A novel security algorithm RPBB31 for securing the social media analyzed data using machine learning algorithms

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A novel security algorithm RPBB31 for securing the social media analyzed data using machine learning algorithms

Abstract:

The present world data is most important in public because without data cannot live in the world. This data is big data and that data daily increases through Social Media like "Twitter, Facebook, Youtube, WhatsApp, Instagram, LinkedIn", etc.., because this media only share public opinion very fast through the net. From this media, more people used especially Twitter. Thus media are used to analyze the public opinion of the tweets and predict the future through Machine Learning Algorithm. This analyzed data should make it polarity score. This score data has very little security because, this score can change the score and affected the future, so apply the existing security algorithms is Salsa and ChaCha. The Salsa algorithm is diagonal values moved to the first row. The ChaCha algorithm is diagonal values moved to the first column. The existing algorithms do not have good security because they focused only on performance, not security. So, the novel security algorithm is RPBB31. This algorithm has seven stages. The 1st stage is to find the secret key N, n, and p values from the matrix. The 2nd stage is to apply the secret key in equation (1). The 3rd stage operation of $P_N(n)$ up to n=1. The 4th stage is all $P_N(n)$ operations make their single line. The 5th stage is to pair the values and swap the values in the matrix. The 6th stage is column operations in the matrix. The 7th stage is again Step 4 values used to swap but "0th" cell value start from reverse in the matrix. The proposed algorithm has provide good security and performance while compare to existing algorithms.

Keywords: Twitter, Machine Learning Algorithm, Security, Encryption, RPBB31

1. Introduction

In the present world, daily increased the data is big data through social media such as Twitter, Facebook, etc... Big data is a huge amount of data that are quickly moved to a lot of fields. Big data has 3 characteristics like Volume, Velocity, and variety. Volume: is the size of the data. Velocity: is processing the data. Variety: is data generated from different sources are shown in Figure 1.

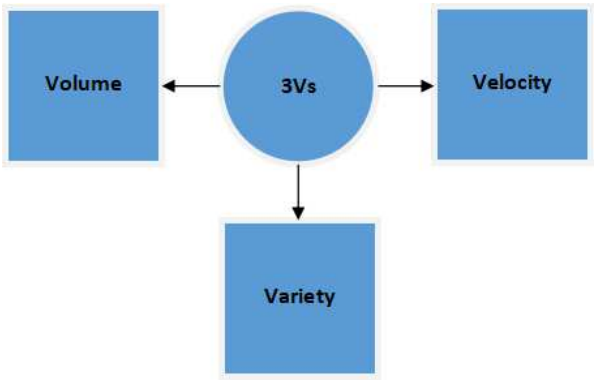

Figure 1. 3 Vs of data

Twitter: Toady is one of the most popular media in public is Twitter. This media used to tweet anybody, anytime and anywhere in the world through the net. These tweets were used to analyze the three things such as positive and symbol is '+', negative and symbol is '-', and neutral.

Table 1 shows the analysis of 1st tweet: "*I am not interested to see this movie because very boring"* ("Class: Negative"), "these words have two negative words and one positive word, so it is considered to be negative tweets".

Table 2 shows the analysis of the 2nd tweet: *"I like this movie to see both mobile and TV"* ("Class: positive"), "these words have one positive word and no negative word, so it is positive tweets".

Table 3 shows the analysis of 3rd tweet: *"I not like this movie so not interested to see this movie".* ("Class: Neutral"), "These words have two negative words and positive words, so it is neutral tweets".

Table 1: 1st Tweet

Tweet 1	I	Am	Not	Interested	To	See	This	Movie	Because	Very	Boring	Class label
Analyzing of First Tweet	1	1	-1	+1	1	1	1	1	1	1	-1	Negative (-1)

Table 2: 2nd Tweet

Tweet 2	To	See	This	Movie	Like	Both	Mobile	And	TV	Class label
Analyzing of First Tweet	1	1	1	1	+1	1	1	1	1	Positive (+1)

Table 3: 3rd Tweet

Tweet 3	I	Not	Like	This	Movie	So	Not	Interested	To	See	This	Movie	Class label
Analyzing of First Tweet	1	-1	+1	1	1	1	-1	+1	1	1	1	1	Neutral

These analyzed things are used to predict the future and make it polarity score in Table 4, through Machine Learning Algorithms.

Table 4: Dataset

Dataset	**#Positive**	**#Negative**	**#Neutral**
ROHITH SHARMA	519	4	477
DHONI	360	2	638
RAHUL	538	97	365
KOHLI	493	25	482

From figure 2, the classification algorithm concept is yes or no. The random forest algorithm concept is Mean Square Error. The naive Bayes algorithm concept is the probability of class and condition. Support Vector Machine algorithm concept is classification and regression, but classification problems are only used more times. The decision tree concept is a representation of the tree. The artificial Neural Network concept is the backpropagation method.

In the present world, social media is very important and fastest share people's opinions in public. For example, Twitter, Facebook, Whatsapp, youtube, Instagram, Linkedin, etc.., are used by people to share information like sports, movies, politics, government jobs, etc…

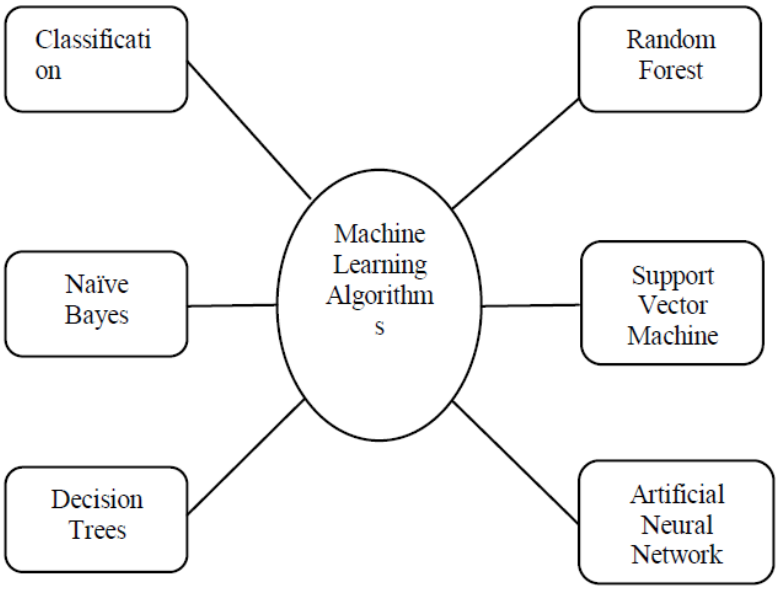

Figure 2. Machine Learning Algorithms [1]

