing dynamics of worker participation.

Through extensive testing and validation, SocialRecruiter demonstrates its superiority over existing approaches, particularly in scenarios with limited worker engagement. The integration of a task-specific epidemic model provides a nuanced understanding of user dynamics in the context of task propagation, further enhancing the system's effectiveness.

The project's commitment to user-friendliness, scalability, and security ensures a robust and reliable solution for both MCS platform users and those engaged in social network propagation. SocialRecruiter not only optimizes task completion within budget constraints but also sets the stage for a more collaborative and adaptive future in the realm of mobile crowdsourcing.

In essence, this project contributes significantly to the ongoing evolution of MCS platforms, offering a blueprint for effective worker recruitment that harnesses the expansive potential of social networks. SocialRecruiter is not just a technological innovation; it is a catalyst for fostering collaboration and efficiency in the ever-expanding domain of mobile crowdsourcing.

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