



SUSTAINABLE AND SECURED SMART CITIES USING IoT

Arya Vithal Sherekar

Bombay Cambridge International School (East)
sherekararya@gmail.com

Abstract

What is a **SMART** city?

Self-Monitoring Analysis and Reporting Technology (Smart) are the devices that can monitor, communicate, analyze and react based on sensor data. Similarly, Smart Sustainable Cities (SSC) use the most advanced sensors, meters, actuators, and analysis tools to bring infrastructure, smart solutions, sustainable and efficient environments, subsidized and safe cities. Smart cities support different types of technologies, including information and communication technology (ICT), the Internet of Things (IoT), and geographic information system (GIS). This document focuses on security, privacy, and risks in smart cities, and focuses on threats related to information security. And the challenges faced by smart city infrastructure in managing and processing private data.

Keywords: *Information and communications technology, Internet of Things network, Geographical information systems, Privacy*

INTRODUCTION

According to the latest United Nations estimates, the average population of India is 1.35 billion (as of May 20, 2018). 70% of the total population live in rural areas and 30% live in cities. Mumbai, Chennai, Delhi, Kolkata, Hyderabad, Bangalore, Pune and Ahmedabad are all metropolitan areas in India. Obviously, less than 30% of capital cities in India have chronically low quality of life in their cities. The country urgently needs to improve the quality of life of citizens in metropolitan and rural areas. India faces several major obstacles that continue to hinder the development of urban infrastructure: complex governance structures, land valuation issues, capacity gaps and lack of funding are part of the urban challenges that severely hinder India's exciting new economic growth. India is a latecomer, more crowded and complicated. On the other hand, India needs a more efficient and sustainable solution to serve urban areas and can benefit from technology and learn best practices from other parts of the world. Therefore, India is building a world-class smart city, a self-sufficient environment with minimal pollution, improving recycling, optimizing energy supply and adequate public transportation.



In 2015, the Indian central government added a new dimension to urbanization and urban development policies and introduced smart city theory. As part of the contract, the Ministry of Urban Development (MoUD) developed a “Draft Concept Note on Smart City Scheme;”. Smart cities are those cities that have physical, social, institutional, and financial infrastructure. It is expected that such a "smart city” will provide ordinary people with opportunities to meaningfully realize their resources and benefits.

I) Vision: With the growth of urban population and the rapid expansion of territory, operators are looking for innovative ways to solve complex problems, increase efficiency and improve the quality of life. This creates a need for cities that control and integrate infrastructure; better optimize equipment and maximize services for citizens.

II) Mission: The mission of City IA is to promote the development of sustainable and inclusive cities and provide its citizens with core infrastructure and a decent life. The availability of high-quality public services such as water and energy is one of the core infrastructure elements of smart cities.

2) Reliable public transportation system

3) Provide residents with work and resources.

4) Provide sufficient conditions for people's entertainment and safety. Health status and learning opportunities are also needed.

5) Reduce waste by improving energy efficiency, reducing water conservation and proper waste management.

Smart city developers use advanced technologies such as mobile cloud computing, electronic objects, networks, sensors and machine learning technologies to enable the various components of the smart city to interact and interact with the norms. The city is to process and manage the information related to the existing data in the city database, and to connect the knowledge with the new systems and sensors that have an impact on security and privacy in the smart city. However, the smart city network infrastructure has brought new user security and privacy challenges, in which sensitive data is vulnerable to third-party attacks.

Table 1 Smart City Data Landscape Suggested

| Sector | Domain | Kind of Data | Application |
|----------------|---|--|---|
| Infrastructure | Transport and asset management, built environment | Monitoring data, registration data, geo data | Traffic and congestion patterns, real time dashboards |



| | | | |
|-----------------------|--|--|---|
| Sustainability | Energy usage, water, environment, weather | Sensor and monitoring data, civic measurement data | Air quality monitoring and pollution warnings |
| Health | Health, quality of life, well-being, life expectancy | Health data, survey data, life logging | Location specific noise levels and social or health problems in specific neighbourhoods |

Because there is little concrete empirical research yet about how people experience their privacy in smart cities, the actual placement of smart city technologies and data in one of the four quadrants in this framework is based on extrapolating and combining the research about people's privacy concerns discussed in the previous paragraph and the smart city data landscape suggested in

Table 1.

1.1 Smart Power Systems

All aspects of the smart city power system are critical to the entire security and data protection infrastructure, because third parties connected to the grid can track usage patterns and predict consumer behaviour. Smart cities, this will make the network vulnerable. A methodology for enhancing privacy within smart power systems-The proposed method uses demand models for different consumers connected to the network to provide new consumption patterns. The new pattern hides individual consumer attributes through the particle swarm optimization process. In the research process, the proposed method has been tested against genetic algorithms on many real-world consumption patterns, which shows that the proposed method is effective.

