

MORSE-CODE BOT

TEAM ID- 365

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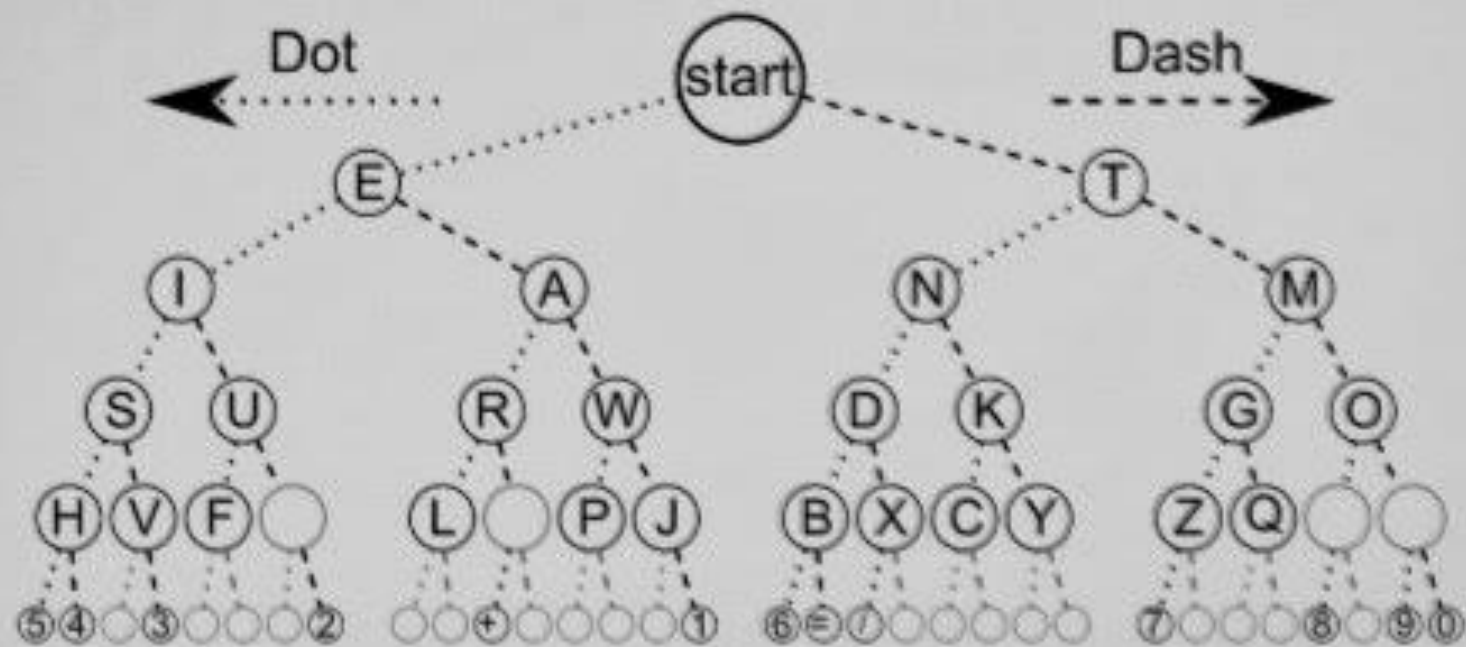
Problem statement

1: Audio Morse code signals will be sent to the bot from source. The signal should be received without attenuation, converted into a pulse signal, and it should then be expressed as a series of dits and dahs by the microcontroller.

2: The series of dits and dahs will be converted into letters of English language. Eg: 'F','B','R','L',etc.

Eg- (Dit,dit,dah,dit) ..-. Corresponds to 'F'

Morse Code Tree



Problem statement

3: Based on the letters received, the bot performs multiple operations. This exercise is being done to show the bot has decoded the signal and has processed it in the required way. Eg: for the letter 'F' the bot performs forward motion.

4: After the bot receives the signal , the bot should be able to transmit Morse code , conveying that it has received the signal. Also, after completing the required task the bot should be able to transmit Morse code. The morse code transmission is using on board buzzer.

International Morse Code

1. A dash is equal to three dots.
2. The space between parts of the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to seven dots.

