A Secure and Packed Bcd System

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Abstract: Today, lossless data compression (LDC) used on personal computers to increase their storage capacity. If we take an example, we can get double the normal capacity by using LDC algorithms. This is necessary to indicate compressed data of variable length in a fixed length block with little fragmentation as much as possible. Binary Coded Decimal is a digital encoding system in which each decimal number is represented in four bits binary. It represents the decimal range 0 through 9. Unpacked BCD consumes a byte for each represented numeral, but in packed BCD typically consumes a single byte for two numerals. Because we can represent a BCD number by using only four bits, so another four bits are free, so by using packed BCD technique we can store another numeral in remaining four bits. In this paper, we are going to apply security mechanism to the packed BCD numerals.

Index terms - Packed, Unpacked, Secure, Encryption, Decryption..

I. INTRODUCTION

If we are storing data in variables byte by byte then it is so memory consuming. And we have no small size variable then byte. If we want to transfer the data through channel then because of larger size file it is a very tedious work. It takes too much time.Packed BCD is a mechanism in which first, we have need to take 8 bit variable. Then we convert the holding value in ASCII code. After this we have to convert this ASCII code to hexadecimal number. Each hexadecimal number needs four binary bits. So in 8 bits we can store 2 decimal values by packing two decimal values in a single byte. For this operation first we need to shift last four to first four bits. But in second number we need first four bit free. By adding these values we found both values in hexadecimal at first and second position respectively.

After packing all values, it should be secure. So we have to apply a proper encryption algorithm. By using this encryption algorithm file will become secure. Then it is able to transfer through channel without worried about data.

Unpacked BCD:

Unpacked BCD would only have one BCD digit per byte (one digit per CPU word) as shown in Table 1.

Decimal	6	2	4	1	3
Binary	0000 0110	0000 0010	0000 0100	0000 0001	0000 0011

Table 1. Unpacked BCD.

Packed BCD:

Packed BCD means that each byte contains two BCD digits, one digit in the upper nibble and the other digit in the lower nibble which is shown in Table 2. To display values bigger than the criteria of a single byte any value of consecutive bytes can be applied. We take an example, to display the decimal number 6 2 3 9 in packed BCD, a program would encode as follows in Table 3.

Decimal	9	2	4	1	3
Binary	1001	0010	0001	0100	0011

Table 2. Packed BCD for 2 byte.

Decimal	6	2	3	9
Binary	0110	0010	0011	1001

Table 3. Packed BCD for 4 byte.

LITERATURE REVIEW

Yoshiyuki Okada et al. [1] have proposed compression of lossless data commonly use on personal type of computers for increase storage capacity. When we take example, we can get double of the normal capacity by using lossless data compression strategies. in this research, it is very necessary to locate compressed data of variable length in a fixed –length block by little fragmentation as much as possible. This can be completed by "compressed data management". PFS has not using garbage type of collection, which one allow it to

maintain high space efficiency because the negative effects of partition are not increased over then get the full of storage capacity to absorb the partition of a compressed area.

Sri Parameswaran et al. [2] describes packed packet type of classification is the most important way of modern networking system. Packet classification system have been built utilizing of ternary content addressable memory reason of high output needed. So, at last we get minimize area and power consumption without treating output.

ShidiQuet et al. [3] presented a new and modern bus encoding scheme (BES) which one is capable to remove effectively and efficiently crosstalk type of problems in bus parts as well as inter partitions using shielding wires. So, this proposed coding technique can save the dynamic power up to 63% and this 63% dynamic power used for 24 bit buses, while totally escaped the crosstalk delay.

Stephen Hines et al. [4] proposed an architectural features and complier optimization technique target one, two or more design goals expense of the others. In this a novel architectural and complier approach used to escape power requirements, minimize code size, and improve performance by adding an IRF (instruction register file) into the architecture.

G. Jaberipuret et al. [5] represent the decimal digits is the binary coded decimal (BCD) encoding. The BCD digit multiplier can present decimal multiplier as the key building part, same of the degree of parallelism. Tong Shang Zhang Tong sheng Zhang et al. [6] introduced a digital communication system ,digital code may be delete or misleading during the transmission, so the receiver can't identify rightly, the main aim is to design the encoding and decoding of hamming by VHDL to describe how hamming code by VHDL language to error detection or correction.

NASRI Nejahet et al. [7] compared some coding schemes over an underwater channel in PSK system. In conclusion we get an effective and efficient wireless underwater communication system. Rusameesawang et al.[8] used a GSM mobile station using SMS messaging for increase the ability of a traffic report system that offer us the understandable and rapid and fast report system.

M. cowlishaw et al. [9] presented an encoding is a lossless compression of three binary coded decimal digits into 10

bits using an algorithm. Here we can be applied or reversed BCD using only simple Boolean operations and functions. We make an improved and acceptable encoding system which has the same type result and advantages but it is not limited to multiples of three digits which is described. In new scheme we can use any length of string efficiently and effectively while keeping decimal digit boundaries accessible. Chung-Hung Lai et al. [10] approaches to minimize the inverted file without use of minimize the query efficiency are important to the success of information system. In this paper, we present a compression way by using binary decision diagram encoding so that all possible relation among large database will be pulled to minimize the posting of representation. Another advantage of using this, we can efficiently and effectively perform Boolean queries. In the experiment's output we can display that the compression ratios of the inverted files have been better result by the BDD scheme.

