IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 12, December 2024

DOI: 10.17148/IJARCCE.2024.131245

Morse Code Decoder Using Arduino

Dr. Saleem S Tevaramani[1], Adith P[2], Akash S[3], Harish M V[4]

Assistant professor, Department of ECE, K S Institute of Technology, Bengaluru, India[1]

Electronics and Communication Engineering, K S Institute of Technology, Bengaluru, India[2-4]

Abstract: Morse code, a communication method based on sequences of dots and dashes, plays an important role in various communication systems, especially in emergency situations and assistive technologies. This paper presents a simple yet effective Morse code decoder system using an Arduino UNO, a 16x2 LCD with an I2C interface, and a laptop for input. The proposed system decodes Morse code signals sent from a laptop and displays the corresponding text on the LCD. The aim of this work is to develop an efficient and cost-effective solution for both communication and assistive purposes.

I. INTRODUCTION

Morse code has been an essential mode of communication since its invention in the 1830s. Despite advancements in modern communication technologies, it remains crucial for emergency services, military operations, and assistive devices. This research presents a Morse code decoder system based on an Arduino UNO microcontroller, a 16x2 LCD with an I2C interface, and a laptop as the input device. The system enables users to input Morse code signals via a laptop, which are decoded and displayed on the LCD. The goal is to provide an accessible, cost-effective solution suitable for educational and assistive purposes.

II. OBJECTIVE

The primary objectives of this research are as follows:
1. To develop a functional Morse code decoder system using Arduino UNO and a 16x2 LCD with an I2C interface.
2. To use a laptop for inputting Morse code signals, enabling easy and convenient user interaction.
3. To create an accessible and cost-effective solution suitable for educational and assistive purposes.

III. LITERATURE SURVEY

A detailed literature survey of related works was conducted to understand the current advancements and limitations in Morse code decoding systems:

[1]. A Novel Approach of Arduino UNO Based Morse Code Generation (2021, IJERT) by Ahishek Banerjee, Shatik Guria, Subranil Samanta, Soumik Das, and Prof. Moumita Pal. This paper explores a Morse code generation system using Arduino UNO, employing LEDs and buzzers. The research highlights the simplicity and effectiveness of Arduino-based systems in communication applications, inspiring our work to employ Arduino for decoding.

[2]. Morse Code to Text Converter Using Arduino (2024, GREENZE) by M. Umapathy, S. U. Suganthi, and A. Divyasri. This paper describes a real-time Morse code-to-text conversion system using Arduino. We were influenced by their design to use Arduino for real-time decoding and text display, simplifying the input and output processes in our system.

[3]. Communication Approach to Handheld Devices for Disabled Patients Based on Morse Code (2017, APRN Journal of Engineering and Applied Sciences) by Mohammad Taib Muskon, Nurazia Ismail, Rosmavati Shafie, Mohd. Amir Hamzah Ab. Ghani, and Nazuha Fadzal. This study discusses the use of Morse code as a communication method for disabled patients. We were inspired by the assistive technology aspect, which led to integrating an accessible input method via the laptop.

[4]. Morse Code to Text Converter for Marine Communication (IJRASET) by Pranali Suryavanshi, Vaishnavi Dhawle, Nishigandha Shinde, K. V. Jadhav, and N. Ainapure. This paper discusses the use of Morse code for communication in marine applications. Their research reinforced the need for a robust and efficient decoding system, which contributed to our focus on reliability and simplicity in our system.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 12, December 2024

DOI: 10.17148/IJARCCE.2024.131245

IV. SYSTEM DESIGN

The proposed Morse code decoder system consists of three main components: a laptop, Arduino UNO, and a 16x2 LCD with I2C.
A. Input Mechanism: The laptop serves as the input device, allowing users to input Morse code signals via key presses. A short press of a key corresponds to a dot (".") and a long press to a dash ("-"). These signals are transmitted to the Arduino via serial communication.

B. Decoding Process: The Arduino UNO receives Morse code sequences via the serial communication and compares them with a predefined lookup table containing the Morse code alphabet. The Arduino decodes the input into corresponding text, which is displayed on the LCD.

C. Output Display: The decoded text is shown on a 16x2 LCD with an I2C interface. The I2C interface simplifies the wiring and ensures efficient communication between the Arduino and the LCD.

