Bionic Morse coding mimicking unnamed transmission objects for converting underground hydro Marine communication

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Abstract **- This research paper is based on communication in marine using hydro technology between the two systems by a transceiver side and receiver side by following devices called automation technique called Morse code and new upgraded version called as bionic Morse code. While communication happens to be there in marine as underwater, Underground system but we came out with new idea upon Industry4.0 as per technology advancement. As with recent technology happens to be with research carried out in various field of marine technology via many security, sea maritime and DRDO type institutions working upon but we have taken out an idea by going through process as advance technology through Morse Code as we want to develop a such system in hydro marine technology under which communication happens through various materials unnamed objects present under sea, oceans, rivers. It can also search out for any high thing volume as whale under the communication what it received through receiver side and this we had done through Proteus software under Proteus professional 8 presented good output as Converting into transceiver receiver system under this based us searching out for more information under this equipment.**

Index Terms **- Morse Code, Proteus, Transmission objects, Hydro Marine communication, Industry 4.0.**

Future of this project: As we need a day-to-day life new resources as different countries make out of many resources under research situated under sea, research as DRDO, ISRO institutions working upon we can relate with issue day by day published on times on India or the Hindu newspaper so we think upon why can't make a resolution upon it based with upgrade technology by Morse code as we had done research regarding report of Morse code using optical cable that's why we see as future in the aforementioned.

INTRODUCTION

The ocean is filled up of millions of sea creatures, species which can emit sound directly for detecting prey and predators as for watching at social interaction and localization of echoless visibility of sea found as acoustic for communication. As choosing behind life beyond hydro technology various country research about going inside underground for mines and minerals.

Morse codes are particularly traditional codes for encoding the appeals which use combinations of dots, dashes and intervals invented in 18th century by Samuel F. B. Morse. They are indicated by dots and dashes also termed as dit and dah which are represented as '•' and '--' respectively. In starting time these codes were used for transmitting messages through telegraph and armature radio. However later it is in used to send secret messages typing by changing the coding algorithm. It was extensively used in World War II and dark web configurations these codes are still being used today in military, oceanography, and amateur radio systems. Updated version called new bionic Morse Code elements are termed as club, diamond, heart and spade represented by ♦ ♥ ♣ ♠.

Character	Freq.	Morse Code	Bionic Morse Code	Character	Freq.	Morse Code	Bionic Morse Code
A	8.17%	•–	♥	N	6.75%	–•	♣♦
B	1.49%	–•••	♠♣	O	7.51%	– – –	♠
C	2.78%	–•–•	♦♠	P	1.93%	•– –•	♠♥
D	4.25%	–••	♦♦	Q	0.10%	– –•–	♦♣♦
E	12.70%	•	♣	R	5.99%	•–•	♦♣
F	2.23%	••–•	♥♠	S	6.33%	•••	♣♥
G	2.02%	– –•	♠♣	T	9.06%	–	♦
H	6.09%	••••	♣♠	U	2.76%	••–	♥♣
I	6.97%	••	♣♣	V	0.98%	•••–	♣♣♣
J	0.15%	•– – –	♣♣♠	W	2.36%	•– –	♥♥
K	0.77%	–•–	♣♣♦	X	0.15%	–••–	♦♣♣
L	4.03%	•–••	♦♥	Y	1.97%	–•– –	♠♦
M	2.41%	– –	♥♦	Z	0.07%	– –••	♦♣♠

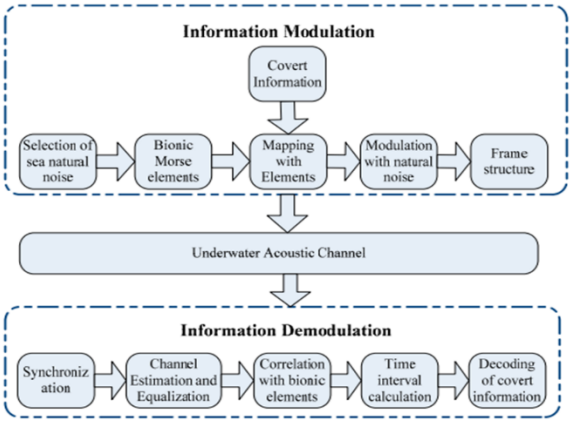
Table: 1 Representation of English language characters through Morse and Bionic Morse Codes

Morse Codes	Bionic Morse Codes
Contains two elements dot • and dash –	Contains four elements club ♣, diamond , heart and spade ♠
Longer sequences.	Shorter sequence.
Fixed duration of elements.	Durations depends of carrier.
Covert communication possible but chances of being decrypted.	Covert communication possible no chances of being decryption.
LPI constraint communication.	Perfect LPR constraint communication.

