e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

COLOR CODE ENCRYPTION ALGORITHM

Abhidnya Tambe*1

*1Indian Institute Of Information Technology Surat, India.

DOI : https://www.doi.org/10.56726/IRJMETS51951

ABSTRACT

The algorithm of Color Code Encryption (CCE) helps to encrypt less word sentences and even large words sentences into single rectangular bar. Color Code Encryption Algorithm is used to encrypt password into more than one crore combinations making it one of the safe approaches to consider. The research paper consists of algorithm to encode any character, word, sentences, numbers, special characters using Huffman encoding algorithm. In message transmission, after drawing the Huffman encoding tree, each character bit is converted into the color code by using root sentence color code and each character hexadecimal code. We can decode each word, character by providing a decoding function to the receiver side to decode each word. The paper follows Huffman encoding and Morse code logic to build color encrypted data.

Keywords: Color Code, Huffman color code, Color encryption, encryption, Noise detection, message trans - mission security.

I. INTRODUCTION

Any message or data or a password in a text form be encoded inside a color bar makes it protective and difficult to decode until special requirements are given. Any message send from sender to the receiver is in the text form of multiline encoded form.

Injecting noise is easy for the intruders and that message can be interpreted as wrong by the receiver causing the great confusion.

Color Code Encryption Algorithm or CCE method automatically detects whether that message is updated or not after the sender sends it and before the receiver receives it i.e. noise detection.

CCE algorithm, converts text message, words, sentences into their respective Color code making it secure even after doing combinations to decode it.

Any data to be send during form action or confidential data to send via mail, CCE algorithm can be used. While Text encoding or bit encoding gives the chance of altering it.

Extending Huffman code and converting that code to an effective color code is one of the approaches to make Huffman code more effective.

II. ALGORITHM

2.1 Encoding:

Steps:

1) Consider string X.
2) Col, consider it an array which concatenate to form a six-digit hexadecimal code, of size=6.
3) Find length of that string: len(X).
4) Calculate len(X)/6 and take the remainder value Y.
5) Convert Y to three-digit hexadecimal value, say hexY.
6) Place the most left side character of hexY at any position of array col say at i.
7) Place the next digit of hexY at i+2th position.
Note: if i=6, i+2=2 → goes in clockwise circular fashion.
8) Place the last digit of hexY at i-1 position.
Note: if i=0, i-1=6 → goes in anticlockwise circular fashion.
9) Now calculate frequency of characters (including <space> and special characters) and add them as = freqSum.
10) Compute Hufman code tree and determine binary code for each character.
11) Let height be the height of the Huffman code tree.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

12) Convert the height to the three-digit hexadecimal value and place it on the empty places of the Col array from left to right.
13) Array Col is now completed.
14) Convert all binary code of each character of the string to their respective hexadecimal value.
15) Add those hexadecimal value with the array Col element via hexadecimal addition each.
16) Now, we get hexadecimal color code for each letter.
17) Add all the hexadecimal color code of the message character to get the message color code by adding it further with root color code.
18) Keep color-bar properties as: height = 20px; width = 100px.

2.1.1 Example:

Despite its prowess, AI faces its own limitations that require careful consideration. Chief among them is the absence of logical reasoning and creativity, which makes AI systems prone to misinterpretation and error in nuanced contexts. Additionally, relying on huge amounts of high-quality data presents challenges in domains with limited or biased datasets. Ethical concerns related to artificial intelligence, including algorithmic bias, privacy violations, and job displacement, further underscore the need for responsible development and deployment practices.

Eg: Take string: X = “Hello World”.

1. count number of characters in X: 11➔len(X)
2. Y ➔ len(X)/6 ➔ remainder = y = 5→(5)10= (005)16.
3. We know that a color code has six digits, hence transform it in hexadecimal form and convert to three-digit hexadecimal to fill three places of that color code.
4. Col

_ _ _ _ _ _

Pos1 2 3 4 5 6

5. Choose any random position in color code.
6. Place the first digit [left most] of (y)16 in any random position. Say, at position i = 2.

➔#_ 0 _ _ _ _

7. Place the second digit at i+2th position.

➔# _0 _ 0 _ _.

Note: 1) if i=6, i+2==2 →circular

8. Place the third digit [right most] on i-1 position

#5 0 _ 0 _ _.

Note: 1) if i=1, i-1=6, in circular manner.

