Experiment No. 3: Setting Up Raspberry Pi

1. **Objective**

   This experiment aims to successfully set up a Raspberry Pi, install an operating system, and configure it for basic use. This includes hardware setup, software installation, and initial configuration to enable network connectivity and remote access.

2. **Materials & Equipment Required**

   - Raspberry Pi
   - NOOBS (New Out of Box Software) Installation Package

   Direct Setup:

   - Monitor
   - Power Adapter
   - microSD Card
   - Keyboard
   - HDMI Cable
   - Mouse

   Headless Setup:

   - Power Adaptor
   - SD Card
   - LAN Cable (Optional)

3. Theory & Background

Raspberry Pi 5 is an ideal platform for biometric systems due to its powerful ARM Cortex-A76 processor, enhanced GPU, and fast connectivity. It supports real-time face and fingerprint recognition using libraries like OpenCV, ensuring efficient image processing and authentication. Its PCIe interface enables quick data storage and retrieval, crucial for biometric security. With improved performance and AI capabilities, Raspberry Pi 5 is a cost-effective solution for access control, surveillance, and identity verification.

4. Procedure

a. Download NOOBS from the official Raspberry Pi website (https://www.raspberrypi.org/downloads/).
b. Format the microSD card using FAT32 file system.
c. Copy the extracted NOOBS files onto the microSD card.
d. Insert the microSD card into the Raspberry Pi.
e. Connect the Raspberry Pi to a monitor using an HDMI cable.
f. Attach a keyboard and mouse to the USB ports.
g. Connect the power adapter to turn on the Raspberry Pi.
h. On the NOOBS menu, select Raspbian OS and install it.
i. Wait for the installation to complete (approximately 20-30 minutes).
j. Once installed, the Raspberry Pi will restart automatically.

The sections below remain empty as the setup of our Raspberry Pi 5 is still incomplete due to delivery delays.

5. Data Collection & Observations

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6. Analysis & Discussion

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7. Conclusion

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8. References

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