Table:2. Comparison of Morse Code and Bionic Morse Code

TRANSMITTER & RECEIVER STRATEGY

Our goal in this project was the process of bionic Morse coding which briefly discusses in the section to build an underwater acoustic communication as required with communication signal pair of high-speed transceivers perfectly to see natural noise that could encode and decode optical signals modulated using Morse code resolutions. The project tangled with a few motivating tasks that we thought it be interesting to tackle. The most important synchronization process of selection of carrier in bionic Morse coding. As it has various noises present in the ocean. the amplitude, frequency, duration and modulation of a particular sound including its geographical location as Respect with the noise level sound features. For long assortment communication, a low frequency and high basis of source level sound should be selected as it will transmit for a large transmission distance. As per the climatology the locations found under which Geographical location of oceanography also plays a vital protagonist as bionic covert communication should be done in the same location where the actual noise is contemporary. If in war happened like situation an enemy would guess that the particular noise is not available in that region. For example, if we take out from ecology senses the species of whale, we opted to mimic a humpback whale song due to its natural characteristics. The song is generated at a low frequency range and high source level which benefits covert operations in a large region of ocean. The humming of a song for hours gives us an additional benefit to perform a covert operation for an elongated period.



Flowchart: 1 The process of bionic Morse coding mimicking sea natural noise

Figure: 1 Data Transmission

1.1.Information modulation:

Step: 1 Selection of carrier

In bionic Morse coding selection of sea cryptic natural wide-ranging sound as mover as carrier. As it been discussing default a noise of present in the ocean the variety of sound predict during prey, Eco localized and social interaction. In practical scenario the noised should be researched at particular level while emitting particular level of amplitude, modulation, time of frequency etc. Unique sound has different level of decibel that was purpose of researched study we octane to compose of low frequency range at high source level.

Step: 2 Synchronization and Bionic Morse Elements Waveforms:

Acoustic channel in under water sea environment degrades poorly due to channel and error is through when channel arrived impulse modulation reaction arises and therefore the results based upon under graph represented below. Identifications of Morse elements as per the synchronizing signals should be different from the each other in respect to time which present noise in the ocean.

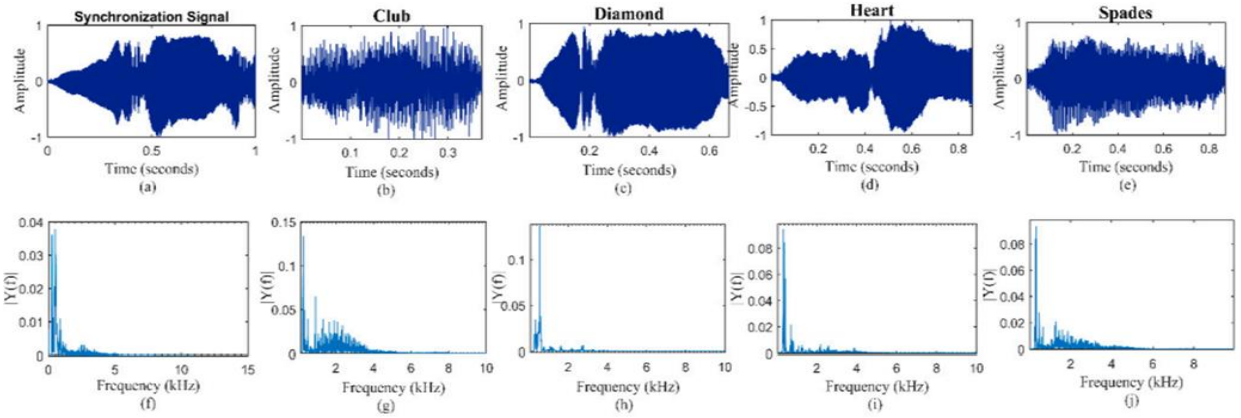


Figure 2. (A) Synchronism signal, (B–E) Morse code elements using bionic as club, diamond, heart and spades in time domain, and (F) shows single sided Fourier transform of synchronic signal and (G–J) Morse code elements using bionic pieces. (*Source taken from the research paper)

