



CSE 334: Pervasive computing

Dept. of Computer Science & Engineering
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Lecture- 2: Information Access Device

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Handheld Computers:

Handheld computers comprise the largest group of Internet connectable pervasive devices. They are small, lightweight, and fit into pockets. Handheld computers also known as personal digital assistants (PDAs). Currently two major operating systems are applied on handheld devices: Palm OS and Windows CE.

Palm OS-Based Devices

Palm OS also known as Garnet OS is a discontinued mobile operating systems for personal digital assistants (PDAs). It is the best-known and most popular operating system for handheld devices.

- Wireless modem, a Bluetooth module, a MP3 player, and a CPS device.
- The most important native applications of Palm OS based devices

applications are the Address Book, the Date Book, The To Do List, the Memo Pad, and the Mail applications.



Palm OS-Based Devices

- The Address Book displays a master list of addresses sorted by last name and displaying the principal phone numbers.
- The Date Book is used to display and edit appointments in a daily, weekly or monthly view.
- At the time the Memo Pad application is started, it first shows an index consisting of the first lines of the memos. If you tap on a list element, the complete memo is displayed.
- With the Mail application users can read downloaded emails or generate new emails offline.

Windows CE-Based Handheld Computers:

Windows CE is the second major operating system for handheld computers developed by Microsoft. Windows CE has been developed by Microsoft and is applied by manufacturers like Casio, HP, and Compaq.

- Compared to the competing Palm OS, Windows CE requires plenty of memory and processing power making devices much more expensive.
- While Palm concentrates on state-of-the-art mobile information Windows CE devices are technological wonder boxes, Management generously equipped with fancy hardware features: They usually have a color display with a good resolution, enabling multimedia applications such as computer games.
- USB and infrared support ensure connectivity with peripherals and other devices.
- ActiveSync is the synchronization software, which Windows CE Activesync applications use for keeping the mobile data consistent and up-to-date with databases on the user's corresponding PC.

Sub-Notebooks:

Subnotebook (also called an ultraportable, super portable or mini notebook) was a marketing term for laptop computers that are smaller and lighter than a typical 'notebook' sized laptop. It could be defined as machines with screen smaller than 13" but with a permanently-attached keyboard intended for two-handed typing.

- More memory, more CPU power and they provide a reasonable screen as well.
- They have a small keyboard, making data entry much Easier.
- Although sub-notebooks won't fit into pockets anymore, they are still highly portable and a bit lighter than full-sized notebooks.



Sub-Notebooks

- The main differences to regular notebooks are that the sub-notebooks have much less computing power, cost less and that they are intended for mobile usage.
- being less convenient to carry around than a handheld and having less functionality than notebooks, makes the sub-notebook class not very popular for a broad audience.

Windows CE-Based Sub-Notebooks:

Major device manufacturers for Windows CE sub-notebooks are HP (Jornada 820) and Compaq (Aero 8000) - both are using version 2.11 of that operating system. It is called Handheld PC or Handheld PC Professional. This might be a bit confusing with the terms "Pocket PC" or "Palm held PC" applied for handheld computers.

- Windows CE handhelds feature a PC Card slot for various peripherals like wireless communication adapter, modems, and many more.

EPOC-Based Sub-Notebooks:

EPOC is a versatile operating system designed for usage in various mobile devices. Beside sub-notebooks, it is also applied for phones. The EPOC operating system is very stable and users only experience crashes every few years.

- EPOC based sub-notebooks are available as MC218 from Ericsson, Oregon Scientific OsariS, and Psion 5mx Pro Series 7, and revo.
- Remarkable is, that the EPOC operating system is very stable and users only experience crashes every few years.



EPOC-Based Sub-Notebooks:

- There is plenty of additional third-party software available for EPOC devices. Maps, databases, dictionaries, tools for internet, email, fax and SMS, financial calculators, and accounting applications, just to name a few of them.

Phones

Modern phones create a high demand for new pervasive technologies. They have evolved from a simple person-to-person voice interface to powerful network clients. Today, address books, calendar, memos, and games are state of the art applications, which are no longer restricted to high-end phones.

Cellular Phones:

An incredible diversity: The diversity of cellular phones is incredible; their functionality too. The endless list of features gets longer every day. There are manifold games, fancy form factors, built-in FM radio, and even PIM functionality.

Entering text: cellular phones without a reasonable keyboard have to cope with, is how to enter text easily. Voice recognition is one sumptuous way. Instead of picking one of the miniaturized keys, commands and data can be spoken to the device. Stored phone numbers are dialed with one shout.

Cellular phones

GSM: The communication bearer between a mobile phone and the telecommunication network differs strongly from country to country. Global System for Mobile Communication (GSM) is the accepted de facto standard for mobile wireless communication.

CDMA and TDMA: In North America and parts of Asia wireless communication providers operate networks based on several other digital standards. Among these, Code Division Multiple Access (CDMA) is today's most common one. It also allows a secure communication using an encoding key, which is sent along with the voice data. Time Division Multiple Access (TDMA) is a competing standard, which works similar to CDMA, but has an improved bandwidth.

Data Transmission Capabilities

Besides the pure voice communication, there are several ways for transmitting and accessing data through a wireless network. Data communication is used to transfer information between devices or between a device and an IT network, like the Internet.

- Paging is one way of sending data to a recipient. Only a notification and a callback number is delivered.
- GSM data is apart of the GSM communication, which can be used for data or fax transmission.
- SMS allows up to 160 characters to be transmitted within one message from and to a GSM phone.
- W AP is a cross-industry standard used to deliver specially formatted content from a web server to phones and other wireless devices with a limited screen.

Data Transmission Capabilities

- Beyond SMS, Picture Messaging allows to send text and graphics. Multimedia Message Service adds digital imaging capabilities. Mobile Multimedia supports entire new content types, such as animations or video clips.
- Mobile phones usually have an infrared port to exchange data locally with another device.
- Bluetooth is a convenient approach to let multiple devices collaborate wireless with each other within a short distance of a few meters.

Smart Phones

Smart phones combine a mobile phone with a handheld organizer into an all-in one communication system. Examples are the Nokia Communicator 9110, Ericsson R380.

- Reasonable resolution.
- Dual band GSM, modem, and infrared port ensure connectivity.
- Versatile EPOC operating system.
- High-speed wireless communication networks like GPRS and UMTS.



Screen phones

Screen phones are the convergence of a phone and an Internet terminal. They have a reasonable screen, an optional keyboard and are dedicated to two single tasks: phoning and accessing Internet content and applications.

- Simple and convenient usage.
- One-dick connection to the net targeting especially non-technical users who would hesitate to install a pc on their own.
- The integrated browsers are capable of displaying multi-media web.



Screen phones

- Screen-phones can be used for simple information retrieval, for executing e-commerce web applications, emailing, etc.
- The device is delivered pre-installed and ready to be plugged into the telephone line.
- Mostly screen-phones require an ISDN high-bandwidth connection, some use cable modems or even wireless connections.

Thank You