

MOBILE DEVICES IN PATIENT CARE IMPROVEMENT AND PERSONAL MANAGEMENT WITH REFERENCE TO PDA,DIGITAL VOICE RECORDERS,SMART PHONES

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Introduction:

the emergence of growing information technology specially in health care sector has been enormously affected physicians to use some gadgets to access knowledge instantly wherever they are:

- to help busy clinicians the gadgets called pocket computers or held in the palm of hand [hand held computers,palm top computers] by providing rapid access critical information resources at the point of care.eg;clinical drug reference.
- the hand held computer is not only lighter in weight than pocket drug guide but also store much more detailed information and provide other facilities too.

Definitions:

PDA: [PERSONAL DIGITAL ASSISTANT]-defined as a conveniently sized and mobile handheld computer used for information storage, communication, and processing. They include: Pocket PCs, Palm handhelds, Tablet PCs, Smartphone's, etc.



hp

NEED FOR PDA:

PDA's MAKE INFORMATION RESOURCES AVAILABLE QUICKLY AND CONVENIENTLY, OFFERING MOBILITY THAT MANY HEALTH CARE PROFESSIONALS AND STUDENTS WOULD LIKELY FOR THEIR URGENT INFORMATION.

Information needs and busy schedules. Having spoken with a few medical residents, they have Stated that sometimes they are too busy to go to a computer terminal to look up information and Would appreciate the convenience of a handheld resource. Also, some nurses appreciate the Handheld medical calculators. Spoke to a few other doctors who feel that PDA's would be a great tool for storing information that is difficult to remember but needs constant regular referral. Of course, this requires further study in a user needs analysis.

LIST OF COMMONLY AVAILABLE PDA'S:

| DEVICE TYPE | OPERATING SYSTEM | FEATURES |
|-------------|---------------------------------|---|
| PALMTOP | PALM OS | THE OLDEST DOES NOT RUN MS OFFICE APPS CLOSED SYSTEM |
| POCKET PC | WINDOWS CE | LOOKS AND WORKS MUCH LIKE PERSONAL COMPUTER PROVIDES MS OFFICE TOOLS OPEN SYSTEM |
| SMART PHONE | WINDOWS MOBILE APPLE I PHONE | SIMILAR TO WINDOWS AUTOMATICALLY SYNCHRONISES WITH COMPUTERS ON CONNECTION |
| BLACK BERRY | BLACKBERRY OS | COMMUNICATER WITH PDA FEATURES. |

UTILITY OF PDA:

IN US NEARLY 50% PHYSICIANS ARE USING PDA,BUT NOT IN INDIA.HENCE THE AWARENESS SHOULD BE MADE BY CONDUCTING THIS TYPE OF HANDS ON WORKSHOP LIKE IN THIS CONFERENCE.

SEVERAL FUNCTIONS OF PDA AS GROUPED BELOW:

1. ORGANIZER FUNCTIONS
2. APPOINTMENTS/ANNIVERSARIES
3. REMINDERS.
4. OFFICE FUNCTIONS
 - A. WRITE LETTERS,DOCUMENTS
 - B. CREATE PPT,MULTIMEDIA
5. MEDICAL AND RADIOLOGICAL REFERENCES
 - A. REFERENCE DOCUMENTS/BOOKS PROTOCOLS,DIFFERENTIALS
 - B. DRUG REFERENCES
 - C. SEARCHABLE TEXTBOOKS
6. DATABASE FUNCTIONS
 - A. PERSONAL FINANCIAL DATA
 - B. PATIENT DATA
7. MEDICAL CALCULATORS
LOAN CALCULATORS
8. AUDIO FUNCTIONS
RECORD AUDIO LECTURES, MEMOS
9. INTERNET ACCESS
 - A. E MAIL
 - B. JOURNAL TRACKING ABSTRACT AND FULL TEXT ARTICLES. ON THE WHOLE ITS JUST IMAGINATION ALMOST ALL FUNCTIONS OF LAPTOP/DESKTOP COMPUTER JOB CAN BE DONE WITH PDA.