V. HARDWARE AND SOFTWARE IMPLEMENTATION

A. **Hardware Components**
1. Arduino UNO: Processes Morse code signals and performs the decoding.
2. 16x2 LCD with I2C: Displays the decoded text.
3. Laptop: Inputs Morse code signals via the keyboard.

B. **Software Design**
Laptop Program: The laptop program captures key presses and converts them into dots and dashes. These are sent to the Arduino via serial communication.

Arduino Code: The Arduino code decodes the Morse code input and sends the decoded message to the LCD.

VI. RESULTS AND DISCUSSION

The system successfully decodes the Morse code input from the laptop and displays the corresponding text on the 16x2 LCD. The accuracy of the system is high, with the Arduino correctly identifying the Morse code sequences and translating them into letters and words. The decoding speed is fast enough for real-time interaction, making the system suitable for educationalandassistiveapplications.

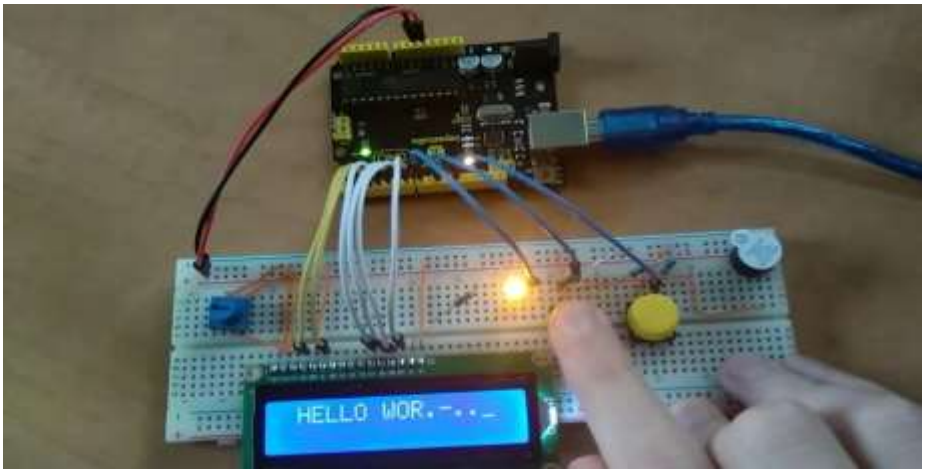

Figure 1 shows the output on the LCD displaying the decoded Morse code message. The system's performance was tested with different Morse code sequences, and the results were consistent with the expected output.

International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 12, December 2024
DOI: 10.17148/IJARCCE.2024.131245

VII. CONCLUSION

In conclusion, the proposed Morse code decoder system using Arduino UNO, a 16x2 LCD with I2C, and a laptop as an input device provides a cost-effective and efficient solution for decoding Morse code. The system has shown reliable performance and can be utilized in educational and assistive technologies for communication. Future work can explore integrating wireless communication and enhancing the user interface for easier interaction.

VIII. ACKNOWLEDGEMENTS

We would like to thank our guide, Saleem **S. Tevaramani**, Assistant Professor at K.S. Institute of Technology, for his invaluable guidance and support throughout the project. We also express our gratitude to our department and college for providing the necessary resources and environment for the successful completion of this research.

REFERENCES

[1]. A. Banerjee, S. Guria, S. Samanta, S. Das, and M. Pal, "A novel approach of Arduino UNO based Morse code generation," Int. J. Eng. Res. Technol., vol. 10, no. 5, pp. 1234–1238, 2021.
[2]. M. Umapathy, S. U. Suganthi, and A. Divyasri, "Morse code to text convertor using Arduino," Greenze, Jan. 2024.
[3]. M. T. Muskon, N. Ismail, R. Shafie, M. A. H. Ab. Ghani, and N. Fadzal, "Communication approach to handheld devices for disabled patients based on Morse code," ARPN J. Eng. Appl. Sci., vol. 12, no. 9, pp. 3456–3460, May 2017.
[4]. P. Suryavanshi, V. Dhawle, N. Shinde, K. V. Jadhav, and N. Ainapure, "Morse code to text convertor for marine communication," Int. J. Res. Appl. Sci. Eng. Technol., vol. 8, no. 3, pp. 567–572, 2020.