This media, particularly choose Twitter, is used to analyze the opinion of the tweets and predict the future. These analyzed tweets are very important for prediction. This prediction data has less security because this data can change the future, so apply the existing security algorithm is Salsa and ChaCha. The Salsa algorithm is diagonal values moved to the first row. This algorithm is a quarter-round process and the performance of encryption running time is fast. The ChaCha algorithm is diagonal values moved to the first column. This algorithm also quarter round process and the performance of the encryption time is fast. The existing algorithms do not have good security because they focused only on performance, not security. So, the novel security algorithm is RajPrakash BagathBasha (RPBB) 31.

2. Literature Survey

The sentiment analysis with machine learning algorithms are compared the performance for more algorithms and showed the classification algorithm is very easy to understand [1]. The proposed algorithm CBB21 and compared the running time with Salsa [2]. They discuss the tweets and security algorithm is CBB20. The CBB20 proposed algorithm is compared the encryption time with Salsa [3]. They studied the Twitter analysis and security algorithm. The proposed security algorithm is SRB21 and compared the running time for encryption with Salsa [4]. They mainly discuss the prediction of the future by twitter and security. The security algorithm is SRB18 is compared the encryption running time with Salsa [5]. They studied the cryptography algorithm is RBJ25 and compared the encryption performance with ChaCha and AES [6]. The proposed security algorithm is RB20 and calculate the encryption running time is compared with the performance with Salsa and AES [7]. The CBB22 algorithm is proposed and provides the security of generalized data. This algorithm is compared the performance of both encryption and decryption time with Salsa and AES [8]. The SRB21 phase 1 algorithm is proposed for the security of Twitter data. This algorithm is compared both encryption and decryption running time with Salsa20/4 [9]. The main analyze the feedback of movies through sentiment analysis by

classification and SVM algorithms [10]. The Proposed algorithm is RB21 and mainly used prime numbers for security and compared with AES and Salsa [11]. The RB29 algorithm is a property of commutative & associative and provides good security while compared with the Salsa algorithm [12]. The RB27 algorithm has two main processes are quadratic equation and perfect numbers, and security is good while compared with the ChaCha algorithm [13]. The RB23 algorithm is a prime number with quadratic equations and security is good while compared to ChaCha [14]. The "hybrid machine learning model is compared with other machine learning algorithms" [15]. They analysis the tweets through a machine learning algorithm and compared the predictions with World2vec [16]. They designed the stream of RCR-32 and RCR-64 with calculating of probability [17] and RBJ20 [18].

3. Research Methodology

Twitter has been used to analyze tweets and predict the future by machine learning algorithms [1]. This analyzed data used to apply the proposed methodology is RPBB31. This methodology has seven stages. The 1st stage is to find the secret key N, n, and p values from the matrix. The 2nd stage is to apply the secret key in equation (1). The 3rd stage operation of $P_N(n)$ up to n=1. The 4th stage is all $P_N(n)$ operations make their single line. The 5th stage is to pair the values and swap the values in the matrix. The 6th stage is column operations in the matrix. The 7th stage is again Step 4 values used to swap but "0th" cell value start from reverse in the matrix. For example, 3x3 matrix has 9 values like 0,1,2,3,4,5,6,7, and 8. Now, assign 8th cell value is 0th cell value, 7th cell value is 1st cell value, 6th cell value is 2nd cell value, 5th cell value is 3rd cell value, 4th cell value is 4th cell value, 3rd cell value is 5th cell value, 2nd cell value is 6th cell value, the 1st cell value is 7th cell value, 0th cell value is 8th cell value.

3.1. Methodology

Figure 3, shows the encryption process of the RPBB31 methodology. The RPBB31 methodology encryption process is a secret key, PN(n) operation, shift columns, and again PN(n) operation but the "0th" cell value starts from reverse in the matrix.

3.2. Encryption Algorithm

Step 1: Get the generalized data and that data makes it to matrix format.

Step 2: To find the N, n, and p values from the matrix.

$$P_N(n) = (N!/(n!*(N-n)!))\, p^n (1-P)^{(N-n)}$$

do $P_N(n)$ operations upto $n = 1$

Step 3:

where N is the size of the matrix
n is upper triangel values, n is upto 1
p is lower triangle values

Step 4: Merge all $P_N(n)$ operations values in a single line.

Step 5: Two values in each pair from left in **Step 4.**

Step 6. To swap the values in the matrix from **Step 5.**

$$CO = C_i \leftrightarrow (C_{i+(n-m)})$$

Step 7. where CO *is column operations*
$i, n, \& \, m$ *is column numbers*

Step 8. Again to swap the values in the matrix by using Step 5 but assign "0^{th}" matrix cell value starts from the end.