FEW INTERNET RESOURCES AND LINKS FOR PDA

1. PDA hardware comparison table
http://www.healthsystem.virginia.edu/internet/library/wdc-lib/services/computing/pda/pda_compare.cfm
2. David Conger's PDA comparison online tool
<http://www.davespda.com/resources/compare/>
3. PDA Learning Centre
<http://www.pdamd.com/vertical/tutorials.xml>
4. The Doctor's PDA and Smart Phone Handbook
<http://www.doctorsgadgets.com/the-doctors-pda-and-smartphone-handbook/>
5. Albert Einstein College of Medicine Biomedical PDA Resources
<http://library.aecom.yu.edu/resources/pda/pdabiomedical.htm>
6. The University of Western Ontario PDA Resources
<http://www.lib.uwo.ca/taylor/outreach/pdaresources.shtml>
7. Ectopic Brain Palm Medical Applications Reference
<http://medicalpda.net/medapps.html>
8. Healthy Palm Pilot Health Care Resource Index

- <http://www.healthypalmpilot.com/Interventions/>
9. Medical iSilo™ Depot PDA Medical References
<http://www.meistermed.com/isilodepot/index.htm>
10. Andrew Yee's Medical Eponym and Palm Pilot page
[http://eponyms.net /](http://eponyms.net/)
11. Healthy Palm Pilot: Medical Interventions Resources
<http://www.healthypalmpilot.com/Interventions/>
12. MedRules
<http://pbrain.hypermart.net/medrules.html>
13. MedCalc
<http://www.med-ia.ch/medcalc>

Pediatric PDA and iPhone apps...

- <http://www.pda4peds.com/>
<http://www.childrensnational.org/pdas/>
http://palmdoc.net/?page_id=1021
<http://www.docmd.com/pdasoftware/>
<http://www.blogcatalog.com/topic/pda+applications/>
http://palmdoc.net/?page_id=1183
http://www.unboundmedicine.com/store/pediatrics_central_pda_wireless/by
<http://www.med.yale.edu/library/services/computing/pdaApp.html>

PDA in reducing medical errors :

Numerous studies have revealed that medical errors are responsible for tremendous patient suffering, loss of life, and billions of dollars in costs. Research also suggests that children are at much higher risk of these errors than adults. New information technologies, particularly personal digital assistants (PDAs), are able to provide readily accessible medical information at the point-of-care. Although definitive studies are still necessary, the bedside use of these portable electronic devices, equipped with relevant, reliable and accurate drug, medical reference and calculator software, can help reduce the prevalence of medical errors, particularly for children. Based on recommendations from medical librarians, physicians, and medical students, an annotated list of free PDA software has been compiled. to meet the needs of medical librarians. Every Palm OS compatible software in the list has been downloaded and tested. Only free PDA software that was judge the past several years, more software has been developed for the Pocket PC. However, Palm OS is still more popular in the medical community as it requires less memory than the Pocket PC.

1. e drug software

<<http://www.geocities.com/fhirning/eDrugsSoftware.html>>

eDrugs software programs are drug information programs for PDAs, written by Fred C. Hirning, PharmD, FAPhA. There are two basic programs:

eDrugsData and eDrugsRenal. eDrugs Data contains information on over 2,450 generic drug listings. It contains over 12,000 drug names and dosage forms.

e Drugs Renal lists over 560 different drugs and has over 2,500 dosage adjustment recommendations and contains recommended dosage adjustments for patients with renal impairments. Multiple recommendations are listed when available. Both databases give the generic name, trade name, use or class, dosage form, usual dose, pregnancy risk factor, and additional information for each listing. Users may add their frequently used drugs to the list. All fields are searchable. Each of the programs is available in HandBase <<http://www.ddhsoftware.com/handbase.html>>, MobileDB Lite <<http://mobiledb.com/>>,

JFile 5.0 and JFile 4.0 <<http://www.land-j.com/jfile.html>> formats for Palm OS and HandBase format for Pocket PC. The respective database 70 JOURNAL OF ELECTRONIC RESOURCES IN MEDICAL LIBRARIES program must be installed onto the PDA in order to open the eDrugs program. All of the above database programs, except JFile 4.0, are not

free. eDrugsData uses 231 KB of memory and eDrugsRenal uses 78 KB memory.

