Morse Code Using Optical Communication

Anubhav Pal
ECD
IIIT- Hyderabad
Hyderabad, INDIA
anubhav.pal@research.iiit.ac.in

Aakash Reddy Gorla
ECE
IIIT- Hyderabad
Hyderabad, INDIA
aakash.reddy@students.iiit.ac.in

***Abstract*—**

Morse Code is a way of visual communication that involves dots and dashes in various patterns to denote letters and numbers. We have written a program on Arduino that encodes a string to Morse Code and another program that decodes the Morse Code stream into the original message. We have also made an app using the MIT AI2 companion app that includes Bluetooth integration into the project and using which we can send the input string on a phone and get the decoded signal at the other.

***Keywords*—**

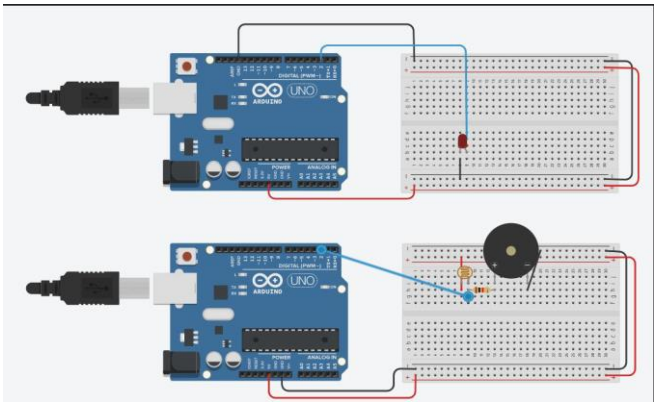
Morse Code, Encoding, Decoding, Bluetooth

I. Introduction

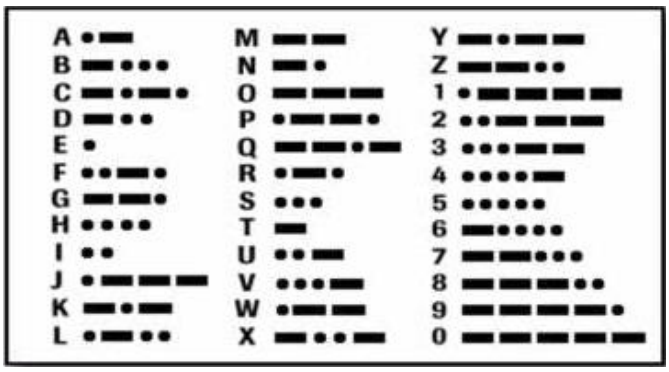
Morse Code is a way of communication that was developed originally around 1840's, it was used extensively for early radio communications during 1890's. Its ability to use visual signal also meant that morse code could be used to indicate distress and need for help, from a lifeboat at sea or from isolated land location.
Morse code has helped make war but also helped make peace. It has made contribution to human communication of incalculable value and significance.
In this project, we demonstrate the ability of Morse code to use visual signals. We have used an LED as source. Dots (.) and Dashes (-) are used in various sequences to code letters and numbers.

II. Components

1. Arduino UNO x2
2. Bluetooth module x2
3. LED x1
4. Photo Resistor
5. Breadboard x2

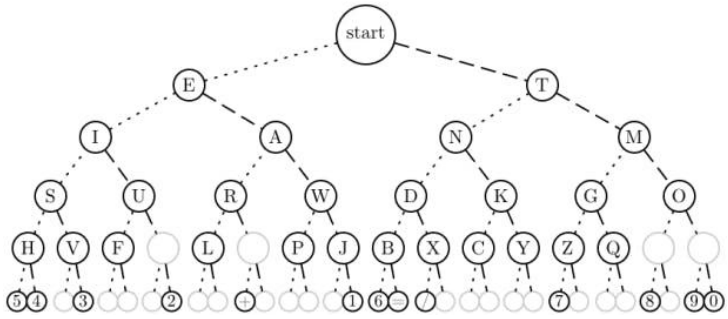


III. Morse Coding



IV. Data Structures

We have used a dictionary and a binary tree for coding and decoding respectively. Following is the image of the binary tree.
A binary tree, as we can see gets divided into 2 branches at every node. At each node if we move to the right subtree, we have dash and on the left subtree we have dot. So if the coded message is '--.-', the code will first go to the right subtree, then again right, then left and then finally the right subtree. The value at this node is 'Q', which is the decoded alphabet of '--.-'



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