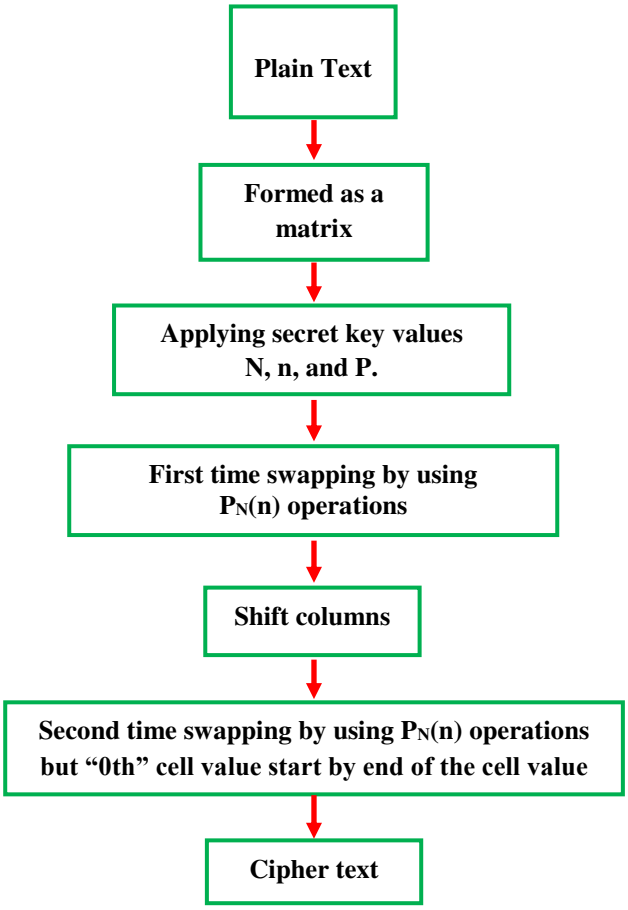

Figure 3. RPBB31 Methodology

3.3. Working of Encryption Algorithm

$$RBE1=\begin{bmatrix} 2101/7 & 2102/7 & 2103/7 & 2104/7 & 2105/7 \\ 2106/7 & 2107/7 & 2108/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

where RBE1is Raj Bagath Encryption 1

Step 1: n=4

N= 5, p=7, N!=120, n!=24

$$P_N(n) = (N!/(n!*(N-n)!))(p^n((1-P)^{(N-n)}))$$

$$P_5(4) = (5!/(4!*(5-4)!))(7^4((1-7)^{(5-4)}))$$

$$P_5(4) = (120/(24*(1)!))(7^4((-6)^{(1)}))$$

$$P_5(4) = (120/(24*1))(2401(-6))$$

$$P_5(4) = (120/24)(-14406)$$

$$P_5(4) = (5)(-14406)$$

$$P_5(4) = 72030$$

Step 2: n=3

N= 5, p=7, N!=120, n!=6

$$P_5(3) = (5!/(3!*(5-3)!))(7^3((1-7)^{(5-3)}))$$

$$P_5(3) = (120/(6*(2)!))(7^3((-6)^{(2)}))$$

$$P_5(3) = (120/(6*2))(343(36))$$

$$P_5(3) = (120/12)(2058)$$

$$P_5(3) = (10)(2058)$$

$$P_5(3) = 20580$$

Step 3: n=2

N= 5, p=7, N!=120, n!=2

$$P_5(2) = (5!/(2!*(5-2)!))(7^2((1-7)^{(5-2)}))$$

$$P_5(2) = (120/(2*(3)!))(7^2((-6)^{(3)}))$$

$$P_5(2) = (120/(2*6))(7^2(-216))$$

$$P_5(2) = (120/12)(49(-216))$$

$$P_5(2) = (10)(10584)$$

$$P_5(2) = 105840$$

Step 3: n=1

N= 5, p=7, N!=120, n!=1

$$P_5(1) = (5!/(1!*(5-1)!))(7^1((1-7)^{(5-1)}))$$

$$P_5(1) = (120/(1*(4)!))(7^1((-6)^{(4)}))$$

$$P_5(1) = (120/(1*24))(7^1(1296))$$

$$P_5(1) = (120/24)(7(1296))$$

$$P_5(1) = (5)(9072)$$

$$P_5(1) = 45360$$

P_5=720302058010584045360

P_5=(7,2), (0,3), (0,2), (0,5), (8,0), (1,0), (5,8), (4,0), (4,5), (3,6), 0 and added 0^{th} place value in the pair (0,0).

Pair 1: (7,2)

$$RBE=\begin{bmatrix} 2101/7 & 2102/7 & 2108/7 & 2104/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 1 value is 7 and 2. The 7^{th} place value is "2108/7" and 2^{nd} place value is "2103/7" in the RBE matrix. To swap the value 2108/7 is to 2^{nd} place in the RBE matrix and the value 2103/7 is to 7^{th} place in the RBE matrix.

Pair 2: (0,3)

$$RBE=\begin{bmatrix} 2104/7 & 2102/7 & 2108/7 & 2101/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 2 value is 0 and 3. The 0^{th} place value is "2101/7" and 3^{rd} place value is "2104/7" in the RBE matrix. To swap the value 2101/7 is to 3^{rd} place in the RBE matrix and the value 2104/7 is to 0^{th} place in the RBE matrix.

Pair 3: (0,2)

$$RBE=\begin{bmatrix} 2108/7 & 2102/7 & 2104/7 & 2101/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 3 value is 0 and 2. The 0^{th} place value is "2104/7" and 2^{nd} place value is "2108/7" in the RBE matrix. To swap the value 2104/7 is to 2^{nd} place in the RBE matrix and the value 2108/7 is to 0^{th} place in the RBE matrix.

Pair 4: (0,5)

$$RBE=\begin{bmatrix} 2106/7 & 2102/7 & 2104/7 & 2101/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 4 value is 0 and 5. The 0^{th} place value is "2108/7" and 5^{th} place value is "2106/7" in the RBE matrix. To swap the value 2108/7 is to 5^{th} place in the RBE matrix and the value 2106/7 is to 0^{th} place in the RBE matrix.

Pair 5: (8,0)

$$RBE=\begin{bmatrix} 2109/7 & 2102/7 & 2104/7 & 2101/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 5 value is 8 and 0. The 8^{th} place value is "2109/7" and 0^{th} place value is "2106/7" in the RBE matrix. To swap the value 2106/7 is to 8^{th} place in the RBE matrix and the value 2109/7 is to 0^{th} place in the RBE matrix.

Pair 6: (1,0)

$$RBE=\begin{bmatrix} 2102/7 & 2109/7 & 2104/7 & 2101/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 6 value is 1 and 0. The 1^{st} place value is "2102/7" and 0^{th} place value is "2109/7" in the RBE matrix. To swap the value 2102/7 is to 0^{th} place in the RBE matrix and the value 2109/7 is to 1^{st} place in the RBE matrix.

Pair 7: (5,8)

$$RBE=\begin{bmatrix} 2102/7 & 2109/7 & 2104/7 & 2101/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2108/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 7 value is 5 and 8. The 5th place value is "2108/7" and 8th place value is "2106/7" in the RBE matrix. To swap the value 2108/7 is to 8th place in the RBE matrix and the value 2106/7 is to 5th place in the RBE matrix.