2. ePocrates Rx

<http://epocrates.com/products/rxPro6/prod_diff.cfm>

ePocrates Rx, a highly recommended free clinical drug database, contains peer-reviewed information about more than 2,700 brand and generic drugs, including off-label indications and formularies in an easy-to-use format. The database is searchable by the drug's generic name, trade name, or class. For each drug, more information is available under tabs labeled "Adult Dosing," "Peds Dosing," "Contraindications/ Cautions," "Drug Interactions," "Adverse Reactions," "Manufacturer/ Cost Info," and "Other Info." There is also a "Notes" feature for entering personal information from personal observations. Under "MultiCheck," up to 30 drugs at a time may be selected for checking drug-drug interactions. Graffiti or the built-in keyboard may be used to enter drug names for searches. ePocrates Rx comes with an AutoUpdate feature. Every time a hotsync is performed, it automatically connects to the server to download update information. A DocAlert provides the latest updated information about drugs. Insurance companies' co-pay information is also available. Clinical tables and guidelines, drug interactions with alternative medicines, and the ePocrates ID infectious disease guide are only available for those who purchase the premium ePocrates Rx Pro version. Available for Palm OS only, and requires 2.5MB of memory. Last update, Version 6.0, December 5, 2002. Johns Hopkins Antibiotic Guide <<http://hopkins-abxguide.org/>>

The Johns Hopkins Point of Care Information Technology (POC-IT) Antibiotic (ABX) Guide is a handheld-ready adaptation of the online ABX Guide. It is

optimized for use at the point of care. The ABX Guide is an electronic reference tool that provides continually updated and easily accessible digests of the most current expert opinions and guidelines for the diagnosis and treatment of infectious diseases. The ABX Guide has three categories: Diagnosis, which lists diagnosis for nineteen systems; Pathogen, which includes bacteria, fungi, parasites, viruses, and other; and Antibiotic, which includes antibacterial, antifungal, Jie Li 71 antimycobacterial, antiparasitic, antiviral, and other. Any of the categories may be easily accessed by tapping on the tabs on the right of the screen. Antibiotics are listed by their generic names with a screen of four columns listing brand name, drug forms, dosages, and costs. Other display information includes class, indications, usual adult dosing, adverse reactions, drug interactions, comments, glomerular filtration, pregnancy risk, and author. The built-in function makes it easy to move it from handheld device to memory card. It connects to a server to get updated information whenever a hotsync is performed. However, it lacks pediatric data, and the disease database is not as extensive as other for-fee infectious disease drug database software. The Guide is available for all forms of PDAs and uses 1363KB of memory.

3. mobilePDR

<http://www.pdr.net/>>

mobilePDR is the concise version of the Physician's Desk Reference (PDR) for handheld devices. mobilePDR displays a brief summary, extracted from PDR, of drug indications, contraindications, warnings and precautions, adult and pediatric dosing, adverse reactions, drug-drug interactions, therapeutic class, Black Box warnings, Drug Enforcement Agency (DEA) class, pregnancy and nursing information by drug's brand and generic names. Each drug has a page number referring to the print PDR. The latest updates of drug information are provided when hotsync is performed. Available for both Palm OS and Pocket PC and requires Palm OS 3.0 or higher and Pocket PC OS 3.0 or higher. It requires 5.4 MB of free memory for Palm and 9 MB for Pocket PC. Version 1.0 was released in 2002. Only physicians, physician assistants, and nurse practitioners with valid DEA numbers are allowed to download the software.

