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MATHEMATICAL MODEL OF INFORMATION AND A NEW APPROACH OF CODING IN IT

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MATHEMATICAL MODEL OF INFORMATION AND A NEW APPROACH OF CODING IN IT

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Abstract:- In this paper we are discussed about logical sentence coding for distinct messages by binary alphabets {0, 1}.The information model contains alphabets, words, sentences and messages are available in the practical purpose. The information and its relation discussed for clarification.

Keywords *:- Logical Information ,Partial Sum.*

I. INTRODUCTION

In our discussion of the paper is that alphabet is the binary alphabet {0,1}. A code is also collection of logical sentence that are used to be represent distinct messages .A sentence in a code is also called a *code-sentence*. Suppose a logical sentence is transmitted from its source of information to its destination. In case of transmission, *inferences* such as noises might cause some of the 1's in the code-sentence to be received as 0's and some of the 0's to be received as 1's.There fore received sentence might no longer supposed as the transmitted one and that one is our aim to recover that transmitted sentence if at every case of possible.

Generally, in telephone wires strung between poles ,later the were cables on poles and in trenches .Next come microwave between relay towers on hill tops follow the were less communication system. Subsequently joined by microwave beam to and from satellites and fix points high wave equator. Now more and more long lines are *fiber-optic* cables. The microwave towers are spaced at 26 mile intervals in long chains that join cities. They are followed the *logical communication system* (LCS).

II. LOGICAL INFORMATION CODING

In modern communication system ,data items are constantly being transmitted from point to point .The basic unit of information called a message, is a finite sequence of character that we want to transmit is now represented as a sequence of m-elements from A .Choose our alphabet set A={0,1}.Let A^m denote the binary sequence of length n. Let $\hat{+}$ be a binary operation on A such that for x and y in A. Then x $\hat{+}$ y is called *partial sum* of sequence length n means carry part is neglected during addition and one if both are different. For example

X=10101 and y=10011 then $x\hat{+}y$ is 00110

To show that (A^m ,$\hat{+}$) is a group by using the properties.

Let x be a sentence in A. We define the weight of x denoted by ω(x) to be the number of 1's in x. The weight of 00110 is two. We define the weight of x and y denoted by ω(x,y) to be the weight of $x\hat{+}y$ is ω(x,y) . Note that the *partial sum* of two words is exactly carry part is neglected during sum and one if both are different . We establish a theorem as follows.

THEOREM:-2.1.

Let x,y and z be elements of A^m . Then

(a) $\omega(x,y) = \omega(y,x)$.

(b) $\omega(x,y) \geq 0$.

(c) $\omega(x,y) = 0$ if and only if x=y.

(d) $\omega(x,y) \leq \omega(x,z) \hat{+} \omega(z,y)$.

PROOF:- The first three properties are simple to prove are not needed.

(d). For x,y in A^m , $|x\hat{+}y| \leq |x|\hat{+}|y|$

If x Є A^m , then $x\hat{+}x = \bar{o}$, the identity element in A^m.

Then $\omega(x,y)= |x\hat{+} y| = |x\hat{+} \bar{o} \hat{+} y|$

$=|x\hat{+} z\hat{+} z\hat{+} y|$

$\leq|x\hat{+} z| \hat{+} | z\hat{+} y|$

$= \omega(x,z) \hat{+} \omega(z,y)$.

Thus this establishes the theorem.

The transmission of information is to reduce the likelihood of receiving a sentence that differs from the sentence that was sent, the code sentence by means of a transmission channel. Then each code sentence x=e(a) is received as the sentence in A^m . This is received from each a Є A^m. e is a function and a may be identified. The noiseless or noiseful arises during transmission.

III. MATHEMATICAL MODEL OF INFORMATION

As we observed that the information can be represented in either symbols , wards ,sentences and message form .The common syntax of representing any information is a mathematical expression .The different models are available in t-he practical purpose .We suggest a triplet (Σ,δ,0) for this purpose.

The symbols Σ, δ and 0 are used for the representation of a set of characters, transactions or relationship from any subset of Σ^* to Σ^* (set of all regular expressions defined on Σ) and the set of operations (logical, arithmetical etc) the following proposition assures the encoding of information with this formulation .

PROPOSITION:-3.1

The set of all alphabets ,words ,sentences and messages are contained in the system (Σ,δ,0).

PROOF:-

Let the system (Σ , δ ,0) be denoted as S .where Σ is the set of alphabets, δ the transactions and 0 is a specific operations on the set of alphabets ,Suppose 0 is the concatenation operation, δ is the identity transformation ,then

$a\ 0\ \lambda = \lambda\ 0\ a = a$ for $a \in \Sigma$

To verify the set of words belongs to S ,the transaction functions are to be considered from any subset of Σ^* to Σ^* and the operation 0 is the concatenation operation.

To show the set of sentences and messages belongs to the system (Σ , δ,0),the choices of δ and 0 should be specific. In this case the operation 0 can be any logical operations such as NOT,AND,NAND,NOR and EOR ,Implication etc.[]

EXAMPLE:-3.2

The sentence "This white car is mine" belongs to the information system (Σ , δ,0). In this case Σ is the set of all English characters including the blank character 'b' and the null characters " lambda" the transaction function δ is a mapping from subset of Σ^* to Σ^* such that δ(this white car is mine)= thiswhitecarismine. This string is a word in Σ^*.

If T ={b,a,c,e,h,I,m,n,r,s,t,w}, $\delta: T \rightarrow \Sigma^*$ then for $u \in \Sigma^*$ such that u={t,th,thi,this,thisb,thisbw,thisbwh,thisbwhi,thisbwhit,thisbwhite,thisbwhiteb, thisbwhitebc,thisbwhitebca,thisbwhitebcar …… }

So 0 is the recursively concatenation operation.

IV. MESSAGE REPRESENTATION

Usually message are represented either in the sequential coding or in the alpha numeric forms. The communication protocols use different types of coding as per the data transmission equipments infrastructures and the security to the data contents. Most of the communication systems use sequential coding. One of the data transmission permission is obtained from the receiver 's end within the STX(start of text)and ETX(end of text) commands most of the massages are transmitted through the proper code. In fact, the codes are binary characters. *Telephone network,Cable television network and Computer network etc*, use binary codes for the data transmission, Surface mail (i.e., News paper etc.) or postal messages are encoding in any other type of characters, not necessarily binary codes.

V. INFORMATION AND ITS RELATIONSHIP WITH MESSAGE

Message carry information. All information derived from any message are either correct or wrong. The information can be interpreted as the proposition or predicates. The sentence connectors and parsers can degenerate information from the basic literal associated with the message.

VI. CONCLUSION

This paper gives the details clarification of different messages during transmission. The transmission of information from point to point and its basic unit called message. The *Telephone network, Cable television network and Computer networks etc*. use binary codes during data transmission. The binary coding is used in this paper is easily implemented in the personal computer system. The messages are either correct or wrong is identified by the system.

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