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Cash Note With High Performance Security

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ABSTRACT

Rapid creation of fake notes affects the financial status, the value of the currency, unemployment rate, etc. In this paper, a cash note is generated with high level security features – it has specific serial number which will be encoded in that cash note with a procedure. Even if a person encodes the serial number in a fake cash note, the decoder will identify it as a fake one. If serial number and cash denomination at the decoding match with those of encoded cash note, then that note can be treated as genuine one. Otherwise it can be considered as a fake one. First, each digit of the serial number on the cash note is converted into binary number with a procedure and can be located beside the count indicator. Every cash note has some denomination and its decimal value is converted into binary number which can be kept beside the mode indicator. The count indicator and mode indicator are generated in the course of operation. The obtained encoded binary number is divided into codewords of 8 bits each. Each bit of code word is arranged at random locations in the cash note.

KEYWORDS

Cash Note's Denomination, Cash Note's Serial Number, Decoding, Encoding, Inset of Cash Note, Prefix of Cash Note

INTRODUCTION

In olden days instead of using the cash, there is exchange of the goods. After some time cash has been prominent over the goods exchanging method. There are lots of disadvantages in exchange method in which the buyer may get more benefit than seller and vice versa (Caroline Humphrey, 1985). In cash utilizing process some fake notes are created due to which the financial status of the country is challenging, like decrease of the value of currency, increase in the unemployment rate, etc, (Ruth Judson & Richard Porter, 2010). Reserve bank of india (RBI) provides some parameters to identify spurious money. Most of the methods automatically detect the fake cash by using these parameters. But, some illegal persons have an ability to create the fake cash note as identical to the original one by using those parameters. These actions can be controlled by only one procedure i.e. generation of Cash Note with High Performance Security.

This paper provides a novel algorithm in which cash note serial number is encoded with a special procedure and then it is embedded in the cash note. At verification side, it needs to decode the cash note for verification and the serial number is obtained. If serial number in the cash note matches with that obtained serial number then cash note is original otherwise it is fake. In case, if any illegal persons attempts to encode the serial number in cash note then decoder identifies it as fake cash by producing garbage value.

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In any country, cash or money plays an important role and different cash notes are present with different money denominations. Every cash note has some serial number which is used to identify the true note and to estimate the total number of notes present in the market. Every serial number indicates some specific identification and it is designed by the super most banking central institution controlling the monitory polices of the respective country to which the note belongs. If take an indian cash note, it has serial number which consists of 9 digits. This 9 digit serial number consists of the segments like Prefix, Inset and Serial Number Syntax. This format is assigned by Reserve Bank of India (RBI).

The prefix has 3 characters and its format is same to the notes of INR 50, 100, 500 and 2000 but differs in INR 10, 20 and 50. The prefix in case of INR 5, 10, 20 and 50 cash notes has two numerical values and only one alphabet. The prefix of the INR 10, 20 and 50 notes start from 00A to 99W.

Generally in Cash notes only 20 letters are used out of 26 alphabet letters. The letters O, I and J are similar to some numerical values like 0 and 1. The reason for eliminating the letters X, Y and Z are to round off the number of prefixes to a multiple of ten for easiness in calculation. The prefix in note from INR 10 to 50 has only two numerals and one alphabet. The prefix in note from INR 100 to 2000 has only one numeral and two alphabets. The ranges of prefix in note from INR 10 to 50 and from INR 100 to 2000 are 00A to 99W and 0AA to 9WW respectively.

The Next six digits Serial number syntax is same to all types of cash notes. The range of serial number syntax is 000001 to 100000. For example if any cash note from INR 10 to INR 50 and from INR 100 to INR 2000 are taken, they have the corresponding ranges for serial number as 00A 000001 to 99W 100000and is 0AA 000001 to 9WW 1000000 respectively.

From 2005 onwards the inset letter is printed as watermarking with the serial number in cash note. In order to represent the inset letter 20 alphabets are used only. O, I, J, X, Y and Z letters are not used as inset letters. In india, there are 4 currency printing stations available each of them is assumed to be assigned with some specific letters. Based on the inset letter, the origin place of the note is identified. The four cash printing stations in india are at Mysore, Dewas, Salboni and Nasik.

Inset A, B, C and D letters may be allotted to Mysore. E, F, G, H and K letters may be allocated to Dewas. L, M, N, P and Q letters may be allotted to Salboni and remaining letters may be allotted to Nasik. From 2006 Reserve Bank of India (RBI) introduced some new cash notes and these are replacement for notes with printing errors and for the damaged (Reserve Bank of India, 2006). For the replacement notes Star mark is added between the prefix and serial number, for example serial number of cash note is 00A* 000001 (Reserve Bank of India, 2006).

BACKGROUND

There are several algorithms available to encrypt the text data. One algorithm is to encrypt the text data by using two keys such as public key and private key (Nentawe Y. & Goshwe, 2013). These two keys are generated by using RSA algorithm (S. G. Krantz & H. R. Parks, 2014). In this method, the text data encryption can be done by using public key which is sent by receiving entity. The sender X encrypts the text data by using this key as explained below.

1. Collect the public key (d, m) of receiving entity Y
2. Express the message with plain text as a positive integer. *P*
3. Calculate the cipher text. $Q=P^d$ Mod m
4. Transfer the cipher text Q to *Y*

Decryption can be done at the receiver which needs an encrypted message and private key. This private key generated through the RSA algorithm will be utilized for decoding which takes the following steps