4. MEDICAL CALCULATORS

a. DietCalc

<<http://pbrain.hypermart.net/files/dietcalc.zip>>

DietCalc is a simple program for calculating resting and active metabolic rates (RMR and AMR), which can be used to estimate daily caloric intake, ideal body weight, and body mass index all in one convenient place. These calculations are based on the Harris-Benedict Equation. "NSBRuntime.prc," which may be downloaded in the same zip file, is required in order for DietCalc to function. Available on Palm OS only and uses 115KB of memory.

b. EBM Calculator

<<http://www.cebm.utoronto.ca/palm/ebmcalc/>>

EBM (Evidence-based Medicine) Calculator is designed to calculate relevant statistics for diagnostic studies, prospective studies, case control studies, randomized control trials (RCT), and conversion from odds ratio (OR) to number needed to treat (NNT). MathLib is required to run EBM Calculator. Requires 51 KB of memory and is available for both Palm OS and Pocket PC.

c. **MedCalc**

<<http://medcalc.med-ia.net/>>

MedCalc is a full-featured free medical calculator for PDA. Developed by Mathias Tschopp, MD, it is designed for rapid calculation of common equations used in internal medicine. This invaluable tool for physicians, medical residents, and students is easy-to-use and comprehensive, with 75 formulas listed alphabetically and sorted by category. Users may select a custom category, as well. It may be calculated by either Système Internationale (S.I.) or United States (U.S.) units. Bibliographic references and clinical-use tips may be found for most formulas by tapping the "i" at the top right corner. Calculations for a particular patient may be stored with a time and date stamp. Multiple values may be stored. English, French, and Spanish versions are available. Only available for Palm OS and requires Palm OS 3.1 or later version. MedCalc uses 252 KB of memory.

MEDICAL APPLICATIONS

a. **ABG Pro**

<<http://www.stacworks.com/>>

Developed by Wade Carlson, MD, ABG Pro is a simple program that will completely analyze arterial blood gases. The program not only provides information on metabolic or respiratory acidosis or alkalosis, but also calculates expected PCO₂ and expected HCO₃ when needed, and alerts if there is a concomitant acid-base disorder. It will even calculate Anion Gap and Delta-Delta if necessary. "Normal ABG Values" is stated if all values are normal. The screen keypad makes it easy-to-use. Available on Palm OS only and only needs 19 KB of memory. If head circumference (HC) is included, HC-Age percentile is presented. Available for Palm OS only and uses 182 KB of memory.

b. **My Patient**

<<http://www.freewarepalm.com/medical/mypatients.shtml>>

This application allows users to track in-patients, labs, beam checkout, and print (with print boy or other print application). Available for Palm OS only, requires Palm III or higher, uses 40 KB of memory.

c. **Patient Tracker by Handheld med**

<http://www.patienttracker.com/download_ptpalm.htm>

Patient Tracker allows mobile access to patient records including patient demographics, laboratory results, medication/allergy lists, test results, and radiology reports. Patient Tracker includes the ability to print notes, checkout lists, and a patient log to any IrDA enabled printer. Available for both Palm OS and Pocket PC and takes 178 KB of memory.

d. Peds Omnibus

<<http://palmgear.com/software/showsoftware.cfm?sid=55690120030110120110&prodID=43121>>

This application calculates oral medication doses, intravenous medication doses, pediatric daily values, and neurological intensive care unit (NICU) daily values; tracks patients; and has developmental milestones, growth charts, and immunization schedules. Available on Palm OS only, uses 186 KB of memory, and requires Palm III or higher.

