



SILENT NOISE TOUCH MORSE CODE DETECTOR

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Abstract: The Silent Noise Touch-Morse Code Communicator is an innovative system designed to enable silent, smooth, and multilingual communication using a touch-based Morse code interface. The project introduces a modern approach where users can send messages by simply tapping dots and dashes on a touch-sensitive surface. These touch signals are detected, processed, and decoded into English text, which is then translated into multiple Indian languages such as Kannada, Hindi, Tamil, and Telugu. This system is especially helpful for people with speech or hearing impairments and can also be used in places where speaking is not possible or allowed, such as hospitals, defence operations, and noisy public environments.

Index Terms: Morse Code, Touch-Based Communication, Assistive Technology, Multilingual Translation, Embedded Systems, Natural Language Processing (NLP), Machine Learning, Silent Communication, Human-Computer Interaction, Accessibility.

1. INTRODUCTION :

In today's world, communication is essential for connecting people and sharing information across different situations. However, traditional methods like speaking or typing may not always be practical—especially in noisy places, during emergencies, or for individuals with speech or hearing impairments. To overcome these challenges, the Silent Noise Touch-Morse Code Communicator has been created as a modern, silent, and touch-based communication system that works using Morse code.

Morse code is one of the oldest and most reliable coded communication methods, using dots and dashes to represent letters and numbers. This project upgrades Morse code by using touch sensors and a microcontroller, allowing users to enter messages through short and long touches instead of sound. These touch patterns are detected, processed, and converted into English text. To make it more accessible, the system then translates this text into multiple Indian languages like Kannada, Hindi, Tamil, and Telugu, so people from different linguistic backgrounds can easily use it.

The development of this system brings together embedded systems, signal processing, and language translation technologies. It shows how traditional communication techniques can be improved using modern tools to solve real-life problems. This device is especially helpful for people with disabilities, defence personnel who need silent communication, and workers in loud or confidential environments. By converting touch inputs into meaningful language, the Silent Noise Touch-Morse Code Communicator not only preserves the value of Morse code but also supports inclusivity, privacy, and innovation in human-machine interaction.

2. LITERATURE REVIEW

2.1 Morse Code-Based Assistive Communication System

[1] Muhammad Akmal Fakhri Aris proposed a communication device for individuals with paralysis, integrating Morse code signaling with an Arduino microcontroller, buzzer, and LCD display. The methodology involved using a push-button interface to generate Morse signals, which were decoded in real time and displayed as text messages. A key contribution of the study is the demonstration of a low-cost, reliable, and real-time communication system suitable for medical and assistive applications. The research concluded that the system effectively supports silent communication for physically challenged users and laid the foundation for future enhancements, including wireless communication and improved decoding algorithms for higher accuracy and speed.

2.2 Arduino UNO-Based Morse Code Generation

[2] Abhishek Banerjee developed an Arduino-based Morse code communication system focusing on simplifying Morse input and decoding using push-button interfaces. The system provided real-time output on a display and required low-cost hardware, making it suitable for educational and prototyping purposes. The study demonstrated the practicality of Morse-based silent communication and highlighted potential extensions such as wireless integration and translation features for disabled users or noisy environments.

2.3 Multi-Button Bluetooth Morse Communication System

[3] Pravin Kumar S. K. and colleagues designed a Morse code system for individuals with partial paralysis, featuring six buttons for Morse input, LCD display, and Bluetooth-based wireless transmission. The methodology improved input speed and enabled hands-free operation. The study concluded that this design enhanced accessibility, efficiency, and convenience for users with motor disabilities and suggested future integration of voice output and regional language translation for wider usability.

2.4 Single-Button Arduino Morse Code Project

[4] Jackson Taylor presented a user-friendly Morse code system using a single push-button interface with Arduino UNO, buzzer, and LED for real-time display. The project emphasized simplicity and cost-effectiveness, targeting students and hobbyists for learning embedded communication concepts. The study suggested that future developments could include machine learning modules to automatically interpret varied input patterns or convert Morse code into natural language.

2.5 Microcontroller-Based Morse Code System

[5] K. B. Ramesh developed a Morse code system using buttons, LEDs, and LCDs to display decoded messages. The system was low-cost and locally designed, suitable for practical implementation in India. The research provided a foundation for real-time encoding and decoding with microcontrollers (8051 and Arduino) and highlighted applications in educational labs and small-scale assistive devices. Future recommendations included integrating voice or language translation modules.

2.6 Machine Learning-Based Morse Code Detector

[6] U. P. Akare introduced a Morse code decoding system using machine learning to adaptively recognize variable button press durations corresponding to dots and dashes. The methodology addressed timing inconsistencies in traditional Morse systems and improved decoding accuracy and robustness. The study suggested potential expansion to portable or IoT devices like ESP32 and integration of speech and language translation modules in future versions.

