

# Exploring Cryptographic Algorithms: Techniques, Applications, and Innovations

**Somnath Banerjee**

Data Engineer, AMFAM, Madison, USA

**Abstract:** *This paper examines various significant symmetric and asymmetric cryptography algorithms and their importance in network security. With the increasing use of the internet, there has been a corresponding rise in attacks on communication channels. Such attacks may enable third parties to access sensitive information regarding an organization and its operations. This information could potentially be used to disrupt an organization's activities or to extort payment in exchange for the data. To mitigate these risks, cryptographic algorithms are employed to secure communications. These algorithms encrypt data in a manner that makes it difficult for unauthorized individuals to access, rendering it ineffective for attackers. Consequently, these algorithms are essential to the security of communications. This paper presents a study of symmetric and asymmetric algorithms with respect to optimal resource allocation, potential attacks that may exploit these algorithms, time and power consumption, overall structure, and other relevant factors, along with an explanation of various security attacks.*

**Keywords:** CIA triad, NIST, FIPS, eavesdropping, DES, AES, RSA, ECC, Symmetric cipher, Asymmetric cipher