We can notice Autocross correlation between high peak which are not uniform as output shows as c11, c22, c33 and c44 and it is numbered as 1,2,3,4 as club diamond hard rapidity.

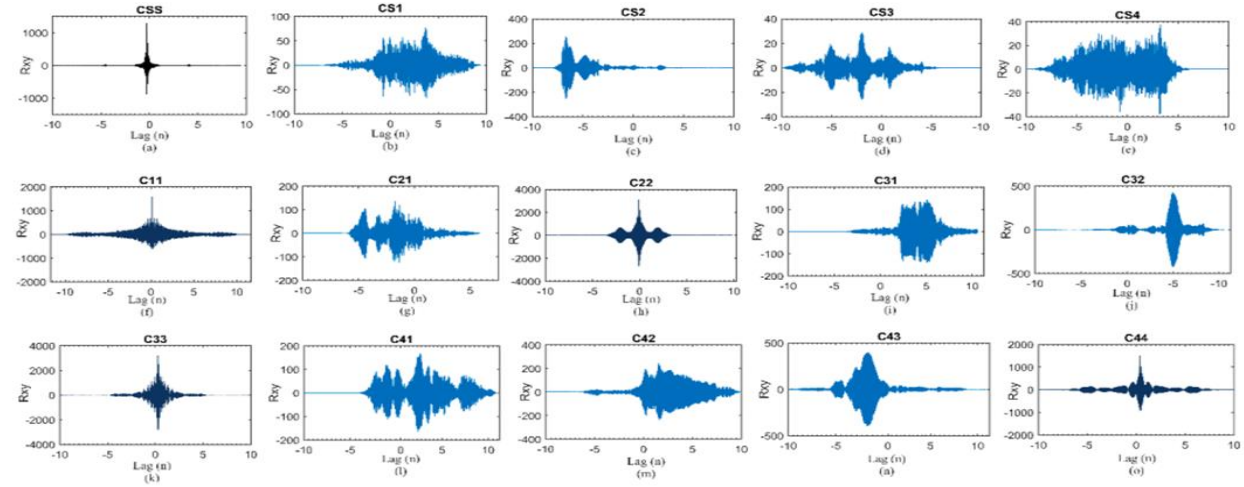


Figure:3 Correlation between synchronization signal and bionic Morse elements

Step: 3 Mapping of information typed in Bionic Morse elements

Mapping of Covert Information to Bionic Morse Elements: Let us translate two words “Covert” and “Communication” in simulated message using elements of an unnamed objects.

COVERT = ♦•♠••♠••♣•♣•♣••♣••♦•♣••♦

COMMUNICATION = ♦•♠••♠••♥•♦••♥•♦••♥•♣••♣•♦••♣•♣••♦•♠••♥••♦••♣•♣••♠••♣•♦

Step: 4 Modulations of sound message:

In this step communication speed defined as mean time duration of character in the mimicked object. It will be equal to the total number of characters in total time of frame - total synchronization time.

$$C = \frac{n}{T_t - T_s} \text{Character/sec}$$

Where, C= Average speed of character

Tt = The total time of signal

Ts = Time of the synchronization frame

N= the total number of characters in the communication signal

ENCODER AND DECODER METHODOLOGY

The encoder and decoder are based on the Morse alphabet. The necessities for the Morse code effectiveness and signs are described in ". ----". To each symbol we associated a value: 0 is associated to the pause between symbols, one to the dot, two to the pause between letters, three to the dash and four to the pause between verses. Through this coding system, we produced two arrays of constants: the first one with the characters and the second one with the codes of each character. Thus, the en-coder transforms a letter into its code and the decoder realizes the inverse action. For both cases, the transmitter and the receiver, we have developed two sub-routines with Proteus, which has the function of encode and decode, i.e. the purpose of changing the "text" (predominantly, each letter of a text) to Morse code or vice versa. The main part subject of individual submission and the GUI (graphical user in-terface) are established in Lab VIEW. Generally, the practice adopted has been the assessment of the input values (a letter or an array, depending on the case) with one of the twice including 'look up to tables', and then output the correspondent value (an array or a eccentric).