1.2 Smart Healthcare

Smart healthcare is a practical method for the intelligent management of patient flow systems in the healthcare industry. The introduction of smart medicine reduces costs, which is a very good disease. However, maintaining privacy and security is becoming an issue for the scalability of portable medical devices. Many design issues need to be resolved. The main security and privacy issues when designing IoT architectures in healthcare applications have highlighted the increasing use of sensors in medical and healthcare applications over the past decade. The importance of heart rate and blood pressure and overall system integration safety solutions. In a study, a solution was developed that enables data owners to authorize external healthcare providers to use attribute-based encryption (ABE) and identity-based transfer encryption (IBBE) to analyze data. This solution uses encryption and decryption processes, effectively entrusting most of the computing costs to the cloud. As a result, the computational workload of mobile devices with limited resources is reduced, thereby improving safety and efficiency.



1.3 Structures, Models, Algorithms, and Protocols for Improving Security and Privacy

As smart cities face various security and privacy issues, some studies have proposed various structures, models, and algorithms to improve these aspects. Integrate safe algorithms in smart city systems. Similarly, an encryption method provides a scheme called Complete Confidentiality and Recall Data-Based Transmission Encryption (FPPRIB). The proposed system should respect the confidentiality of data and the confidentiality of the identity of recipients and withdrawn users. Only authorized users can access the data. The revocation procedure does not provide any information about the content of the data or the identity of the recipient, and the identity of the recipient and the identity of the revoked user are not known to the public. These characteristics lead to smart city applications that need to protect personal data. As part of the research, an encryption protocol was developed to manage large amounts of personal data generated in a scalable and interoperable manner through electronic participation, and to ensure the privacy of smart city citizens. It is important to develop sufficient security or access to IoT systems to prevent attackers from controlling IoT devices or leaking sensitive information stored at the facility or node level. Protect user privacy while ensuring scalability and efficiency. The proposed platform effectively

Provides decentralized access control for IoT devices based on users' privacy preferences. SMARTIE aims to integrate privacy and user-centric privacy and governance within IoT applications in a scalable and efficient mode. The role of software in smart cities is very important, but it also brings some privacy and security issues, such as personal data, access to data centre information, and the impact of other applications and economic pressure. A mobile smart city application protocol that solves user privacy issues by integrating a pseudonym-based signature scheme and the signature delegation scheme into the OAuth2.0 protocol process (an authorization platform is a protocol that allows users to grant access to third-party websites or applications to access users' protected resources without revealing their long-term credentials or even their identity.). This product enables users to automatically generate pseudonyms for specific users and applications. It also provides enhanced data protection for user authentication on the service provider side.

1.4 Operational Security Vulnerabilities for Smart Cities

Data in smart city applications must withstand modification, manipulation, inspection, unauthorized access, disclosure, and destruction. Basic security and confidentiality requirements include confidentiality, integrity, availability, non-repudiation, access control, and confidentiality. Privacy issues are caused by security vulnerabilities in smart city applications, but without perceived security and privacy precautions, the public may be reluctant to use smart city mobile applications. Methods of collecting and processing personal data. They usually do not provide facilities and consent mechanisms to the community. For smart cars, the issue may be related to physical threats, communication interception, data security, and DoS. For IoT sensors, security threats may include data protection, secure communication, data management, data storage, sensor failure, and remote use. Finally, security threats to cloud platforms may include data leakage, malicious insider threats, insecure APIs, DoS, malware injection attacks, system and application vulnerabilities.



1.5 Social Media

Data collected from social networks on the Internet (such as Facebook, Instagram, LinkedIn) provide social, economic, and cultural information that can be used by governments, politicians, authorities, and companies. This can help them better understand the market trends and behaviours that affect personal dynamics, through open data sources. However, online social media may pose a threat to privacy. Disclosing on the Internet the risks, threats, and personal behaviours associated with social media to improve data protection, security, and social participation challenges in smart cities. The use of the Internet poses risks of endangering personal identity, anonymity, personal space, privacy and communication, as well as security threats from third parties. And implement appropriate guidelines, taking into account all stages of individual behaviour on social media.

Theory

Table 2 Books Related to Issues In Smart City.

| Book Name | Author |
|---|--------------------------------|
| From Smart Grids to Smart Cities: New Challenges in Optimizing Energy Grids | <u>Massimo La Scala</u> et al. |
| Block chain Technology for Smart Cities (Block chain Technologies) 1st ed. 2020 Edition | <u>Dhananjay Singh</u> et al. |

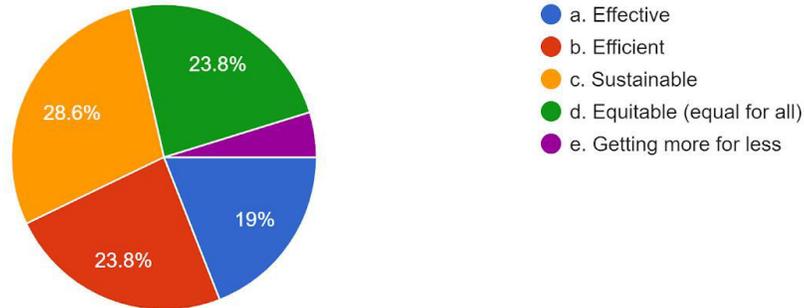
This book studies various algorithms and applications based on optimization theory to achieve multi-standard goals. The author showed in detail how the best network system for the transmission tower (i) corresponds to the load, (ii) minimizes energy costs, and (iii) ensures the stable and reliable operation of the grid. It can be formalized with limited general nonlinear optimization problems. Because these design goals contradict each other, there is no single solution to the optimal energy flow problem, and a suitable compromise must be found between the goals. Provide a comprehensive overview of all aspects of smart city development to ensure safe, reliable and reliable data transmission, put forward theoretical concepts and empirical research, as well as examples of smart city plans and their ability to create added value for citizens. These materials outline the most important aspects of the development and implementation of smart cities in various fields such as health, education, and transportation.