Pair 8: (4,0)

$$RBE=\begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2101/7 & 2102/7 \\ 2108/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 8 value is 4 and 0. The 4th place value is "2105/7" and 0th place value is "2102/7" in the RBE matrix. To swap the value 2105/7 is to 0th place in the RBE matrix and the value 2102/7 is to 4th place in the RBE matrix.

Pair 9: (4,5)

$$RBE=\begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2101/7 & 2108/7 \\ 2102/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 9 value is 4 and 5. The 4th place value is "2102/7" and 5th place value is "2108/7" in the RBE matrix. To swap the value 2102/7 is to 5th place in the RBE matrix and the value 2108/7 is to 4th place in the RBE matrix.

Pair 10: (3,6)

$$RBE=\begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2107/7 & 2108/7 \\ 2102/7 & 2101/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 10 value is 3 and 6. The 3rd place value is "2101/7" and 6th place value is "2107/7" in the RBE matrix. To swap the value 2101/7 is to 6th place in the RBE matrix and the value 2107/7 is to 3rd place in the RBE matrix.

Pair 11: (0,0)

$$RBE=\begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2107/7 & 2108/7 \\ 2102/7 & 2101/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 2118/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 11 value is 0 and 0. The both values are same place; so cannot swap the values in the RBE matrix.

Step 4: Column operations

$$RBE=\begin{bmatrix} 2108/7 & 2109/7 & 2104/7 & 2107/7 & 2105/7 \\ 2110/7 & 2101/7 & 2103/7 & 2106/7 & 2102/7 \\ 2115/7 & 2112/7 & 2113/7 & 2114/7 & 2111/7 \\ 2120/7 & 2117/7 & 2118/7 & 2119/7 & 2116/7 \\ 2125/7 & 2122/7 & 2123/7 & 2124/7 & 2121/7 \end{bmatrix}$$

The first column operations are changed in the RBE matrix like 1st column values will be swapped into 5th column places and 5th column values will be swapped into 1st column places in the matrix.

$$RBE=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2118/7 & 2117/7 & 2116/7 \\ 2125/7 & 2124/7 & 2123/7 & 2122/7 & 2121/7 \end{bmatrix}$$

The second column operations are changed in the RBE matrix like 2nd column values will be swapped into 4th column places and 4th column values will be swapped into 2md column places in the matrix.

Step 5: P_5=(7,2), (0,3), (0,2), (0,5), (8,0), (1,0), (5,8), (4,0), (4,5), (3,6), 0

Here, 0th cell value assign is 25th cell value, 1st cell value assign is 24th cell value, and like that all cell values assigned reverse in the matrix

$$RBE\text{- }R=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2118/7 & 2117/7 & 2116/7 \\ 2125/7 & 2124/7 & 2123/7 & 2122/7 & 2121/7 \end{bmatrix}$$

where RBE-R is Raj Bagath Encryption and Reverse

Pair 1: (7,2)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2124/7 & 2118/7 & 2122/7 & 2121/7 \end{bmatrix}$$

The pair 1 value is 7 and 2. The 7^{th} place value is "2118/7" and 2^{nd} place value is "2123/7" in the RBE matrix. To swap the value 2118/7 is to 2^{nd} place in the RBE matrix and the value 2123/7 is to 7^{th} place in the RBE matrix.

Pair 2: (0,3)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2121/7 & 2118/7 & 2122/7 & 2124/7 \end{bmatrix}$$

The pair 2 value is 0 and 3. The 0^{th} place value is "2121/7" and 3^{rd} place value is "2124/7" in the RBE matrix. To swap the value 2121/7 is to 3^{rd} place in the RBE matrix and the value 2124/7 is to 0^{th} place in the RBE matrix.

Pair 3: (0,2)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2121/7 & 2124/7 & 2122/7 & 2118/7 \end{bmatrix}$$

The pair 3 value is 0 and 2. The 0^{th} place value is "2124/7" and 2^{nd} place value is "2118/7" in the RBE matrix. To swap the value 2124/7 is to 2^{nd} place in the RBE matrix and the value 2118/7 is to 0^{th} place in the RBE matrix.

Pair 4: (0,5)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2118/7 \\ 2125/7 & 2121/7 & 2124/7 & 2122/7 & 2116/7 \end{bmatrix}$$

The pair 4 value is 0 and 5. The 0^{th} place value is "2118/7" and 5^{th} place value is "2116/7" in the RBE matrix. To swap the value 2118/7 is to 5^{th} place in the RBE matrix and the value 2116/7 is to 0^{th} place in the RBE matrix.

Pair 5: (8,0)

$$\text{RBE - R}=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2116/7 & 2123/7 & 2117/7 & 2118/7 \\ 2125/7 & 2121/7 & 2124/7 & 2122/7 & 2119/7 \end{bmatrix}$$

The pair 5 value is 8 and 0. The 8th place value is "2119/7" and 0th place value is "2116/7" in the RBE matrix. To swap the value 2119/7 is to 0th place in the RBE matrix and the value 2116/7 is to 8th place in the RBE matrix.

Pair 6: (1,0)

$$\text{RBE - R}=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2116/7 & 2123/7 & 2117/7 & 2118/7 \\ 2125/7 & 2121/7 & 2124/7 & 2119/7 & 2122/7 \end{bmatrix}$$

The pair 6 value is 1 and 0. The 1st place value is "2122/7" and 0th place value is "2119/7" in the RBE matrix. To swap the value 2122/7 is to 0th place in the RBE matrix and the value 2119/7 is to 1st place in the RBE matrix.

Pair 7: (5,8)

$$\text{RBE - R}=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2121/7 & 2124/7 & 2119/7 & 2122/7 \end{bmatrix}$$

The pair 7 value is 5 and 8. The 5th place value is "2118/7" and 8th place value is "2116/7" in the RBE matrix. To swap the value 2118/7 is to 8th place in the RBE matrix and the value 2116/7 is to 5th place in the RBE matrix.

Pair 8: (4,0)

$$\text{RBE - R}=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2117/7 & 2116/7 \\ 2122/7 & 2121/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

The pair 8 value is 4 and 0. The 4th place value is “2125/7” and 0th place value is “2122/7” in the RBE matrix. To swap the value 2125/7 is to 0th place in the RBE matrix and the value 2122/7 is to 4th place in the RBE matrix.