A • ■
B ■ • •
C ■ • ■
D ■ • •
E •
F • • ■
G ■ ■ •
H • • • •
I • •
J • ■ ■ ■
K ■ • ■
L • ■ • •
M ■ ■
N ■ •
O ■ ■ ■
P • ■ ■ •
Q ■ ■ • ■
R • ■ •
S • • •
T ■

U • • ■
V • • • ■
W • ■ ■
X ■ • • ■
Y ■ • ■ ■
Z ■ ■ • •

1 • ■ ■ ■ ■
2 • • ■ ■ ■
3 • • • ■ ■
4 • • • • ■
5 • • • • •
6 ■ • • • •
7 ■ ■ • • •
8 ■ ■ ■ • •
9 ■ ■ ■ ■ •
0 ■ ■ ■ ■ ■

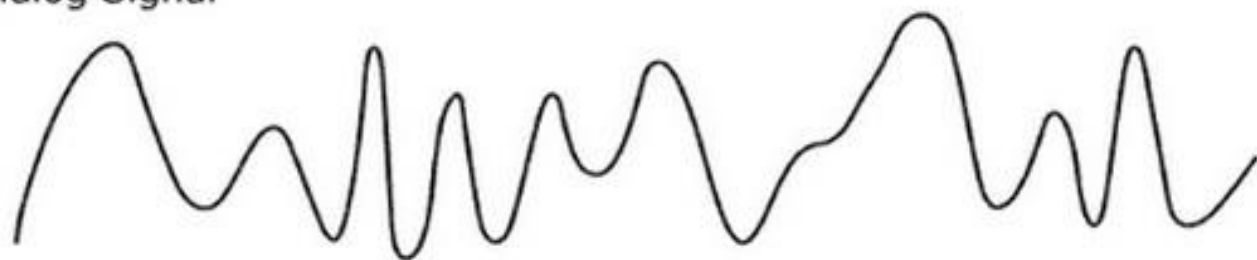
Challenge

- Receiving morse code in the form of audio signals and providing it to the microcontroller, in such a way that it would be able to process it.

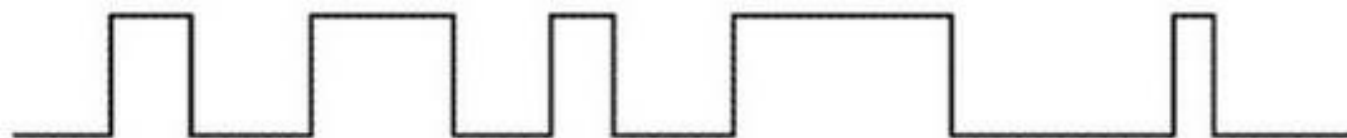
Solution-

- *Converting the received audio signals to digital signals (as the following fig. suggests) using comparator .*