Experiment

What is your interpretation of “Smart” in a Smart City?

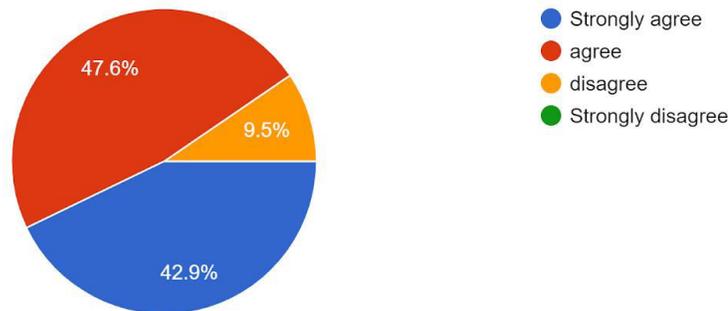
21 responses



Most of the people chose Sustainable which is correct, as it is referred to an eco-city, the smart city targets to enhance the high-satisfactory of city services or lessen its costs. ... Their primary purpose is to reconcile technological innovation with the economic, social, and ecological demanding situations of the city of tomorrow.

Do you think being 'smart' is essential to the future of cities

21 responses



It's true! Smart is essential to future cities as a smart metropolis must offer urban surroundings that offer an excessive first-class lifestyle to citizens. This will become more and more vital within side the mild of the future population increase in city areas, wherein extra green use of infrastructure and belongings could be required. Smart metropolis offerings and programs will permit those enhancements to cause a better quality of lifestyles for residents. We need smart cities in India to have well organised and developed country



Discussion

Significant developments in wireless and sensor technologies have paved the way for the widespread adoption of IoT technologies in smart city environments. Smart cities require the integration of key technologies such as the Internet of Things, big data, sensors, machine learning, and GPS. All these applications pose a major threat to the security and integrity of citizen data. The system must be technically rigorous and have sufficient security mechanisms to prevent data leakage and identify weaknesses. Smart grids, building automation systems, unmanned aerial vehicles (UAV) and electric vehicles (electric vehicles) have been largely ignored. Poor system quality the fragmented nature of smart city data can negatively affect the efficiency and accuracy of key business systems. These factors create additional risks associated with the large-scale deployment of systems and equipment from different manufacturers using the latest technology. The key factors related to privacy and security risks in smart cities highlight the threats caused by the imprecise roles and responsibilities of different parties. Inf Syst FrontContent is provided by Springer Nature and the terms of use apply.

The key factors are the lack of common understanding of key security requirements that are not shared between parties, flexibility of privacy policies, anonymity, and data sources. Users interact with mobile applications and interact with smart city infrastructure. However, solving the privacy problem in the smart city environment seems to be a major technical challenge facing system designers and developers. The privacy protection system must be closely related to ongoing security requirements, and the implementation of security requirements is critical to the trust and well-being of smart cities. The focus of the concept usually comes down to questions about when cities can use technology to reduce crime, improve the efficiency and sustainability of road transportation, reduce energy consumption and ensure a healthier and more fulfilling life. Technology seems to be a starting point, not a mechanism to solve problems and bring benefits to urban participants. The use of technology is regarded as a key element of smart cities, but integrating ICT into urban infrastructure (if a city is social capital) does not make it smart, as are general economic policies and urban development management. After consideration. The reality of the smart city plan effectively creates an innovative ecosystem that enables citizens and communities to interact with the government and knowledge developers, which shows that “people, not technology, are the real contributions to urban intelligence. The basic elements of people-centeredness show that, in the context of the security and privacy of smart cities, when determining the outcome, special attention should be paid to assessing the benefits and risks from a human perspective.

Results

The developments of smart cities around the world enables citizens to communicate with authorities at all levels, obtains services, and improve the efficiency and effectiveness of system interaction, thereby bringing greater economic prosperity and quality of life. Look at confidentiality, security, and risk from the perspective of many stakeholders. The literature emphasizes how these multiple issues affect citizens' interests and identify vulnerabilities that can be exploited by external organizations. Although the smart IoT



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environment has considerable capabilities and advantages, security and data protection are key factors that seriously endanger the safe operation of smart city infrastructure. Technological progress and the transition to an integrated digital society may affect many cultural characteristics. And social aspects. In daily life, maintaining interpersonal communication, a sense of belonging and identity is an indispensable part of a person (Monzón 2015). The literature shows how these factors may limit future development and threaten the realization of citizens' interests. And general stakeholders. ; May not consider interaction and related human factors.

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