

CHAPTER 1

INTRODUCTION

The high cost of healthcare and the trends of increasing costs due to the ageing society are important issues in the present days. Thus, the implementation of measures for cost reduction is one of the most significant current trends in healthcare. One way of the reducing the cost can be achieved by increasing the efficiency within healthcare organizations, i.e., by reducing of the number of days of stay in a hospital, reduction of costly treatment programmes, and the number of face-to-face consultations. Another way is knowing the people who are at risk in an early stage and providing guidance to prevent costly hospitalization. It is also important to motivate people to maintain a healthy lifestyle. In the modern world, people are feeling increasingly responsible for their health and many people, in particular when young, wish to be involved in the decision making associated with their health issues.

1.1 What is Embedded system?

An Embedded System is a combination of computer hardware & software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market.

An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system - generally 32, 64 Bit Controllers used with OS. For e.g. Personal Digital Assistant and Mobile phones etc. Lower end embedded systems - generally 8, 16 Bit Controllers used with an minimal operating systems and hardware layout designed for the specific purpose. For e,g Small controllers and devices in our everyday life like Washing Machine, Microwave Ovens, where they are embedded in.

1.2 Characteristics of Embedded system

- An embedded system is any computer system hidden inside a product other than a computer.
- User will encounter a number of difficulties while writing embedded system software in addition to those that are encounter while write applications

- Throughput – Our system may need to handle a lot of data in a short period of time.
 - Response–Our system may need to react to events quickly
 - `Testability–Setting up equipment to test embedded software can be difficult
 - Debugability–Without a screen or a keyboard, finding out what the software is doing wrong (other than not working) is a troublesome problem
 - Reliability – embedded systems must be able to handle any situation without human intervention
 - Memory space – Memory is limited on embedded systems, and you must make the software and the data fit into whatever memory exists
 - Program installation – Need special tools to install the software into embedded systems
 - Power consumption – Portable systems must run on battery power, and the software in these systems must conserve power
 - Processor hogs – computing that requires large amounts of CPU time can complicate the response problem
 - Cost – Reducing the cost of the hardware is a concern in many embedded system projects; software often operates on hardware that is barely adequate for the job.
- Embedded systems have a microprocessor/ microcontroller and a memory. Some have a serial port or a network connection. They usually do not have keyboards, screens or disk drives.

Applications of Embedded system

- Military and aerospace embedded software applications
- Communication application
- Industrial automation and process control software
- Mastering the complexity of applications.
- Reduction of product design time.
- Real time processing of ever increasing amounts of data.

1.3 GSM Modem

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

1.4 ZIGBEE

Zig Bee focuses on defining a general purpose in expensive self-organizing mesh network that can be used for industrial control, embedded sensing, medical data collection, building automation and home automation. This project makes use of the wireless Zig Bee protocol. The XBee OEM RF Modules were engineered to operate within the Zig Bee protocol and provide reliable delivery of data between remote devices.