ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

AUTONOMOUS INSTITUTION

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VI Semester

CBM 370 - Wearable Devices

Unit- 1 INTRODUCTION TO WEARABLE SYSTEMS AND SENSORS

1.2 Drawbacks of Conventional Systems for Wearable Monitoring, Applications of Wearable systems:

1.2.1 Drawbacks of Conventional Systems for Wearable Monitoring:

1. Limited Battery Life:

❑ Many conventional systems rely on bulky batteries, which can be heavy and uncomfortable for wearers.

❑ Frequent charging is often required, disrupting the user's routine and limiting the system's usability.

2. Data Transmission Issues:

❑ Bluetooth and Wi-Fi connections can be unreliable, especially in crowded or remote areas.

❑ This can lead to data loss or delays in real-time monitoring.

3. Privacy Concerns:

❑ Continuous data collection raises concerns about privacy and data security.

❑ There is a risk of unauthorized access to sensitive personal information.

4. Limited Functionality:

❑ Many conventional systems have limited functionality, focusing on specific health metrics like heart rate or steps.

❑ They may not be able to provide a comprehensive view of the wearer's overall health and well-being.

5. Cost:

❑ Wearable monitoring systems can be expensive, making them inaccessible to many people.

❑ The cost of maintaining and replacing devices can also be significant.

6. Comfort and Aesthetics:

❑ Some conventional systems are bulky and uncomfortable to wear, which can discourage users from wearing them regularly.

❑ They may also be aesthetically unappealing, making them less desirable to wear in social settings.

7. Interoperability Issues:

❑ Different wearable devices and software platforms often have difficulty communicating with each other.

❑ This can make it difficult to integrate data from multiple sources and get a complete picture of the wearer's health.

8. Data Interpretation Challenges:

❑ Interpreting large amounts of data collected by wearable devices can be challenging.

❑ It requires specialized knowledge and tools to make sense of the data and identify meaningful trends.

9. Lack of Standardization:

❑ There is no universal standard for data collection and reporting in wearable monitoring.

❑ This makes it difficult to compare data across different devices and platforms.

10. Regulatory Hurdles:

❑ The development and deployment of wearable monitoring systems can be subject to regulatory hurdles.

❑ Ensuring compliance with data privacy and safety regulations can be complex and time-consuming.

1.2.2 Applications of Wearable systems:

I. Health Care:

1. Fitness Tracking: Wearables like fitness trackers and smartwatches monitor physical activity, heart rate, sleep patterns, and calorie intake, promoting healthier lifestyles.

2. Chronic Disease Management: Devices can track vital signs, medication adherence, and symptoms for conditions like diabetes, heart disease, and epilepsy, enabling better patient care and early intervention.

3. Remote Patient Monitoring: Wearables allow healthcare providers to remotely monitor patients' health status, reducing the need for frequent hospital visits.

4. Assistive Technology: Wearables can assist individuals with disabilities by providing sensory feedback, navigation aids, and communication tools.

II. Industrial Applications:

1. **Workplace Safety:** Wearables can monitor workers' vital signs in hazardous environments, detect falls, and provide real-time alerts in case of emergencies.
Their devices could, for instance, alert them when toxins are present in the atmosphere, temperatures climb to dangerously high levels, noise levels require hearing protection, or heavy machinery is operating nearby.

2. **Productivity Enhancement**: Augmented reality (AR) glasses to assist in complex tasks or assembly-line processes.

3. Industrial Automation: Wearables can enable hands-free control of machinery and equipment, enhancing productivity and reducing errors.

4. Fatigue and Stress Monitoring: Detecting fatigue to prevent accidents and improve efficiency

III. <u>Military and Defense:</u>

1. **Soldier Monitoring:** Wearables can track soldiers' vital signs, location, and activity levels in combat situations, ensuring their safety and well-being.
2. **Surveillance** : Wearables equipped with sensors and cameras can be used for surveillance
3. **Communication and Coordination:** Wearables can facilitate communication and coordination among military personnel in the field.

IV. <u>Entertainment and Lifestyle:</u>

1. **Augmented Reality (AR) and Virtual Reality (VR):** Wearables like smart glasses and headsets can provide immersive AR and VR experiences for gaming, entertainment, and education.
2. **Fashion and Accessories:** Wearable technology is increasingly integrated into fashion accessories, offering features like contactless payments, music playback, and personalized notifications.
3. **Social Interaction:** Wearables can enhance social interactions by providing new ways to connect with friends and family, share experiences, and express oneself.

V. <u>Other Applications:</u>

1. **Education:** Wearables can be used to create interactive learning experiences, provide personalized feedback, and track student progress.
2. **Smart Homes:** Wearables can control smart home devices, automate tasks, and provide personalized comfort settings.
3. **Transportation:** Wearables can be used for navigation, traffic information, and hands-free communication while driving.

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