IoT-Based Morse Code Transmission System Using Raspberry Pi 4

Morse Code Messaging

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1. Introduction

This project implements a **Morse code messaging system** using a **touch sensor**, **Blynk**, and **Twilio** on a **Raspberry Pi 4**. The system allows a user to input Morse code using a **touch sensor**, which is then translated into readable text and sent via **Blynk** and **Twilio SMS**. Challenges included accurately detecting touch durations, ensuring proper Morse code decoding, and handling transmission delays. The implementation also required careful GPIO handling for real-time input capture.

2. Components Used

- **Raspberry Pi 4**
- **Touch Sensor (Capacitive or Mechanical)**
- **Internet Connectivity (WiFi)**
- **Twilio Account for SMS transmission**
- **Blynk IoT Platform**
- **Power Supply (5V, 2.5A)**

3. System Architecture

- The **user inputs Morse code** via a **touch sensor**.
- The Raspberry Pi **decodes** the Morse code into **readable text**.
- The **decoded text is sent** to the **Blynk app** for display.
- The same message is also **forwarded via Twilio** as an SMS to a designated phone number.
- The system ensures **real-time input detection** and **accurate Morse code translation**.

4. Software and Tools Required

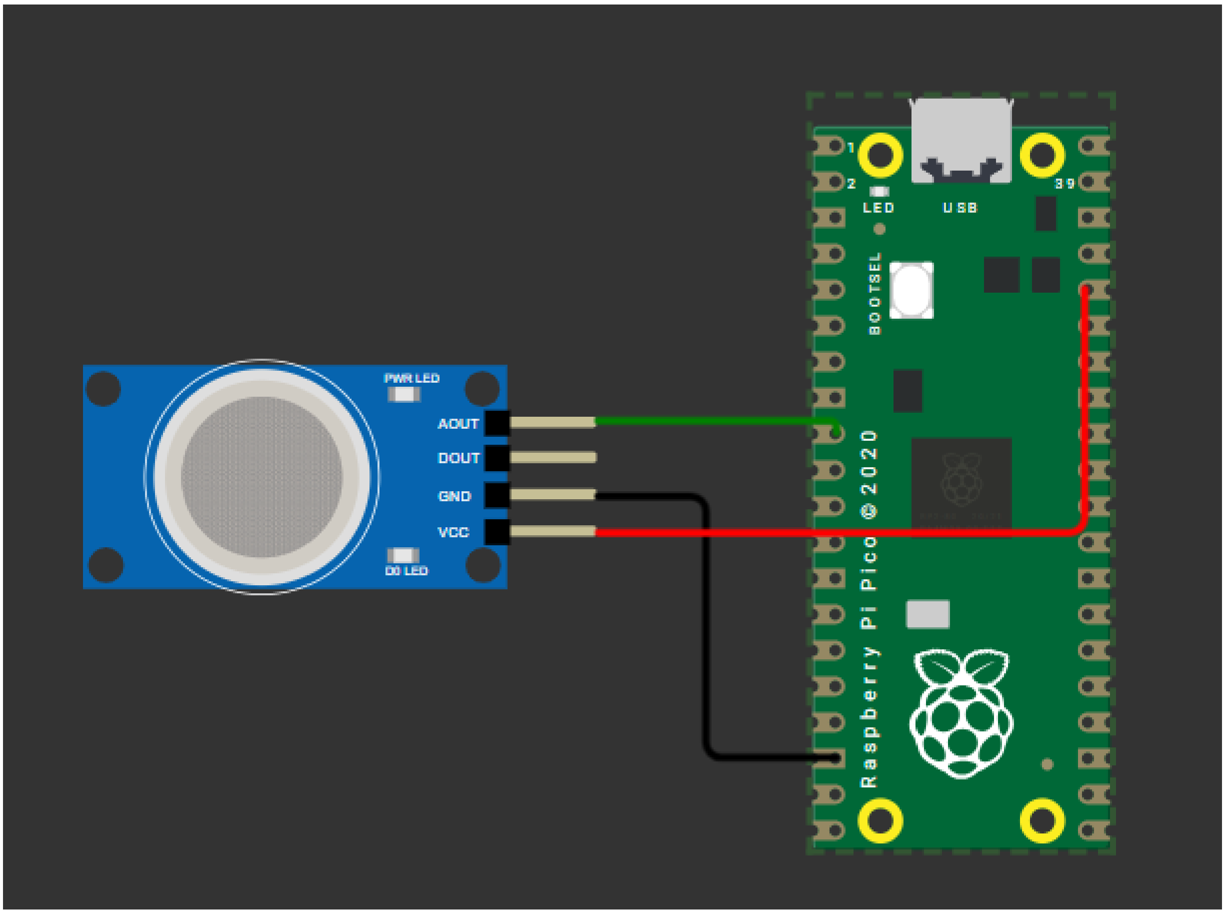
- **Raspberry Pi OS (Debian-based)**
- **Python 3.9**
- **Blynk Python Library**
- **Twilio API**
- **RPi.GPIO for GPIO Handling**

