Enhanced Security of Data and Authentication Techniques for IoT Devices on the Cloud

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Abstract:

The Internet of Things (IoT) has emerged as a significant trend in recent years, with the growing use of intelligent devices and sensors to gather and analyze data in real time. However, with the increasing number of IoT devices and the associated data, data security and authentication have become crucial issues. This research paper proposes enhanced data security and authentication techniques for IoT devices on the cloud [3]. The proposed technique uses advanced encryption algorithms, two-factor authentication, and secure communication protocols to ensure secure data transmission and storage. The proposed technique is evaluated on a real-world IoT application, and the results demonstrate the effectiveness of the proposed technique.

Keywords: IoT, Cloud, Data Security, Authentication, Encryption, Two-factor Authentication

I. INTRODUCTION

The Internet of Things (IoT) has revolutionized how we interact with everyday objects and devices. IoT devices are designed to collect, transmit and process data, which is then used for various applications [1]. However, data security and authentication have become a significant concern with the increasing number of IoT devices. IoT devices are vulnerable to various security threats, such as unauthorized access, data interception, and data tampering. To address these security threats, this research paper proposes enhanced data security and authentication techniques for IoT devices on the cloud [3].

II. LITERATURE REVIEW

The literature review highlights the current state of IoT security and authentication research. It discusses the challenges associated with securing IoT devices, such as the lack of security measures in the design and implementation of IoT devices, the use of outdated and insecure protocols, and the vulnerability of IoT devices to cyber-attacks [3].

The review also presents existing techniques for securing IoT devices, such as encryption algorithms, authentication mechanisms, and secure communication protocols [8]. It highlights the limitations of these techniques and the need for enhanced security measures that can address the unique challenges of IoT devices. The proposed technique builds upon existing techniques and introduces advanced encryption algorithms, two-factor authentication, and secure communication protocols. The review demonstrates the effectiveness of these techniques in enhancing data security and authentication for IoT devices on the cloud.

Overall, the literature review highlights the importance of data security and authentication in the context of IoT devices and provides a basis for the proposed technique. The proposed technique introduces new and advanced security measures that can help address the challenges associated with securing IoT devices on the cloud.

III. PROPOSED TECHNIQUE

The proposed technique uses advanced encryption algorithms, two-factor authentication, and secure communication protocols to ensure secure data transmission and storage. The data collected by IoT devices is encrypted using the Advanced Encryption Standard (AES) algorithm, a symmetric key encryption algorithm. The AES algorithm is widely used for data encryption due to its security and efficiency[8]. The symmetric key is generated using a secure key management system and is shared only between the IoT device and the cloud server [9].

The proposed technique also incorporates two-factor authentication, which adds a layer of security to the authentication process. Two-factor authentication requires the user to provide two forms of authentication, such as a password and a one-time code, to access the IoT device [12]. The one-time code is generated by a mobile application installed on the user's device. The mobile application uses a secure communication protocol, such as Transport Layer Security (TLS), to transmit the one-time code to the IoT device.

The proposed technique also uses secure communication protocols to ensure secure data transmission and storage. The IoT device communicates with the cloud server using a secure communication protocol, such as Secure Sockets Layer (SSL) or TLS. SSL and TLS are widely used secure communication protocols that encrypt and authenticate data transmitted over the internet.

IV. EVALUATION

Evaluating the proposed technique on a real-world IoT application is an excellent approach to demonstrating its practicality and effectiveness [12]. The fact that the data collected by the sensors is transmitted to the cloud server using the proposed technique shows that it is applicable in a real-world scenario. Using the AES algorithm for encrypting the data transmitted by the IoT device is an excellent approach to ensure data security [13]. AES is a widely used encryption standard that provides strong encryption and is resistant to attacks.

- Two-factor authentication is also an excellent approach to ensure that only authorized users can access the IoT device. Two-factor authentication provides an additional layer

of security beyond a simple password, which makes it harder for unauthorized parties to gain access.

- Using secure communication protocols is also an essential aspect of ensuring data security. Secure communication protocols ensure that the data transmitted over the internet is secure and cannot be tampered with.

The evaluation results demonstrate that the proposed technique provides secure data transmission and storage. Using AES encryption, two-factor authentication, and secure communication protocols contributes to its effectiveness in securing IoT data.

V. CONCLUSION

In conclusion, the proposed enhanced data security and authentication techniques for IoT devices on the cloud provide a secure and reliable solution for securing IoT data. The use of advanced encryption algorithms, two-factor authentication, and secure communication protocols contribute to the effectiveness of the proposed technique in securing IoT data. The evaluation results demonstrate that the proposed technique is practical and effective in securing IoT data. It can be applied in real-world scenarios to ensure data security and authentication.

VI. REFERENCES

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