INTELLIGENT SYSTEM TO SECURE THE INFORMATION BASED ON INNOVATIVE GAMES

Project Reference No.: *47S_BE_5205*

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Problem Description:

"Intelligent System to Secure the Information based on Innovative Games" aims at developing a game-based encryption algorithm that integrates game theory and cryptography for secure data protection. It helps to evaluate the algorithm's security properties to ensure resilience against potential attacks. It compares the algorithm's performance with existing encryption schemes to assess its efficiency. The project aims at determining the encryption algorithm and conduct thorough testing to validate its effectiveness. It considers factors such as encryption strength, computational complexity, and resistance to brute-force attacks. It ensures the algorithm is scalable and adaptable to different data types and communication channels. It addresses potential vulnerabilities or weaknesses in the algorithm through rigorous analysis and improvement. It continuously monitors and updates the algorithm to address emerging threats and maintain its effectiveness. It will promote the adoption and use of the game-based encryption algorithm to enhance data security in various applications

Problems identified:

- Difficulty in achieving a balance between security and efficiency
- Increased computational resources and potential latency compared to traditional encryption methods
- Risk of implementation errors or vulnerabilities
- Potential challenges in real-time or high-performance data processing applications
- Need for thorough evaluation and testing to ensure algorithm effectiveness
- Requirement for ongoing monitoring and updates to address emerging threats
- Potential resistance or reluctance to adopt new encryption methods
- Importance of promoting awareness and adoption of game-based encryption algorithms to enhance data security**.**

ExistingSolutions:

- Symmetric encryption: Algorithms like Advanced Encryption Standard (AES) use a single key for both encryption and decryption. It is widely used for secure communication and data protection.
- Asymmetric encryption: Public-key encryption schemes such as RSA and Elliptic Curve Cryptography (ECC) use different keys for encryption and decryption. They are commonly used for secure key exchange and digital signatures.
- Hash functions: Algorithms like SHA-256 produce fixed-length hash values used for data integrity and password storage. They are one-way functions, making it computationally difficult to reverse-engineer the original data.
- Disk and file encryption: Various software and hardware solutions provide encryption for individual files or entire storage devices, protecting data at rest.
- Machine learning : (ML) techniques can also be utilized in encryption to enhance security and address specific challenges.
- Secure key generation: ML algorithms can assist in generating secure cryptographic keys by analyzing patterns in random data sources

Problem Solution:

Each of the above existing solutions can only solve fewer problems. Combining all these solutions would be very hard, and it is nearly impossible to developa singleapplication. In search of a single solution for all such problems, atrending technology was explored that provides enhanced security, uses encryptionalgorithms, immutability, faster settlement, and scalability.

Encryption is important because it helps protect sensitive information and ensures data security. It involves converting plain text into an unreadable format using mathematical algorithms, making it difficult for unauthorized individuals to access or understand the information. Encryption is crucial for confidentiality, data integrity, authentication.

Although there are many types of encryption algorithms for different types of data available, but there is a great confusion in determining best-suited algorithm for specific type of data and also distinct type of transfer. Hence there is a need for selecting the best suited algorithm and technique for different types of data and various hierarchies of complexities.

The project “Intelligent System to Secure the Information based on Innovative Games” aims at developing a game-based encryption algorithm that integrates game theory and cryptography for secure data protection. It helps to evaluate the algorithm's security properties to ensure resilience against potential attacks. It compares the algorithm's

performance with existing encryption schemes to assess its efficiency. The project aims at determining the encryption algorithm and conduct thorough testing to validate its effectiveness.

This project selects the most appropriate game based encryption algorithm based on the existing knowledge and all the previous experiences available. It takes the data such as text, image, video that is to be encrypted and transferred as input and determines the most applicable encryption algorithm based on the type of data and complexities. Therefore, it produces the suggestion of the algorithm as output.

Mapping to the Program Outcomes:

PO#	Level	Justification
PO – 3	L3	This project helps us to solve real world data security problems and in selecting suitable data transfer procedures using different games based cryptographic algorithms and Machine Learning techniques.
PO – 5	L3	We are designing a platform to select the most suitable encryption algorithm among the various available game-based encryption techniques for different types of data of distinct level of complexities.
PO - 6	L3	Designing a real-time project using the knowledge of Machine learning and Cryptographic techniques to predict the most appropriate gamebased encryption algorithms for different types of data inputs.
PO - 11	L3	Having well-defined project goals and objectives, having clear team roles and responsibilities,identifying priorities and milestones ahead of time, monitoring and measuring progress, etc.
PO - 12	L3	Keeping up with industry trends is vital to professional growth. Continuous learning is essential to career advancement, especially in IT.

Expected Outcomes:

The "game-based encryption" project has the potential to yield several promising outcomes. First and foremost, it could lead to the development of highly secure and innovative encryption techniques that leverage principles from the field of game theory. These new encryption methods could enhance data security and privacy by creating systems that are more resilient to attacks, including those from quantum computers. The project might result in encryption algorithms that are both efficient and robust, striking a balance between security and performance, making them practical for a wide range of applications, from securing communications and financial transactions to protecting sensitive data in healthcare and

government sectors using machine learning techniques and algorithms.

Furthermore, a successful "game-based encryption" project could contribute to the advancement of cryptography as a whole, using machine learning techniques.By exploring the synergy between encryption and game theory, it may open up new avenues for research and development in the field. This could foster interdisciplinary collaboration between computer scientists, mathematicians, and experts in game theory, ultimately leading to a deeper understanding of security and privacy. The project's outcomes could have a significant impact on cybersecurity, benefiting individuals, organizations, and society as a whole by providing better tools to safeguard digital information in an increasingly interconnected world.

Appendix – 1: Program Outcomes

#	Program Outcomes
PO – 1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO – 2	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO – 3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO – 4	Useresearch-basedknowledgeandresearchmethodsincludingdesignofexperiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO – 5	Create, select, and apply appropriate techniques, resources, and modern engineering andITtoolsincludingpredictionandmodellingtocomplexengineeringactivitieswith an understanding of thelimitations.
PO – 6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO – 7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO – 8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO – 9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

#	Program Outcomes
PO - 10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effectivereportsanddesigndocumentation,makeeffectivepresentations,andgive and receive clearinstructions.
PO - 11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO - 12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.