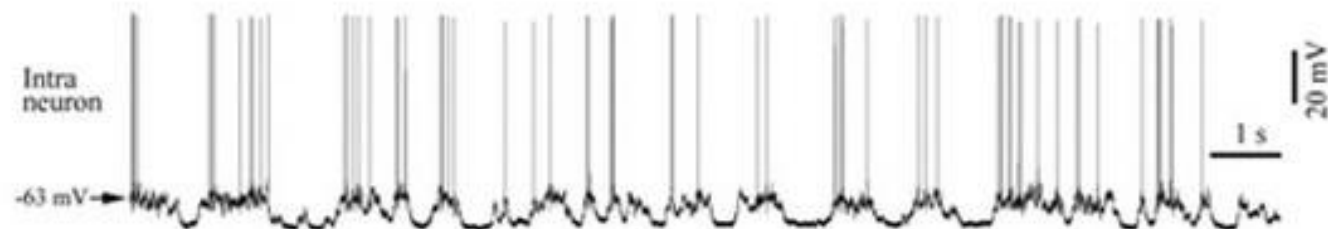
Analog Signal



Digital Signal

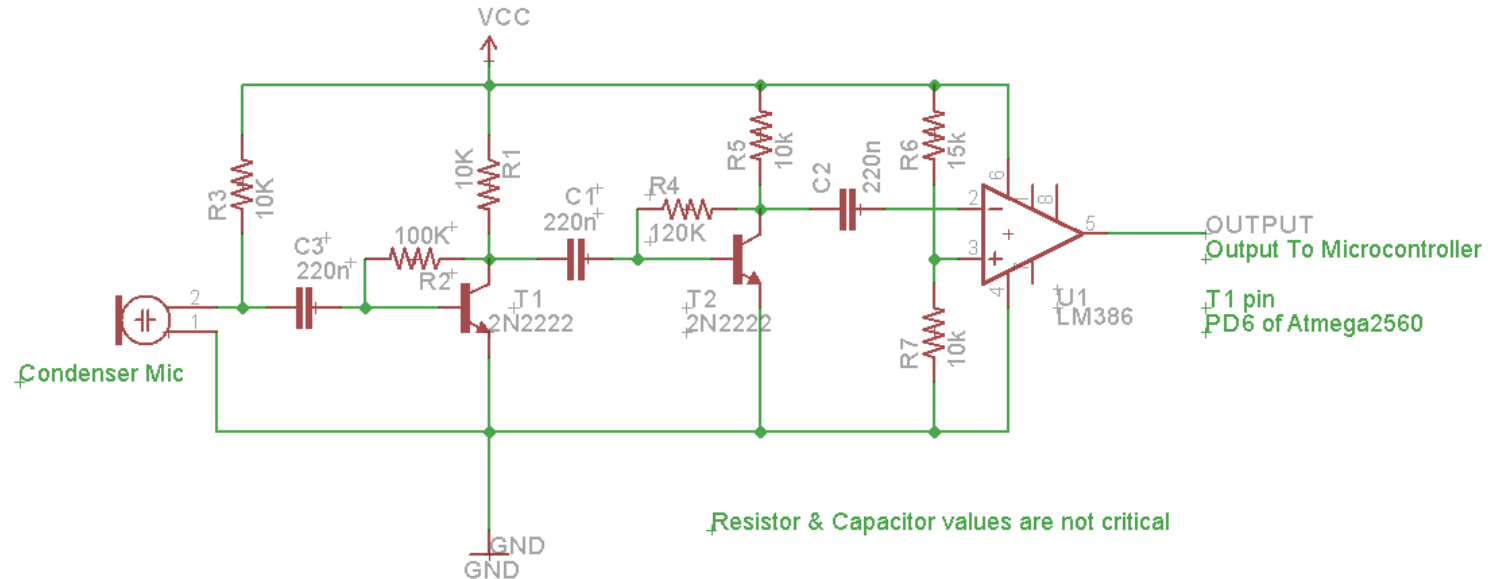


Neuron Spiking Signal



External Hardware

- The circuit for the microphone receiver:*



External Hardware

- *Audio signals amplified first using transistor amplifier.*
- *Output of amplifier is fed to comparator (Compares voltages) .*
- *Output is a series of square pulses dependent on audio input.*
- *No ADC (Analog To Digital Converter) is used .*
- *Uses only one pin of microcontroller.*
- *Internal Counter is used for counting the pulses on T1 (PC6) pin on atmega.*

Limitations

The surrounding noises should be minimal to avoid false decoding by bot. It should be ensured that the bot should be kept in a noise free zone for error free processing.

Can be overcome by advance audio processing techniques.
like DSP (Digital Signal Processing Techniques)- it is characterized by the representation of discrete domain signals by a sequence of numbers or symbols and the processing of these signals.

Future Work

- 1) One can introduce light sensors like LDR, and make the given project decode morse code transmitted as light. Flashing light Morse even from a flashlight may be read several miles away for a lost sailor or hunter. Mirrors accomplish the same thing during the day. The user directs a mirrored sun reflection and then blocks it with his other hand or piece of cardboard flashing out the Morse code signal. The code for the program will still remain quite similar .
- 2) For security applications, one can create his own code to communicate with the bot , so that others can't comprehend this secretive piece of data.

Future Work

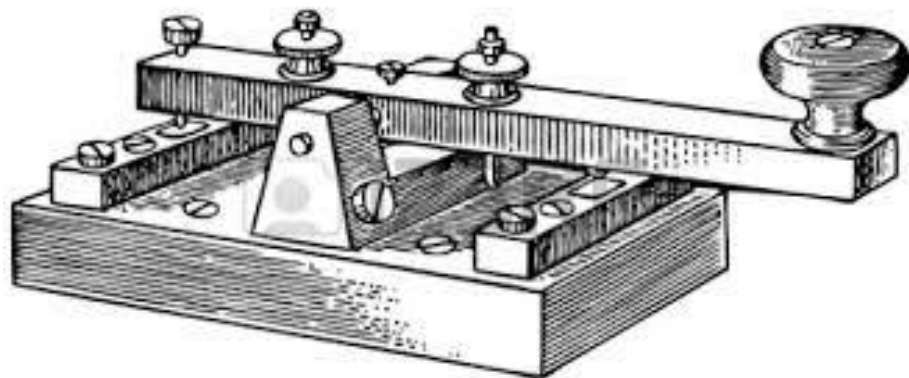
- 3) Medical uses allow the severely handicapped person to tap or blink out a message that could be read by our decoder, giving new hope and meaning to life for sufferers.
- 4) A new method for using Morse code involves cell phones and text messages entered from an iambic keyer on the cell phone face. It seems that experienced Morse code operators can enter the text much faster than a normal keyboard operator and can do it without looking at the keyboard. Our decoder will play a role in converting the Morse code written to text and to display it on the screen. Reference: <http://iditdahText.com/iDitDahText.html>



A B C D E F G
 H I J K L M N
 O P Q R S T
 U V W X Y Z



"I'm sorry, your heartbeat is sending S.O.S. in morse code."



THANK YOU !!!