9. Now calculate the frequency of each character and make Huffman code tree.

Z = total frequency

H e l o <space> w r d

1 1 3 2 1 1 1 1

10. Create Huffman code tree

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

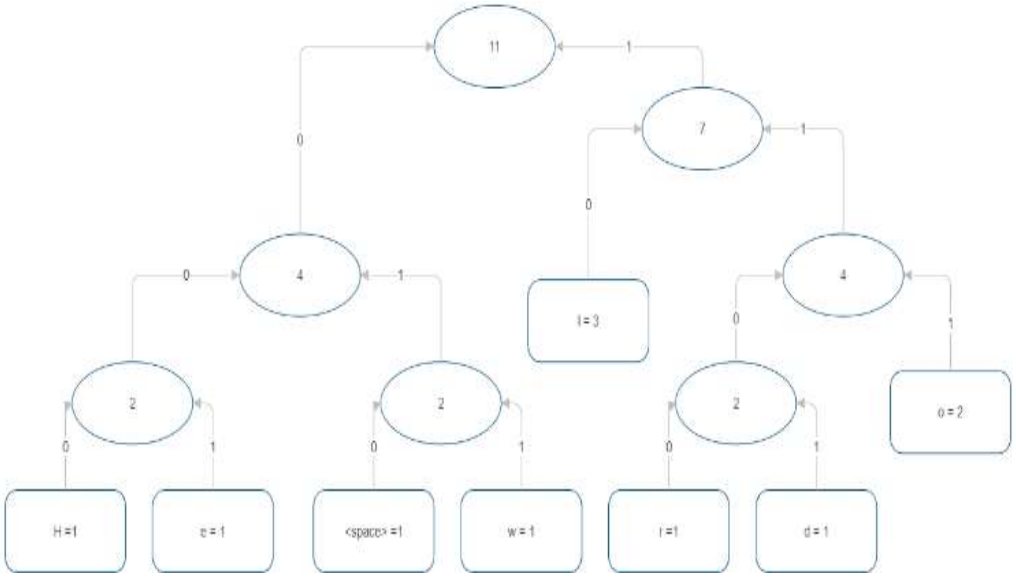

Fig 2.1 Huffman code example

11. Height of the tree = 6 → (006)16 [keep identical frequency at same tree level]

Place the hexadecimal value of height of the tree in Col array from left to right

#500006 //RootColorCode

Now,

H = 000 = (000)16

e = 001 = (001)16

<space> = 010 = (002)16

w = 011 = (003)16

r = 1100 = (00C)16

d = 1101 = (00D)16

o = 111 = (007)16

l = 10 = (002)16

Output:

("Hello world") = #507026

Hello world

"Hello world" will be shown in this way:

Fig 2.2: CCE Output of "Hello world"

color-bar {height = 20px; width = 100px;}

III. MESSAGE TRANSMISSION APPLICATION

3.1 Encoding:

Follow the same step as given in Heading 2.1.

In heading 2.1.1, after getting the root color and each character hexadecimal color send the message like this:

#500006 //RootColorCode

H = #500006

e = #500007

<space> = #500008

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

w = #500009

r = #500012

d = #500013

o = #50000D

l = #500008

here the color code of <space> and l is same. So, after duplication of a particular color code, the next color code should be incremented till unique color code is not found.

l = #50000A

Along the transmission line, the packages will be like the following:

Fig 3.1: Message transmitting through transmission channel

Along with the color codes, one text file 'FILE_Decode' containing dictionary of text character and their Huffman code converted to hexadecimal form.

Note:

1. The sender has to send the character color code according to the message and the text file should be encrypted.
2. For the text file encryption, sender can use Color Code Encryption Algorithm by changing the password text to its color code shown in heading 2.1.
3. First color bar will always be the RootColorCode.
4. The entire color code sequence and text file can be transmitted through the transmission channel using the encrypted folder.

3.2 Decoding:

1. The function in the receiver side machine/system will take that text file and will insert the transmitted color code in to the function program.
2. Function program: RootColorCode minus individual color code operations will be performed and each character will be decoded according to the transmitted color code sequence.
3. And hence the decoded version of the message is shown on the receiver side display.

IV. APPLICATIONS

Applications includes:

1. Data encryption
2. Message transmission
3. Password locking
4. Verification of the message send with that of received as a key.
5. Confidential documents can be represented with a color instead of a multiline encoded text encryption.
6. Image can be encoded using same pixel intensity frequency.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

7. If intruders try to add some noise in the message send, its color code will be different to that of the color code presented to the receiver.
8. Large amount of text, special characters or also single words can be encoded to their color code.
9. The Color code of the message cannot be decoded until found the Huffman code tree.
10. Since any set of words i.e. a sentence can have same color code. Determining the exact message by the intruder is hectic and time consuming.
11. Data can be encrypted and can be store on a local machine or global database by using color bar.
12. Password locking works effectively, as six-digit code to be determined takes lots of combinations.
13. Determining the password with the help of color code is difficult as it can't define the exact message.
14. Also, image can be saved securely.
15. Big sentences can be encoded to a single-color code making it unrecognized.

V. CONCLUSION

The conversion of any text, word, alphabet, special numeric characters or big length paragraph can be stored and send securely with the provision of detecting Intrusion attack, Noise detection with the help of CCE Algorithm. We can securely transmit any data from sender to receiver which is encoded inside six places making it impossible to crack by any attacker within a given time frame because of fast transmission.

Hence by using Color Code Encryption Algorithm, security can be achieved efficiently and can be managed between two agents predetermined in the transaction/transmission.

VI. REFERENCE

[1] https://www.javatpoint.com/huffman-coding-algorithm
[2] https://www.youtube.com/watch?v=Y3Do2D-DsmI
[3] https://www.youtube.com/watch?v=uCehHHVsRFg
[4] https://www.youtube.com/watch?v=W5q0xgxmRd8