5. Morse Code Reference Table

Morse Code	Character
.-	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
-----	0
.----	1
..---	2
...--	3

Morse Code	Character
....-	4
.....	5
-....	6
--...	7
---..	8
----.	9

5. Circuit Diagram



6. Code

```python
import time
import RPi.GPIO as GPIO
import blynklib
from twilio.rest import Client

# Blynk Auth Token
BLYNK_AUTH = "YOUR_BLYNK_AUTH_TOKEN"
blynk = blynklib.Blynk(BLYNK_AUTH)
```

```
# Twilio Credentials
ACCOUNT_SID = "YOUR_TWILIO_SID"
AUTH_TOKEN = "YOUR_TWILIO_AUTH_TOKEN"
TO_NUMBER = "+1234567890"
FROM_NUMBER = "+0987654321"

# Touch Sensor Pin
TOUCH_PIN = 4  # Change to actual GPIO pin
GPIO.setmode(GPIO.BCM)
GPIO.setup(TOUCH_PIN, GPIO.IN, pull_up_down=GPIO.PUD_UP)

# Morse Code Dictionary
MORSE_CODE = {
    ".-": "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", "-----": "0",
    ".----": "1", "..---": "2", "...--": "3", "....-": "4", ".....": "5", "-....": "6",
    "--...": "7", "---..": "8", "----.": "9"
}

def send_sms(message):
    """Send message using Twilio"""
    client = Client(ACCOUNT_SID, AUTH_TOKEN)
    client.messages.create(to=TO_NUMBER, from_=FROM_NUMBER, body=message)
    print("SMS sent:", message)

def send_to_blynk(message):
    """Send message to Blynk app"""
    blynk.virtual_write(1, message)
    print("Message sent to Blynk:", message)

def read_morse():
    """Reads Morse code input from touch sensor"""
    morse = ""
    message = ""
    last_press_time = None

    while True:
        if GPIO.input(TOUCH_PIN) == GPIO.LOW:
            press_start = time.time()
            while GPIO.input(TOUCH_PIN) == GPIO.LOW:
                pass
            press_duration = time.time() - press_start

            if press_duration < 0.3:
                morse += "."
            else:
                morse += "-"
            last_press_time = time.time()
            print("Current Morse:", morse)

        if last_press_time and time.time() - last_press_time > 1.5:
            if morse in MORSE_CODE:
                message += MORSE_CODE[morse]
            morse = ""
            print("Decoded so far:", message)

        if time.time() - last_press_time > 3:
            if message:
                send_sms(message)
                send_to_blynk(message)
                message = ""
            last_press_time = None

try:
    print("Touch sensor Morse code input ready...")
    read_morse()
except KeyboardInterrupt:
    GPIO.cleanup()
```