Step: 5 Estimation and Equalization

Doppler factor is calculated following equation

$$\alpha = \frac{\Delta f}{f_c}$$

Change in frequency

Change in carrier frequency

Here calculated as

Additive white Gaussian noise (AWGN)

Variance (sigma)^2

Received signal

$Y(t)= \sum_{k=0}^{n-1} \mathbf{x(t-l)} * \mathbf{h(l)} + \mathbf{n(t)}$

t=0,1,2 …., N-1, x(t)

$y(t)= \sum_{k=0}^{n-1} \mathbf{x(t-l)} * \mathbf{h(l)} + \mathbf{n(t)}$

t=0,1, 2…. N-1, X(t)

$$\begin{bmatrix} y(0) \\ y(1) \\ y(N-1) \end{bmatrix} = \begin{bmatrix} x(0) & 0 & 0 \\ x(1) & x(0) & 0 \\ x(N-1) & \ldots. & x(N-1) \end{bmatrix} * \begin{bmatrix} h(0) \\ h(1) \\ h(n-1) \end{bmatrix}$$

y X +u(n)

x= added to receive data

y&x = difference

r0 =y

$\mathbf{ri}=\underset{j \to I}{\operatorname{argmax}}\left(\left|Xj^{Hri} - 1\right|/||Xj||\right)^2$

hj=X^Hxi rj-1/|Xxi||^2

residual

vector ri=ri-1-hi Xxi

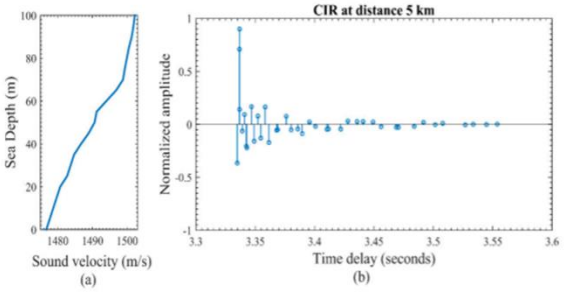
Xr(t)=y(t) *h(-t)

Xr(t)=[X(t)*h(t)+n(t)] *h(-t)

Xr(t)=[X(t)*[h(t)*h(-t)] +[n(t)+h(-t)]

Step: 6 Detection of Our Product Element

The next step is to demodulate the under hydro information. The covert information is extracted by hydro communication the detection of bionic Morse elements presents in the underground



(a) Sound velocity profile of the channel

(b) Channel impulse response based on sound speed profile

$$\text{Rxyi}(t) = \int_{-}^{+\infty} x(t)yi(t+)dt\,, \qquad for - x < t < y$$

Rxyi(t) =correlation for all

Values of

X(t), y(t)=Transmitted &received signal

Holding information "COMMUNICATION"

Step: 7 Mapping of Converting information

In last two steps we obtained the location of the bionic Morse code related elements and determined the time delay between them. This shows how the sound can easily catch up between two objects.

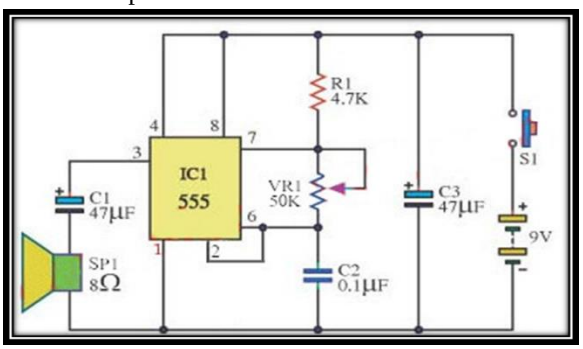
♦ S ♠ N ♠ N ♥ S ♦ N ♥ S ♦ N ♥ S ♣ N
♣ S ♦ N ♣ S ♣ N ♦ S ♠ N ♥ N ♦ N ♣ S
♣ N ♠ N ♣ S ♦

Figure4: Taking out of mimicked information "COMMUNICATION" from the received signal

The above frame describes the covert information. S and N represent the same letter and next letter respectively.

