Here's the Arduino code for a **Sign Language Glove** using an **ADXL345 accelerometer** and **flex sensors**. It translates hand gestures into text or speech by reading sensor values and mapping them to predefined words or letters.

Required Components:

- Arduino (Uno/Nano)
- ADXL345 Accelerometer
- Flex Sensors (attached to fingers)
- Bluetooth Module (HC-05) (optional for wireless output)
- OLED/LCD Display (if needed for visual output)
- Buzzer/Speaker (for audio output)

Wiring:

Component	**Arduino Pin**
ADXL345 SDA	A4 (SDA)
ADXL345 SCL	A5 (SCL)
Flex Sensor 1 (Thumb)	A0
Flex Sensor 2 (Index)	A1
Flex Sensor 3 (Middle)	A2
Flex Sensor 4 (Ring)	A3
Flex Sensor 5 (Pinky)	A5
HC-05 TX	Arduino RX (via 1KΩ & 2KΩ divider)
HC-05 RX	Arduino TX
HC-05 VCC	5V
HC-05 GND	GND

How It Works:

1. **Reads flex sensor values** → Determines if fingers are bent or straight
2. **Reads ADXL345 accelerometer data** → Detects hand orientation
3. **Detects gestures using predefined conditions**
4. **Sends the recognized gesture via Bluetooth (HC-05)**
5. **Connect Bluetooth to a phone/PC using a serial terminal app** to display gestures

Code:

```
#include <Wire.h>

#define ADXL345_ADDR 0x53  // I2C address of ADXL345

// Flex sensor pins
const int flexThumb = A0;
const int flexIndex = A1;
const int flexMiddle = A2;
const int flexRing = A3;
const int flexPinky = A5;

// ADXL345 variables
int16_t ax, ay, az;

void setup() {
  Serial.begin(9600);  // Bluetooth module uses Serial
  Wire.begin();
```

```
  // Initialize ADXL345
  Wire.beginTransmission(ADXL345_ADDR);
  Wire.write(0x2D);  // Power control register
  Wire.write(8);  // Enable measurements
  Wire.endTransmission();
}

void loop() {
  // Read flex sensor values
  int thumb = analogRead(flexThumb);
  int index = analogRead(flexIndex);
  int middle = analogRead(flexMiddle);
  int ring = analogRead(flexRing);
  int pinky = analogRead(flexPinky);

  // Read accelerometer data
  Wire.beginTransmission(ADXL345_ADDR);
  Wire.write(0x32);  // Start reading from data registers
  Wire.endTransmission(false);
  Wire.requestFrom(ADXL345_ADDR, 6, true);

  ax = Wire.read() | (Wire.read() << 8);
  ay = Wire.read() | (Wire.read() << 8);
  az = Wire.read() | (Wire.read() << 8);

  // Gesture Detection Logic
  String gesture = detectGesture(thumb, index, middle, ring, pinky, ax, ay, az);
```

```
    // Send detected gesture via Bluetooth
    Serial.println(gesture);
    delay(500);
}

String detectGesture(int t, int i, int m, int r, int p, int ax, int ay, int az) {
    if (t > 500 && i < 400 && m < 400 && r < 400 && p < 400) return "Thumbs Up";
    if (t < 400 && i > 500 && m > 500 && r > 500 && p > 500) return "Open Palm";
    if (t > 500 && i > 500 && m < 400 && r < 400 && p < 400) return "Peace Sign";
    if (ax > 100 && ay < 50) return "Wave Left";
    if (ax < -100 && ay < 50) return "Wave Right";

    return "Unknown Gesture";
}
```