Pair 9: (4,5)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2117/7 & 2122/7 \\ 2116/7 & 2121/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

The pair 9 value is 4 and 5. The 4th place value is “2122/7” and 5th place value is “2116/7” in the RBE matrix. To swap the value 2122/7 is to 5th place in the RBE matrix and the value 2116/7 is to 4th place in the RBE matrix.

Pair 10: (3,6)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2121/7 & 2122/7 \\ 2116/7 & 2117/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

The pair 10 value is 3 and 6. The 3rd place value is “2121/7” and 6th place value is “2117/7” in the RBE matrix. To swap the value 2121/7 is to 6th place in the RBE matrix and the value 2117/7 is to 3rd place in the RBE matrix.

Pair 11: (0,0)

$$\text{RBE - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2121/7 & 2122/7 \\ 2116/7 & 2117/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

The pair 11 value is 0 and 0. The both values are same place; so cannot swap the values in the RBE matrix.

3.2. Decryption Algorithm

Step 1: Get the encrypted data.

Step 2: To get the secret key for N, n, and p values.

$$DP_N(n) = (N!/(n!*(N-n)!))\, p^n (1-P)^{(N-n)}$$

do $DP_N(n)$ operations upto $n = 1$

Step 3:

where N is the size of the matrix
n is upper triangel values, n is upto 1
p is lower triangle values

Step 4: Merge all $DP_N(n)$ operations values in a single line.

Step 5: Two values in each pair from right in **Step 4.**

Step 6. To swap the values reverse in the matrix from **Step 5.**

$$DCO = DC_i \leftrightarrow (DC_{i+(n-m)})$$

Step 7. where *DCO is decrypted column operations*
i, n, & m is column numbers

Step 8. Again to swap the values in the matrix by using Step 5 but not reverse.

3.3. Working of Decryption Algorithm

$$\text{RBE - R} = \begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2121/7 & 2122/7 \\ 2116/7 & 2117/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

- The secret keys are n=4 and p=7.

Step 1: n=4

N= 5, p=7, N!=120, n!=24

$$DP_N(n) = (N!/(n!*(N-n)!))\,(p^n((1-P)^{(N-n)}))$$

$$DP_5(4) = (5!/(4!*(5-4)!))\,(7^4((1-7)^{(5-4)}))$$

$$DP_5(4) = 72030$$

Step 2: n=3

N= 5, p=7, N!=120, n!=6

$$DP_5(3) = (5!/(3!*(5-3)!))\,(7^3((1-7)^{(5-3)}))$$

$$DP_5(3) = 20580$$

Step 3: n=2

N= 5, p=7, N!=120, n!=2

$$DP_5(2) = (5!/(2!*(5-2)!))(7^2((1-7)^{(5-2)}))$$

$$DP_5(2) = 105840$$

Step 3: n=1

N= 5, p=7, N!=120, n!=1

$$DP_5(1) = (5!/(1!*(5-1)!))(7^1((1-7)^{(5-1)}))$$

$$DP_5(1) = 45360$$

DP_5=720302058010584045360

DP_5=(0,0), (6,3), (5,4), (0,4), (8,5), (0,1), (0,8), (5,0), (2,0), (3,0), (2,7)

Pair 1: (0,0)

$$\text{RBD - R} = \begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2121/7 & 2122/7 \\ 2116/7 & 2117/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

where RBD-R is Raj Bagath Decryption and Reverse

The pair 1 value is 0 and 0. The both values are same place; so cannot swap the values in the RBD matrix.

Pair 2: (6,3)

$$\text{RBD - R} = \begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2117/7 & 2122/7 \\ 2116/7 & 2121/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

The pair 2 value is 6 and 3. The 6th place value is "2121/7" and 3rd place value is "2117/7" in the RBD matrix. To swap the value 2121/7 is to 3rd place in the RBD matrix and the value 2117/7 is to 6th place in the RBD matrix.

Pair 3: (5,4)

$$\text{RBD - R} = \begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2117/7 & 2116/7 \\ 2122/7 & 2121/7 & 2124/7 & 2119/7 & 2125/7 \end{bmatrix}$$

The pair 3 value is 5 and 4. The 5th place value is “2122/7” and 4th place value is “2116/7” in the RBD matrix. To swap the value 2122/7 is to 4th place in the RBD matrix and the value 2116/7 is to 5th place in the RBD matrix.

Pair 4: (0,4)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2118/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2121/7 & 2124/7 & 2119/7 & 2122/7 \end{bmatrix}$$

The pair 4 value is 0 and 4. The 0th place value is “2125/7” and 4th place value is “2122/7” in the RBD matrix. To swap the value 2125/7 is to 4th place in the RBD matrix and the value 2122/7 is to 0th place in the RBD matrix.

Pair 5: (8,5)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2116/7 & 2123/7 & 2117/7 & 2118/7 \\ 2125/7 & 2121/7 & 2124/7 & 2119/7 & 2122/7 \end{bmatrix}$$

The pair 5 value is 8 and 5. The 8th place value is “2118/7” and 5th place value is “2116/7” in the RBD matrix. To swap the value 2118/7 is to 5th place in the RBD matrix and the value 2116/7 is to 8th place in the RBD matrix.

Pair 6: (0,1)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2116/7 & 2123/7 & 2117/7 & 2118/7 \\ 2125/7 & 2121/7 & 2124/7 & 2122/7 & 2119/7 \end{bmatrix}$$

The pair 6 value is 0 and 1. The 0th place value is “2122/7” and 1st place value is “2119/7” in the RBD matrix. To swap the value 2122/7 is to 1st place in the RBD matrix and the value 2119/7 is to 0th place in the RBD matrix.

Pair 7: (0,8)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2118/7 \\ 2125/7 & 2121/7 & 2124/7 & 2122/7 & 2116/7 \end{bmatrix}$$

The pair 7 value is 0 and 8. The 0^{th} place value is "2119/7" and 8^{th} place value is "2116/7" in the RBD matrix. To swap the value 2119/7 is to 8^{th} place in the RBD matrix and the value 2116/7 is to 0^{th} place in the RBD matrix.

Pair 8: (5,0)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2121/7 & 2124/7 & 2122/7 & 2118/7 \end{bmatrix}$$

The pair 8 value is 5 and 0. The 5^{th} place value is "2118/7" and 0^{th} place value is "2116/7" in the RBD matrix. To swap the value 2118/7 is to 0^{th} place in the RBD matrix and the value 2116/7 is to 5^{th} place in the RBD matrix.