Proteus Simulation Model

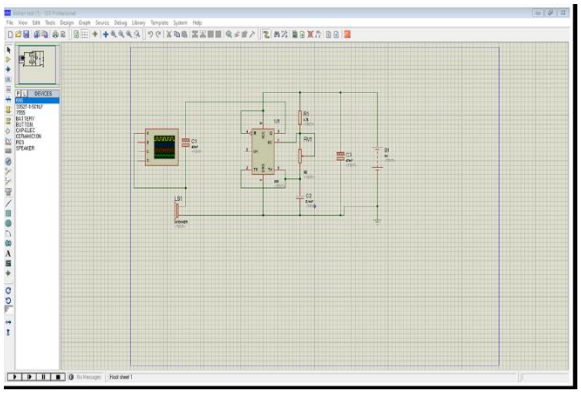
This developed in Proteus Simulation Model:

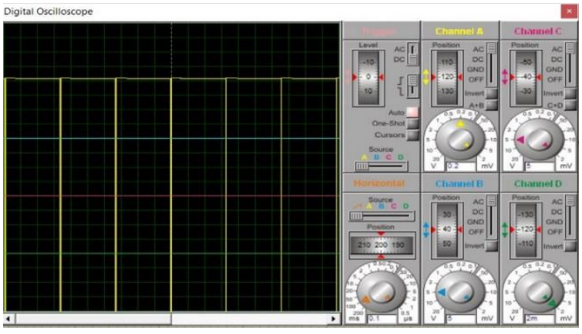


Parts you will need:

1.IC1-555 timer IC = 1 pieces.
2.Resistor1-4.7K, 0.25W resistors = 1 pieces.
3.VR1- 50,000 Potentiometer = 1 pieces.
4.C1, C3-47uF 25V Electrolytic capacitor = 1 pieces.
5.C2-0.01uF 50V ceramic capacitor = 1 pieces.
6.9Volt battery to power the circuit.
7.S1-Pushbutton switch = 1 pieces.

Result Analysis:





- From that this project appear as the one solution of to read or understand about Bionic Morse code to the user.
- It makes us more understanding about the hardware and the software of this project.
- From the construction the input and the output are positive. The contribution of this project circuit is need to be adjust.
- And the output of this project only can get if the software of the project is available to the Proteus Professional 8 that we use.
- Pattern of the output and the input are the number displayed at the LCD.
- The result of this project will get by follow the final steps of this project.
- In ending steps there are an instruction of using this Morse code trainer. By build this Morse code Instructor, we also can learn to use a Morse code trainer but a connect a button, encourage them to be more understand about this Morse code wide-ranging.
- Besides that, this chance of this project is for the student that taking military.
- This is the simplest project try and tested method for sectors based on government as established ppp (public, private partnership)model and the student to learn something new with the old stuff.

CONCLUSION

This Morse code Reader project is to create an easy way to understand Morse code. To encourage people to learn about Morse code. The LCD as the output. This project is something that really interesting to do and learn. This project is something that really interesting to do and learn. So, this project is suitable for all kind of age, student, military, and the policeman, Space and Technology, International Sea maritime, Hydro technology etc. In responsibility of this project has achieved many goals further in such as to study on the project to identify the Morse code. We do a lot of projects to increase knowledge in technical areas such as circuit design of the initially step engraving PCB board, drill and install the microcontroller that function as the hearth of the system. Program included of the IC gives us new assistances in learning microcontrollers characteristic and we can also learn ways to assessment if the circuit and element assembly that need to be modified as the IC accept the voltage supplies. The furthermost knowledge we get is on programming and the

designing of modification the circuit. This Project also shows a great future development in electrical building system.

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