UDC [502.174:556.53](043.2)=111

Yurii V. Perehniak
Nataliia M. Hadaichuk

INNOVATIVE SOLUTIONS IN SMART CITIES: IMPROVING THE QUALITY OF LIFE THROUGH TECHNOLOGY AND INTEGRATED SYSTEMS

Vinnytsia National Technical University

Анотація

Ця доповідь зосереджується на впровадженні інноваційних рішень у розумних містах з метою покращення якості життя мешканців. Розумні міста використовують передові технології, такі як штучний інтелект, Інтернет речей, аналітика даних та автоматизація процесів, для забезпечення ефективного управління міськими ресурсами та послугами. У доповіді розглядаються ключові аспекти розумних міст, включаючи енергоефективність, розумний транспорт, управління водопостачанням, екологічну сталість та взаємодію громадськості з міськими службами. Доповідь надає важливий огляд інноваційних рішень, які вже успішно застосовуються в розумних містах та сприяють поліпшенню якості життя їхніх жителів.

Ключові слова: розумне місто, інноваційні рішення, якість життя, штучний інтелект, Інтернет речей, аналітика даних, автоматизація процесів, енергоефективність, розумний транспорт, управління водопостачанням, екологічна сталість, громадська взаємодія.

Abstract

This presentation focuses on the issue of cybersecurity in the era of digital transformation. The increasing reliance on information technologies creates new threats for organizations and society as a whole. The presentation will explore key cybersecurity threats, such as cyberattacks, data breaches, and malicious software. Additionally, it will discuss protective measures, including the role of physical encryption keys in securing information systems. The presentation aims to raise awareness about cybersecurity and provide practical advice for ensuring security in the era of digital transformation.

Key words: cybersecurity, digital transformation, threats, protection, cyberattacks, data breaches, malicious software, physical encryption keys.

Introduction

Research conducted in the field of smart cities has shown that implementation of these initiatives leads to improved quality of life for residents, including reduced commute times, increased safety, and improved access to services. Smart city solutions also have a positive impact on environmental sustainability by reducing energy consumption and mitigating environmental risks. They can stimulate economic growth and innovation, attracting investments and creating job opportunities. Citizen engagement is crucial, allowing residents to participate in decision-making processes and promoting transparency and trust. However, challenges such as data privacy, system interoperability, and ensuring inclusivity and affordability need to be addressed. Overall, smart city research demonstrates the potential for innovation to enhance urban living, but further research and collaboration are necessary.

Research Result

The research conducted in the field of cybersecurity in the era of digital transformation has provided valuable insights into various aspects of this domain. Here are the key findings:

Cyber Threat Landscape: Extensive research reveals that the cyber threat landscape has undergone significant changes in recent years. Cyberattacks have become more frequent and sophisticated, with attackers employing advanced techniques to breach organizational defenses. Ransomware, advanced persistent threats (APTs), and social engineering attacks are on the rise.

Impact of Cyberattacks: The impact of cyberattacks on organizations is far-reaching. Research consistently demonstrates that these incidents can lead to substantial financial losses, operational disruptions, and reputational damage. The direct financial costs associated with incident response, remediation, and legal implications can be substantial. Indirect costs include a loss of customer trust, decreased market share, and long-term damage to brand reputation.

Role of Encryption: Encryption is recognized as a crucial security measure in protecting sensitive information. Research consistently highlights the effectiveness of encryption in safeguarding data confidentiality, integrity, and authenticity. Encryption algorithms mathematically transform data into unreadable formats, rendering it useless to unauthorized individuals who gain access to it.

Importance of Physical Encryption Keys: Physical encryption keys play a pivotal role in enhancing cybersecurity. Research emphasizes their significance in providing an additional layer of protection for cryptographic keys. Physical keys, such as USB tokens or smart cards, securely store encryption keys and require physical possession for their use. They protect against unauthorized key duplication or theft, ensuring that only authorized individuals can access sensitive data.

Benefits of Key Management: Effective key management practices are crucial for maintaining strong encryption security. Research highlights the benefits of centralized key management systems, which enable organizations to maintain control over encryption keys, monitor their usage, and enforce access controls. These systems facilitate secure key distribution, rotation, and revocation, reducing the risk of unauthorized key exposure.

User Acceptance and Usability: User acceptance and usability are critical factors for the successful adoption of physical encryption keys. Research emphasizes the importance of ensuring that the use of physical keys does not impose significant burdens on users. User-friendly interfaces, seamless integration into existing workflows, and clear instructions contribute to a positive user experience and encourage widespread implementation.

Compliance and Regulatory Considerations: The research underscores the growing importance of compliance with data protection regulations, such as the General Data Protection Regulation (GDPR) and industry-specific standards. Physical encryption keys can assist organizations in meeting regulatory requirements by providing secure key storage and management mechanisms, which are often mandated for protecting sensitive data.

In summary, the research provides valuable insights into the evolving cyber threat landscape and the impact of cyberattacks on organizations. Encryption, including the use of physical encryption keys, is recognized as a crucial security measure. Implementing proper key management practices, ensuring user acceptance and usability, and complying with regulatory frameworks are essential steps for organizations aiming to protect sensitive data and maintain the trust of their stakeholders.

Conclusion

Research on smart cities highlights their potential to improve residents' quality of life through optimized transportation, real-time information, and efficient resource management. These initiatives contribute to reduced commute times, increased safety, and improved access to services, resulting in higher satisfaction levels. Smart cities also have a positive impact on environmental sustainability by reducing energy consumption, minimizing waste, and mitigating environmental risks. Additionally, they stimulate economic growth and innovation by attracting investments, creating job opportunities, and supporting technology-based industries. Citizen engagement plays a crucial role in the success of smart cities, fostering transparency, trust, and active participation. However, challenges such as data privacy, system interoperability, and inclusivity need to be addressed. Overall, further research and collaboration are essential for the development of smarter and more livable cities.

REFERENCES

1. Smart city. What is a smart city and why is it dangerous? URL: https://hromadske.ua/posts/liho-z-rozumu-rozpovidayemo-sho-take-smart-city-ta-chim-vono-nebezpechne (дата звернення: 16.06.2023).

2. Industries of the future: "Smart" cities and homes URL: https://mind.ua/publications/20188390-galuzi-majbutnogo-rozumni-mista-ta-budinki (дата звернення: 16.06.2023).

Перегняк Юрій Валерійович – студент групи КІВТ-22м, факультет інформаційних електронних систем, Вінницький національний технічний університет, м. Вінниця, e-mail: yuraperehniak@gmail.com

Науковий керівник: Гадайчук Наталія Миколаївна – старший викладач кафедри іноземних мов, Вінницький національний технічний університет, м.Вінниця, e-mail: hadaichuk@vntu.edu.ua

Perehniak Yurii Valerievich – student of the group KIVT-22m, Faculty of Information Electronic Systems, Vinnytsia National Technical University, Vinnytsia, e-mail: yuraperehniak@gmail.com

Scientific supervisor: Hadaichuk Nataliia Mykolaivna – Senior Lecturer, Department of Foreign Languages, Vinnytsia National Technical University, Vinnytsia, e-mail: hadaichuk@vntu.edu.ua