2.7 Haptic Interface Design for Morse Code

[7] Wang proposed a low-latency Morse code recognition system capable of real-time text translation using optimized decoding algorithms. The modular design supported scalability and multilingual translation, suitable for embedded assistive devices. The study emphasized inclusivity for regional languages and field communication applications where sound-based interaction is not feasible.

2.8 Machine Learning-Based Morse Code Detector

[8] Barapatre developed a Morse code system using machine learning on ESP32 boards to improve decoding accuracy for variable dot and dash durations. The study addressed inconsistent timing and noise interference, demonstrating intelligent decoding capabilities. The research concluded that such systems could evolve into smart communicators with automatic translation and speech synthesis, bridging traditional Morse signaling with modern multilingual communication.

2.9 Real-Time Morse Code Recognition and Translation System

[9] Wang proposed a low-latency Morse code recognition system capable of real-time text translation using optimized decoding algorithms. The modular design supported scalability and multilingual translation, suitable for embedded assistive devices. The study emphasized inclusivity for regional languages and field communication applications where sound-based interaction is not feasible.

2.10 Gesture-Glove Morse Translator

[10] Gupta introduced a wearable glove-based communication system using motion and pressure sensors to detect Morse code gestures. The signals were processed by a microcontroller and translated into text, enabling hands-free communication for physically disabled users. The study suggested future improvements such as multi-language translation and wireless data transfer, making it practical for broader assistive communication and rehabilitation applications.

3. SYSTEMS DESIGN AND IMPLEMENTATION

The Silent Noise Touch-Morse Code Communicator is built using a touch sensor that detects short and long taps representing dots and dashes. These signals are sent to a microcontroller, which processes the touch duration and converts the patterns into Morse code characters. The decoded Morse symbols are then translated into English text using an embedded decoding algorithm. To improve accuracy, the system uses machine-learning-based filtering to handle variations in touch pressure and timing. The English output is further translated into multiple Indian languages such as Kannada, Hindi, Tamil, and Telugu using built-in language modules. A compact display or speaker then presents the final translated message to the user. This design creates a reliable, silent, and accessible communication system for users in both everyday and specialized environments.

3.1 . BLOCK DIAGRAM



Figure 3 .1 .1. Block Diagram of silent noise touch through morse code detector.

- The dynamic wireless charging architecture operates through a coordinated sequence of sensing, control, power conversion, and inductive transfer stages. Vehicle detection is achieved through an array of infrared (IR) sensors embedded along the roadway, which generate discrete digital signals upon the presence of a passing chassis.
- These signals are processed by a microcontroller (Arduino), which executes the segment-activation logic and determines the appropriate transmitter coil to energize based on real-time vehicle position. The controller drives a relay switching network, where each relay corresponds to a specific road-embedded coil, enabling the low-power control signal to interface with the high-power charging circuitry.
- Once activated, the relay connects the selected coil to a high-frequency AC power supply, which provides the 20–100 kHz excitation required for efficient inductive power transfer.
- The energized transmitter coil establishes an alternating magnetic field that couples with the resonant receiver coil mounted beneath the vehicle.

- As the vehicle traverses the charging lane, the magnetic coupling induces high-frequency AC in the receiver coil, in accordance with Faraday's law of electromagnetic induction.
- This induced AC is subsequently processed by a rectifier and filter stage, which performs AC-to-DC conversion and ripple reduction to produce a stable DC output. The conditioned DC power is delivered to the vehicle's charging module and battery management system (BMS), which regulates current, voltage, and thermal conditions to ensure safe and efficient charging.
- The system can additionally supply power to onboard vehicle electronics as required, enabling continuous energy flow during dynamic operation.

