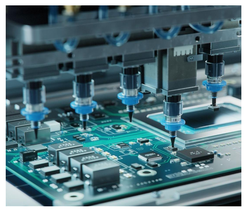
IoT Research and Innovation Laboratory

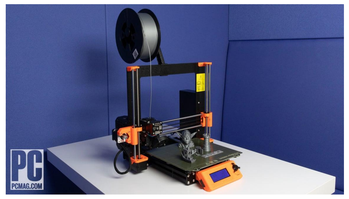
LAB OVERVIEW

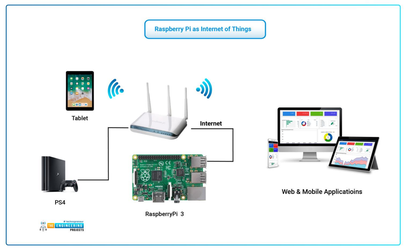
The IoT Research and Innovation Laboratory at the Department of Electrical and Electronic Engineering, BUET, is poised to be a cutting-edge facility within the upcoming 4IR Advanced Research and Innovation Park. This laboratory aims to spearhead advancements in the Internet of Things (IoT) technologies, fostering a robust environment for research, innovation, and practical application.

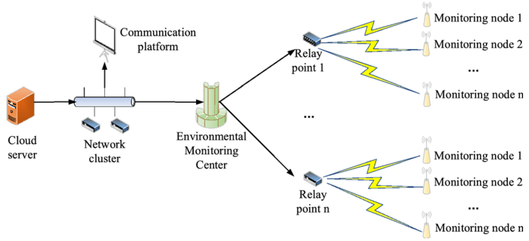
IoT Research and Innovation Laboratory will act as a hub for interdisciplinary collaboration, fostering partnerships with other academic institutions, government bodies, and industry leaders to meet the telecommunication requirements of 4IR. This synergy will drive innovation, facilitate knowledge exchange, and contribute to the growth of a skilled workforce ready to tackle the challenges and opportunities of the IoT landscape.

ILLUSTRATION









MISSION OF THE LAB

1. **Innovative Research and Sustainable Solutions:**
   To advance IoT technology through cutting-edge research, developing scalable and sustainable solutions that address real-world challenges and improve quality of life.
2. **Educational Excellence and Training:**
   To provide comprehensive hands-on experience and training in IoT technologies, preparing students and researchers for leadership roles in the Fourth Industrial Revolution.
3. **Interdisciplinary Collaboration:**
   To foster interdisciplinary collaboration and engage with the community through workshops and outreach programs, promoting awareness and understanding of IoT technologies.
4. **Security and Privacy:**
   To prioritize the development of robust and secure IoT systems, ensuring the protection of user data and maintaining trust in IoT applications.
5. **Innovation Ecosystem and Global Leadership:**
   To establish a thriving innovation ecosystem that supports startups and entrepreneurial ventures in IoT, positioning the lab as a global leader in IoT research and technological progress.

PRIMARY RESEARCH AREA

- **Smart Cities and Urban IoT**
- **Intelligent Transportation System**
- **Smart Surveillance and Monitoring**
- **Industrial IoT (IIoT)**
- **Healthcare and Wearable IoT**
- **Environmental Monitoring and Agriculture**
- **Edge Computing and Distributed Systems**
- **Energy Management and Smart Grids**
- **IoT Data Analytics and Machine Learning**
- **Communication Protocols and Standards for IoT**
- **Human-Computer Interaction and User Interfaces**

FACILITIES AND EQUIPMENT

1. **IoT Development Kits and Boards**:
   1.Arduino, Raspberry Pi, ESP32, and other microcontroller boards
   2.Various IoT starter kits with sensors and actuators
2. **Sensor Modules**:
   1.Environmental sensors (temperature, humidity, air quality, etc.)
   2.Motion and proximity sensors
   3.Light, sound, and vibration sensors
3. **Actuators and Output Devices**:
   1.Relays, motors, and servos
   2.Displays (LCD, OLED, etc.)
   3.Smart actuators for home automation and industrial applications
4. **Communication Modules**:
   1.Wi-Fi, Bluetooth, Zigbee, and LoRa modules
   2. GSM/GPRS and NB-IoT modules for cellular communication
   3. RFID and NFC readers and tags
5. **Networking Equipment**:
   1. Routers, switches, and access points
   2. IoT gateways and hubs
   3. Network simulation and monitoring tools
6. **Edge Computing Devices**:
   1. Single-board computers (NVIDIA Jetson, Intel NUC, etc.)
   2. Edge AI development kits
   3. Fog computing infrastructure
7. **Computer, Server, Cloud Platforms and Services**:
   1. Personal Computer, Laptop, Server for data analysis
   2. Access to cloud IoT platforms (AWS IoT, Google Cloud IoT, Azure IoT)
   3. Cloud storage and database services
   4. IoT data analytics and visualization tools
8. **Demonstration of IoT Systems and Data Analytics**:
   1. Energy management and analysis
   2. Environment monitoring and analysis
   3. Access control and video surveillance
9. **Prototyping and Fabrication Tools**:
   1. 3D printers and CNC machines
   2. PCB Prototype solutions including, PCB Design, Soldering stations and fabrication tools
   3. Electronic component testers
10. **Measurement and Testing Equipment**:
    1. Spectrum Analyzer, Radiation Meter
    2.Oscilloscope, Function Generator and multimeters
    3. Optical and network Cable Tester

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING
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4IR Advanced Research and Innovation Park