Pair 9: (2,0)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2121/7 & 2118/7 & 2122/7 & 2124/7 \end{bmatrix}$$

The pair 9 value is 2 and 0. The 2^{nd} place value is "2124/7" and 0^{th} place value is "2118/7" in the RBD matrix. To swap the value 2124/7 is to 0^{th} place in the RBD matrix and the value 2118/7 is to 2^{nd} place in the RBD matrix.

Pair 10: (3,0)

$$\text{RBD - R=}\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 2123/7 & 2117/7 & 2116/7 \\ 2125/7 & 2124/7 & 2118/7 & 2122/7 & 2121/7 \end{bmatrix}$$

The pair 10 value is 3 and 0. The 3^{rd} place value is "2121/7" and 0^{th} place value is "2124/7" in the RBD matrix. To swap the value 2121/7 is to 0^{th} place in the RBD matrix and the value 2124/7 is to 3^{rd} place in the RBD matrix.

Pair 11: (2,7)

$$\text{RBD - R}=\begin{bmatrix} 2108/7 & 2107/7 & 2104/7 & 2109/7 & 2105/7 \\ 2110/7 & 2106/7 & 2103/7 & 2101/7 & 2102/7 \\ 2115/7 & 2114/7 & 2113/7 & 2112/7 & 2111/7 \\ 2120/7 & 2119/7 & 218/7 & 2117/7 & 2116/7 \\ 2125/7 & 2124/7 & 2123/7 & 2122/7 & 2121/7 \end{bmatrix}$$

The pair 11 value is 2 and 7. The 2nd place value is "2118/7" and 7th place value is "2123/7" in the RBD matrix. To swap the value 2118/7 is to 7th place in the RBD matrix and the value 2123/7 is to 2nd place in the RBD matrix.

Step 4: Column operations

$$\text{RBD}=\begin{bmatrix} 2105/7 & 2107/7 & 2104/7 & 2109/7 & 2108/7 \\ 2102/7 & 2106/7 & 2103/7 & 2101/7 & 2110/7 \\ 2111/7 & 2114/7 & 2113/7 & 2112/7 & 2115/7 \\ 2116/7 & 2119/7 & 218/7 & 2117/7 & 2120/7 \\ 2121/7 & 2124/7 & 2123/7 & 2122/7 & 2125/7 \end{bmatrix}$$

The first column operations are changed in the RBE matrix like 1st column values will be swapped into 5th column places and 5th column values will be swapped into 1st column places in the matrix.

$$\text{RBD}=\begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2107/7 & 2108/7 \\ 2102/7 & 2101/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The second column operations are changed in the RBE matrix like 2nd column values will be swapped into 4th column places and 4th column values will be swapped into 2md column places in the matrix.

Step 5: DP_5=(0,0), (6,3), (5,4), (0,4), (8,5), (0,1), (0,8), (5,0), (2,0), (3,0), (2,7)

Pair 1: (0,0)

$$\text{RBD}=\begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2107/7 & 2108/7 \\ 2102/7 & 2101/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

where RBD-R is Raj Bagath Decryption and Reverse

The pair 1 value is 0 and 0. The both values are same place; so cannot swap the values in the RBD matrix.

Pair 2: (6,3)

$$\text{RBD} = \begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2101/7 & 2108/7 \\ 2102/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 2 value is 6 and 3. The 6^{th} place value is "2101/7" and 3^{rd} place value is "2107/7" in the RBD matrix. To swap the value 2101/7 is to 3^{rd} place in the RBD matrix and the value 2107/7 is to 6^{th} place in the RBD matrix.

Pair 3: (5,4)

$$\text{RBD} = \begin{bmatrix} 2105/7 & 2109/7 & 2104/7 & 2101/7 & 2102/7 \\ 2108/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 3 value is 5 and 4. The 5^{th} place value is "2102/7" and 4^{th} place value is "2108/7" in the RBD matrix. To swap the value 2102/7 is to 4^{th} place in the RBD matrix and the value 2108/7 is to 5^{th} place in the RBD matrix.

Pair 4: (0,4)

$$\text{RBD} = \begin{bmatrix} 2102/7 & 2109/7 & 2104/7 & 2101/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2106/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 4 value is 0 and 4. The 0^{th} place value is "2105/7" and 4^{th} place value is "2102/7" in the RBD matrix. To swap the value 2105/7 is to 4^{th} place in the RBD matrix and the value 2102/7 is to 0^{th} place in the RBD matrix.

Pair 5: (8,5)

$$\text{RBD} = \begin{bmatrix} 2102/7 & 2109/7 & 2104/7 & 2101/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2108/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 5 value is 8 and 5. The 8^{th} place value is "2106/7" and 5^{th} place value is "2108/7" in the RBD matrix. To swap the value 2106/7 is to 5^{th} place in the RBD matrix and the value 2108/7 is to 8^{th} place in the RBD matrix.

Pair 6: (0,1)

$$RBD = \begin{bmatrix} 2109/7 & 2102/7 & 2104/7 & 2101/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2108/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 6 value is 0 and 1. The 0^{th} place value is "2102/7" and 1^{st} place value is "2109/7" in the RBD matrix. To swap the value 2102/7 is to 1^{st} place in the RBD matrix and the value 2109/7 is to 0^{th} place in the RBD matrix.

Pair 7: (0,8)

$$RBD = \begin{bmatrix} 2108/7 & 2102/7 & 2104/7 & 2101/7 & 2105/7 \\ 2106/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 7 value is 0 and 8. The 0^{th} place value is "2109/7" and 8^{th} place value is "2108/7" in the RBD matrix. To swap the value 2109/7 is to 8^{th} place in the RBD matrix and the value 2108/7 is to 0^{th} place in the RBD matrix.

Pair 8: (5,0)

$$RBD = \begin{bmatrix} 2106/7 & 2102/7 & 2104/7 & 2101/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 8 value is 5 and 0. The 5^{th} place value is "2106/7" and 0^{th} place value is "2108/7" in the RBD matrix. To swap the value 2106/7 is to 0^{th} place in the RBD matrix and the value 2108/7 is to 5^{th} place in the RBD matrix.