E.STAT Cardiac Clearance

<<http://www.statcoder.com/cardiac1.htm>>

This application guides clinicians through the complex algorithms established by the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the American College of Physicians for evaluating patients prior to noncardiac surgery with detail and explanatory footnotes. It provides a checklist that needs to be considered prior to surgery. Available on Palm OS only, and uses 97KB of memory.

f.STAT Growth Charts

<<http://www.statcoder.com/growthcharts.htm>>

This program calculates growth percentiles based on the June 2000 revision of the Centers for Disease Control and Prevention (CDC) Growth Charts. It includes new body mass index-for-age charts. The age in years and months can be entered using the pop-up lists. The weight, height, and head circumference can be entered using graffiti, and sex can be selected. Metric or English units are available. If head circumference (HC) is included, HC-Age percentile is presented. Available for Palm OS only and uses 182 KB of memory.

REFERENCES

General References

a. EKG Reference

<<http://pbrain.hypermart.net/medfiles.html>>

This is a quick reference to aid in interpreting EKGs. A doc reader is required. Available for Palm OS only, uses 3 KB of memory, released June 7, 2000.

b. Endocarditis Prophylaxis

<http://www.meistermed.com/MoreMeister/endocarditis_prophylaxis.htm>

This Guide to Endocarditis Prophylaxis Decision Making is based on the American Heart Association's "Prevention of Bacterial Endocarditis" guidelines published in JAMA 277(1997): 1794-1801. It answers the questions of whether the patient's heart condition requires endocarditis prophylaxis, whether the patient with "mitral valve prolapse" needs endocarditis prophylaxis, whether the patient who is about to undergo fiberoptic bronchoscopy procedure requires prophylaxis, how long before the prophylaxis procedure the patient is supposed to take Amoxicillin, and what is the recommended prophylaxis regimen when the patient is allergic to penicillin and needs antibiotic prophylaxis before his cystoscopy. The document is formatted with hyperlinks for ideal viewing in Isilo reader. Available for Palm OS and Pocket PC. Uses 14 KB of memory.

c. Family Practice Management offers a short and a long list of ICD-9 coding tools free for Palm-compatible handheld computers on doc file. The short list of about 600 codes has been a popular FPM resource over the past few years. It uses problem-oriented descriptors of conditions common in family practice to sort the ICD-9 list. The long list of about 1,500 codes common in family practice expands the short list to include a wider range of four-digit and five-digit codes. It also includes more codes useful for hospital care. Both lists are downloadable on the PC and Mac.

To view doc files, a user will need a "doc reader" such as AportisDoc <<http://www.aportis.com/>>, Quickword <<http://www.cesinc.com/>> or TealDoc <<http://www.tealpoint.com/>> to display the doc files. Aportis-Doc is free, but the other two are not. Available for Palm OS only. The short list uses 14 KB, and the long list uses 52 KB of memory.

JournalToGo

<<http://www.journaltogo.com/>>

JournalToGo provides weekly updated journal abstracts from the National Library of Medicine and news articles from Reuters to PDA by Health Tech Solutions. Every time a hotsync is performed, it automatically accesses the JournalToGo's Web site to get the most current information.

Sign up is required for the free service. Users have the option to copy the documents to memo pad and to e-mail them to a friend if the PDA has an Internet connection. Journal citations and abstracts provided are updated as they are published. Available for both Palm OS and Pocket PC. Palm OS requires a minimum of 200 KB free RAM, and Pocket PC requires a minimum of 3.0 MB free RAM.

Lab Manual

<<http://www.freewarepalm.com/medical/labmanual.shtml>>

Lab Manual is designed for medical workers who must draw and/or interpret blood labs. This free database has the most common serum labs, their drawing tubes and quantities (minimums and ideal), normal values, and clinical implications. The hyperlinked Lab Manual is easy to navigate by tapping the index letters and specific lab values to the content page. Requires the doc reader iSilo <<http://www.isilo.com/>>, which may be downloaded for a 30-day trial. Available on Palm OS only and uses 11 KB of memory.