Y.-K. Chang et al. [12] propose a set of encoding schemes based on Gray code. Encoding techniques are used to improve the existing elementary interval- based range encoding schemes. Experiment's results show that the proposed Gray code-based schemes consume less TCAM storage space than the existing schemes.

S. Rahil Hussian et al. [14] presented the reversible implementation of DPD converter to and from conventional BCD format. Conversion is applied to the adder circuits where they follow BCD code for the arithmetic addition such that converting them to DPD (Densely packed Decimal) will result in the better storage capacity by decreasing the less density of storage devices for faster access to memory. H. Che et al. [13] proposed a dynamic range encoding scheme (DRES) to considerably increase the TCAM storage efficiency for range matching. DRES uses the TCAM coprocessor itself to support range encoding. It can be programmed in a network processor using a TCAM coprocessor for packet classification.

PROBLEM DEFINITION:

Unpacked data consumes too much memory, but packed data consumes 50% memory then previous. But problem is still there with packed BCD because data is not secure. So our main problem is, how to make packed data secure. After apply a security mechanism we can transfer data without any drought.

SOLUTION METHODOLOGY:

To transfer a secure packed data through channel we will work on following:

Step1. Creating unpacked BCD file.

Step2. Develop a java code to make packed BCD file.

Step3. Convert or compress the unpacked file into packed file by using above code.

Step4. Develop a substitution encryption algorithm code in java to convert in cipher text.

A. BCD Packing:

• First, convert all the decimal values into equivalent ASCII codes.

• Then convert these ASCII codes to equivalent hexadecimal codes as shown in Table 4.

• Then apply packing methodology on these hexadecimal codes.

ASCII	HEX	ASCII	HEX	ASCII	HEX
0	30	L	4C	g	67
1	31	M	4D	h	68
2	32	N	4E	i	69
3	33	O	4F	j	6A
4	34	P	50	k	6B
5	35	Q	51	l	6C
6	36	R	52	m	6D
7	37	S	53	n	6E
8	38	T	54	o	6F
9	39	U	55	p	70
A	41	V	56	q	71
B	42	W	57	r	72
C	43	X	58	s	73
D	44	Y	59	t	74
E	45	Z	5A	u	75
F	46	a	61	v	76
G	47	b	62	w	77
H	48	c	63	x	78
I	49	d	64	y	79
J	4A	e	65	z	7A
K	4B	f	66		

Table 4. ASCII TO HEXADECIMAL.

Initially, BCD value is changed into ASCII Values. Then, ASCII values is converted into Hexadecimal code. Finally, we get an output as Packed BCD as shown in Figure 1.
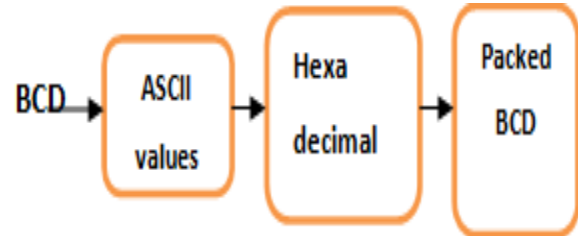

Fig1. Flow chart for BCD to packed conversion.

For example:-

Here, Decimal Value 8, 4 are represented as ASCII value 56, 52. Then 56, 52 is converted as Hexadecimal value 38, 34. Finally, we get a packed value as 84 which is shown in Table 5.

Decimal	ASCII	Hexadecimal	Packed
8	56	38	
4	52	34	84

Table 5. Decimal to packed conversion

B. ENCRYPTION:

In encryption algorithm, packed BCD file is encrypted from plain text to cipher text. We applied substitution cryptography on plain text to make it secure. According to a regular system; the "units" may be single letter (most common), pairs of letters, triple letters, mixtures of the above, and so forth. The receiver decrypts the text by performing an inverse substitution which is shown in Table 6.

32	31	30	29	28	27	26	25
24	23	22	21	20	19	18	17
16	15	14	13	12	11	10	9
8	7	6	5	4	3	2	1

Table 6. Permutation-expansion-bit-mapping.

Graph representation:

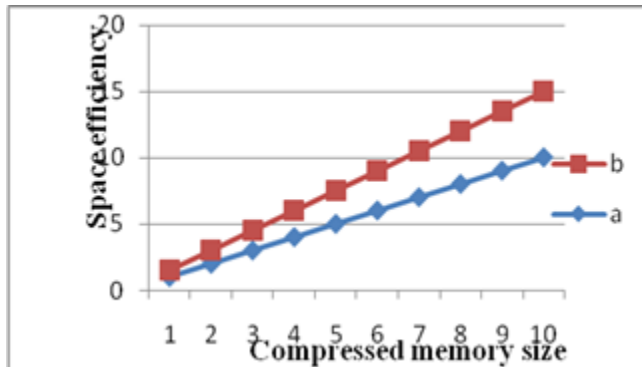Performance of disk space efficiency is shown in Figure 2.

Fig.2. Performance of disk space efficiency.

CONCLUSION

With our research done in the related field we are able to compress the file and can save 50% memory and the same file can also be transferred securely through any channel. We also applied an encryption algorithm successfully, with the help of which we are able to reduce the size of the binary coded decimal file and save the memory in this process. The file now can be compressed from its initial size to a reduced size with the help of which we are able to save the amount of memory which is occupied in the bigger code. The algorithm is working efficiently in reducing the memory. At the present time we are able to compress the file in the BCD format and for our future reference we will try and implement the file in character form.

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