Pair 9: (2,0)

$$RBD = \begin{bmatrix} 2104/7 & 2102/7 & 2106/7 & 2101/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 9 value is 2 and 0. The 2^{nd} place value is "2104/7" and 0^{th} place value is "2106/7" in the RBD matrix. To swap the value 2104/7 is to 0^{th} place in the RBD matrix and the value 2106/7 is to 2^{nd} place in the RBD matrix.

Pair 10: (3,0)

$$RBD = \begin{bmatrix} 2101/7 & 2102/7 & 2106/7 & 2104/7 & 2105/7 \\ 2108/7 & 2107/7 & 2103/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 10 value is 3 and 0. The 3rd place value is "2101/7" and 0th place value is "2104/7" in the RBD matrix. To swap the value 2101/7 is to 0th place in the RBD matrix and the value 2104/7 is to 3rd place in the RBD matrix.

Pair 11: (2,7)

$$RBD - R = \begin{bmatrix} 2101/7 & 2102/7 & 2103/7 & 2104/7 & 2105/7 \\ 2106/7 & 2107/7 & 2108/7 & 2109/7 & 2110/7 \\ 2111/7 & 2112/7 & 2113/7 & 2114/7 & 2115/7 \\ 2116/7 & 2117/7 & 218/7 & 2119/7 & 2120/7 \\ 2121/7 & 2122/7 & 2123/7 & 2124/7 & 2125/7 \end{bmatrix}$$

The pair 11 value is 2 and 7. The 2nd place value is "2106/7" and 7th place value is "2103/7" in the RBD matrix. To swap the value 2106/7 is to 7th place in the RBD matrix and the value 2103/7 is to 2nd place in the RBD matrix.

4. Result and Discussion

The "proposed algorithm RPBB31encryption performance compared with Salsal and ChaCha". Salsa concept is the "all diagonal values move to the 1st row and ChaCha concept is the all diagonal values move to the 1st column".

Table 4. RPBB31 Encryption Performance.

File Size	ChaCha	Salsa	RPBB31
24	1.69	3.4	6
76	1.29	2.2	6.2
312	2.73	2.3	7.5
822	2.64	3.9	8.9
1531	3.4	9.1	10.6
6580	2.27	10.5	14.5

The "three by three matrix has 24 bytes of file size"; the "six by six matrix has 76 bytes of file size"; the "ten by ten matrix has 312 bytes of file size"; the "fifteen by fifteen matrix has 812 bytes of file size"; the "twenty by twenty matrix has 1531 bytes of file size", and the "forty by forty matrix has 6580 bytes of file size as shown in Table 4 and Tale 5".

Table 5. RPBB31 Decryption Performance.

File Size	ChaCha	Salsa	RPBB31
24	1.62	3.1	6.5
76	1.99	3.9	7.1
312	2.55	4.3	7.9
822	2.99	4.8	9.1
1531	3.6	9.6	11
6580	3.9	10.7	13.5

From Figure 4, the RPBB31 method and "has compared the encryption speed in seconds". The "encryption performance of the speed 1.69 (s), 1.29 (s), 2.73 (s), 2.64 (s), 3.4 (s), and 2.27 (s) for the ChaCha", 3.4 (s), "2.2 (s), 2.3 (s), 3.9 (s), 9.1 (s) and 10.5 (s) for the Salsa" and 6 (s), 6.2 (s), 7.5 (s), 8.9 (s), 10.6 (s) and 14.5 (s) for the RPBB31. The RPBB31 "gives more protection of the data; when compared to existing techniques".

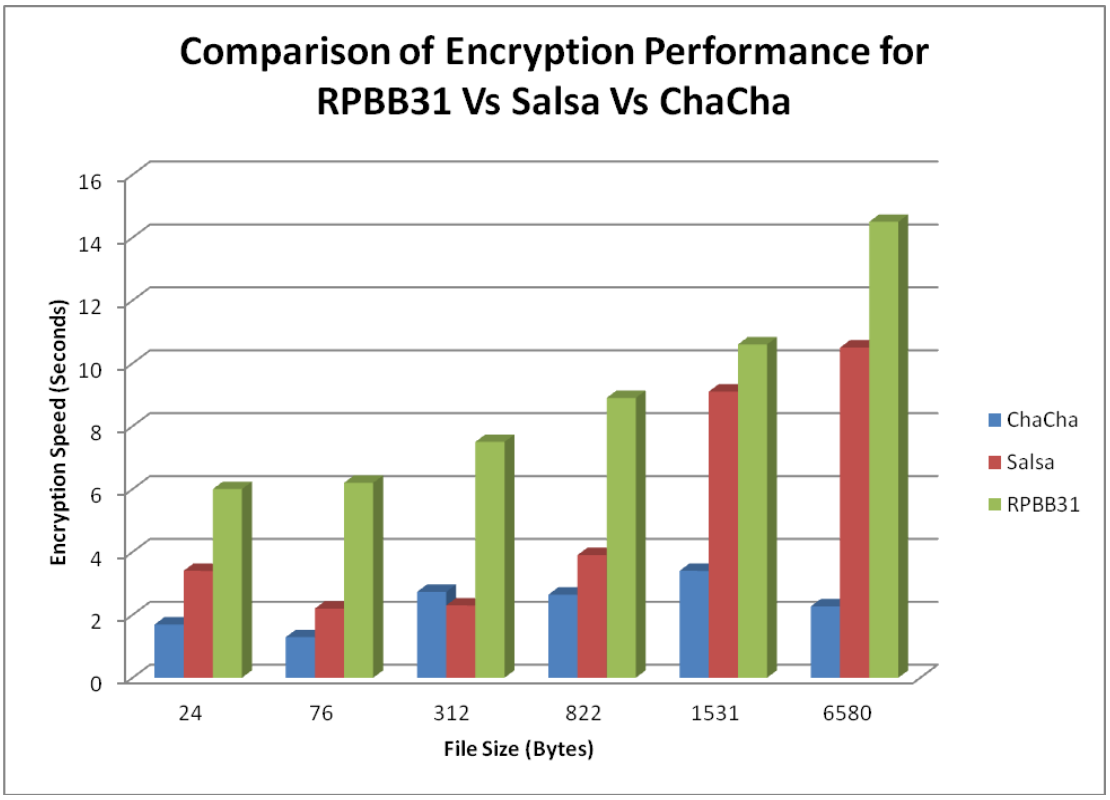

Figure 4. Encryption Performance

The RPBB31 method and "has compared the decryption speed in seconds". The "decryption performance of the speed 1.62 (s), 1.99 (s), 2.55 (s), 2.99 (s), 3.6 (s), and 3.9 (s) for the ChaCha", 3.1 (s), "3.9 (s), 4.3 (s), 4.8 (s), 9.6 (s) and 10.7 (s) for the Salsa" and 6.5 (s), 7.1 (s), 7.9 (s), 9.1 (s), 11 (s) and 13.5 (s) for the RPBB31 shown in Figure 5. The RPBB31 "gives more protection of the data; when compared to existing techniques".

