Bluetooth-Controlled 6-Wheeled Robotic Car

Overview

This is a GSM-based Mobile Communication System built using an Arduino UNO, a SIM900A GSM module, a 4x4 matrix keypad, and a 16x2 I2C LCD display. Designed as a standalone embedded system project, this module simulates basic mobile phone functionality such as making calls and sending text messages, powered entirely by an Arduino and a GSM network.

It is ideal for learning the fundamentals of telecommunication modules, AT commands, serial communication, and hardware interfacing with microcontrollers.

Features

- Call Functionality: Enter any mobile number and initiate a phone call using the keypad.
- SMS Capability: Type and send custom text messages directly from the system.
- LCD Display: Real-time feedback via a 16x2 LCD display with I2C interface for reduced wiring complexity.
- Custom Input: 4x4 matrix keypad for number and character input.
- AT Command Based: Controlled entirely using AT commands sent to the SIM900A via Arduino.

Hardware Components

- Arduino UNO: 1
- SIM900A GSM Module: 1
- 4x4 Matrix Keypad: 1
- 16x2 I2C LCD Display: 1
- Battery/Power Supply: 1
- Jumper Wires: Various
- Resistors/Connectors: As needed

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How It Works

1. Dialing a Number:

- Use the keypad to enter a phone number.
- Press a predefined key (e.g., #) to initiate the call.
- The LCD displays the number being dialed and call status.

2. Sending an SMS:

- Enter a phone number using the keypad.
- Enter a message character-by-character.
- Press a specific key (e.g., *) to send the SMS.
- The message and number are confirmed on the LCD.

3. Underlying Communication:

- Arduino sends AT commands to the SIM900A module over serial.
- The GSM module interacts with the mobile network to perform actions.

Possible Upgrades

- Phonebook Storage via EEPROM
- Voice Feedback using Speaker Module
- Touchscreen instead of Keypad
- Integration with Sensors for Alert-Based Calls/SMS (Security Systems)
- Cloud-Based Call Logs or SMS History

Skills Gained

- Understanding of GSM-based communication

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- AT Command structure

- Arduino serial communication

- Keypad interfacing

- I2C communication for LCD

- Real-world telecom applications using embedded systems