3.2 FLOW CHART

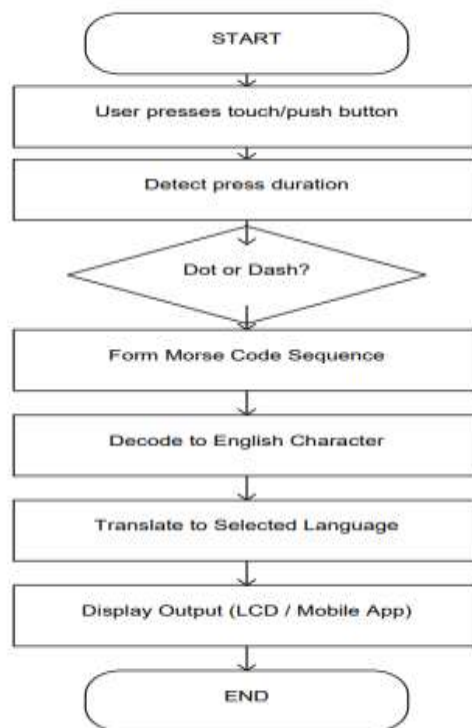


Figure 3.. 2 Flow Chart Of Silent noise touch morse code detector

1. The user presses the touch or push button to begin entering a Morse code input. The system immediately starts monitoring the touch signal.
2. The system measures how long the button is pressed. This duration helps identify whether the input is a dot or a dash. Based on the press duration, the system classifies the input as either a dot (short press) or a dash (long press). This classification is stored for forming a Morse pattern.
3. The detected dots and dashes are combined to form a complete Morse code sequence. The system waits until a character gap is detected.
4. The formed Morse sequence is decoded into its corresponding English alphabet or number. A lookup table is used for accurate decoding.
5. The English character is then translated into the selected regional language such as Kannada, Hindi, Tamil, or Telugu. A translation module or API performs this conversion.
6. The final translated output is displayed on an LCD or mobile application. This completes the communication cycle for each character.

4. RESULTS

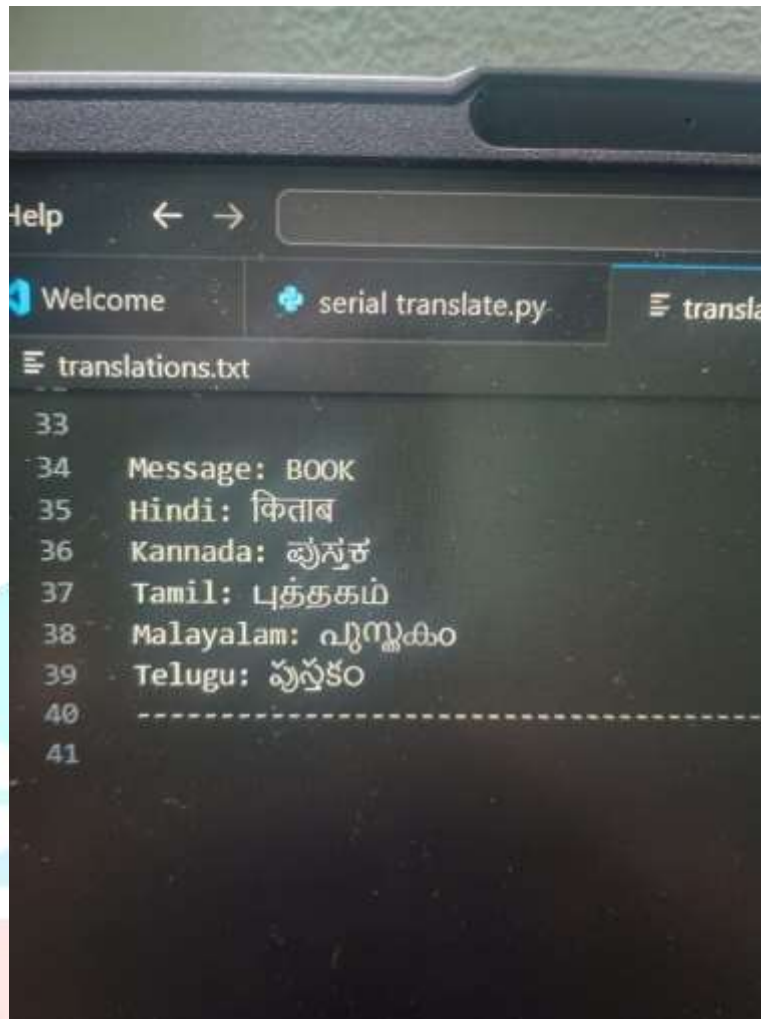


Figure 4.1 output of morse code through 5 different languages.

The Silent Noise Touch-Morse Code Communicator was successfully designed and implemented to achieve silent and multilingual communication using a touch-based Morse input system. The prototype effectively detected and distinguished between short and long touches, representing dots and dashes respectively. The microcontroller-based decoding algorithm accurately converted these signals into English text, which was further translated into regional Indian languages such as Kannada, Hindi, Tamil, and Telugu. During testing, the system demonstrated high accuracy in Morse decoding and real-time response, ensuring smooth user interaction. The inclusion of the piezoelectric buzzer provided effective feedback for each input, while the LCD display clearly presented the decoded or translated messages. The system consumed minimal power, proving its suitability for portable and assistive applications.

5 . CONCLSUTIONS AND FUTURE SCOPE

The Silent Noise Touch-Morse Code Communicator successfully integrates touch sensing, Morse decoding, and multilingual translation into a single, user-friendly system. It bridges the gap between traditional Morse code and modern communication needs by offering a silent, efficient, and accessible method of message transmission. The project demonstrates how embedded systems and language processing technologies can work together to assist individuals with disabilities and support silent communication in sensitive situations.

Overall, the system proves to be a cost-effective and innovative communication solution, offering potential for further development in areas such as wireless transmission, voice output integration, and AI-based adaptive decoding. It stands as a strong example of how technology can enhance inclusivity and communication beyond conventional means.

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