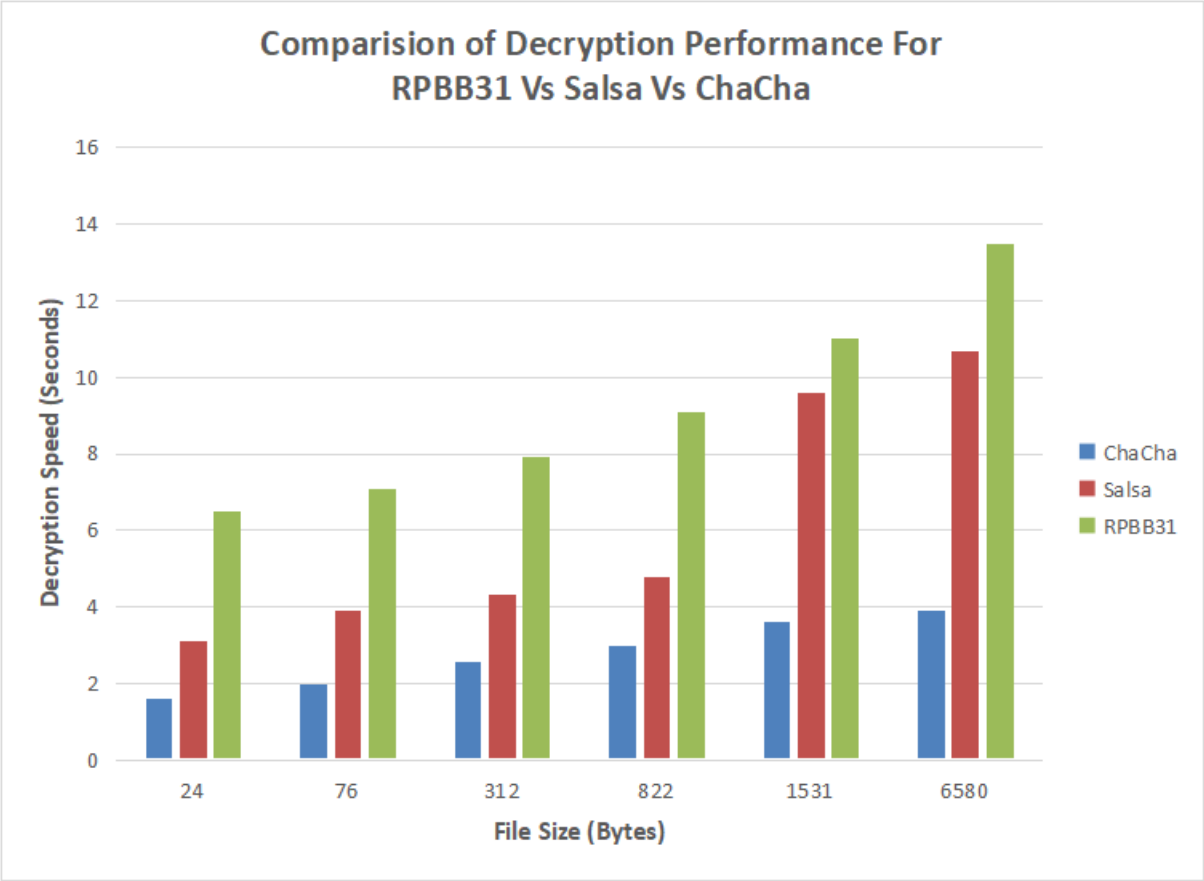

Figure 5. Decryption Performance

5. Conclusion

In today's world data is most important in public because without data cannot live in the world. This data is big data and that data daily increases through "Twitter". This media is used to analyze the public opinion of the tweets and predict the future through Machine Learning Algorithm and used to make it polarity score; and the score has very less security because, this score can change the score and affected the future, so apply the existing security algorithms is Salsa and ChaCha. These algorithms are not providing good security because they focused only on performance, not security. So, the proposed security algorithm is RPBB31. This algorithm has seven stages. The 1st stage is to find the secret key N, n, and p values from the matrix. The 2nd stage is to apply the secret key in equation (1). The 3rd stage operation of $P_N(n)$ up to n=1. The 4th stage is all $P_N(n)$ operations make their single line. The 5th stage is to pair the values and swap the values in the matrix. The 6th stage is column operations in the matrix. The 7th stage is again Step 4 values used to swap but "0th" cell value start from reverse in the matrix. The RPBB31 algorithm has provide good security and performance while compare to existing algorithms. In the future, to add more mathematical models for security.

Declarations

Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability:

The data used to support the findings of this study are available from the corresponding author upon request

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Ethical Approval

This material is the authors' own original work, which has not been previously published elsewhere. The paper is not currently being considered for publication elsewhere. The paper reflects the authors' own research and analysis in a truthful and complete manner.

Consent to Participate

I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions I may have will also be answered by a member of the research team. I voluntarily agree to take part in this study

Consent to Publish

Individuals may consent to participate in a study, but object to having their data published in a journal article

Competing Interests

To the best of my knowledge and belief any actual, perceived or potential conflicts between my duties as an employee and my private and/or business interests have been fully disclosed in this form in accordance with the requirements of the journal

Author contribution

Bagath Basha Chan Batcha- Drafting the manuscript

Rajaprakash Singaravelu- Drafting the manuscript

Meenakumari Ramachandran -Supervision

Suresh Muthusamy -Supervision

Hitesh Panchal -Assisting in drafting the manuscript

Kokilavani Thangaraj -project administration

Ashokkumar Ravindaran- project administration

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