Medical Approaches

<<http://www.medicalapproaches.com>>

Medical Approaches was designed by junior doctors for junior doctors.

This book contains approaches that help bridge the gap between problem and diagnosis and treatment, frameworks for dealing effectively with common diseases, templates for the rapid identification and management of emergencies, and a means to contribute users' own approaches and experiences with clinical problem solving. The approaches are designed to cross-refer and cut across specialty divisions and clinical settings. The hyperlinks lead users directly to individual chapters or subdivisions. A help page provides information to navigate the book. To read the book, Mobipocket reader <<http://www.mobipocket.com/>> is needed. The standard version of Mobipocket reader is free. Available for both Palm OS and Pocket PC and requires 1 MB of memory.

On Call–Floor Emergencies

<<http://pbrain.hypermart.net/medfiles.html>>

This quick reference to common hospital floor emergencies, designed to aid interns on call, was compiled by Kent Willyard, MD. It includes various categories of emergencies, their diagnoses, tests, medications, procedures, etc. Requires a doc reader to run. Available for Palm OS only, uses 15 KB of memory.

PalmEKG

<<http://palmekg.com/PalmEKG/>>

The PalmEKG is an arrhythmia field guide for Palm OS PDAs, featuring 25 ECG/EKG Arrhythmias. PalmEKG includes Sinus Rhythms, Atrioventricular Blocks, Atrial Rhythms, Junctional Rhythms, and Ventricular Rhythms. Available for Palm OS only, requires Palm OS 3.0 or higher and takes 20 KB of memory. Version 1.0 was released in 2001.

Sample Floor Notes <<http://pbrain.hypermart.net/medfiles.html>>

Examples of common hospital floor notes (admission orders, op note, delivery note, etc.) for medical students and interns. A doc reader is required. Available for Palm OS only, uses 4 KB of memory.

Shots 2003

<<http://www.immunizationed.org>>

Shots 2003 is a quick reference guide to the 2003 Childhood Immunization Schedule, a collaboration of the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP), and the 2002-2003 Adult Immunization Schedule, recommended by the Advisory Committee on Immunization Practices (ACIP). Details on each vaccine are available by clicking on the vaccine names. Requires Palm OS 3.1 or higher and 279KB of memory. Shots 2003 runs on both color and non-color handhelds and is available on Palm OS only.

Dictionaries

Medical Abbreviations

<http://www.medlists.net/Medical_Abbreviations.htm>

The author of this application, Krystof J. Neumann, MD, has collected more than 2000 abbreviations from all medical specialties throughout his medical school training and compiled this free, easy-to-use, searchable database, hoping to reduce some of the confusion that results from the use of abbreviations in medical charting. It is convenient to use a three-letter abbreviation (e.g., TLA) instead of writing out an entire phrase, but TLA may be confusing. Medical Abbreviations is unique in that it not only contains all the standard abbreviations for common disease entities, but is also the only database that was developed to specifically contain all the common shorthand abbreviations used in note writing. The author desires to distribute it free to help those medical students struggling through their clinical clerkships. It requires list.prc, a freeware that may be downloaded at <<http://www.magma.ca/~roo/list/list.html>>. Available for Palm OS only and uses 75 KB of memory.

Medical Eponyms

<<http://eponyms.net>>

The Eponyms database contains 1,300 common and obscure medical eponyms (e.g., Rovsing's sign, Virchow's node) with descriptions. This is a handy reference tool for medical professionals struggling with Jie Li 81 hard-to-remember names for common diseases. The author of the database, Andrew Yee, a medicine senior resident at Massachusetts General Hospital, has been working on this database since he was a second-year medical student. Tap the trigger on the upper right corner to choose one of the 22 categories to find an eponym. An on-screen keyboard, with the option of switching from English letters to numbers and symbols or international letters, makes entering a name for searches much easier. The stand-alone version is for Palm OS only. There is also an alternative version of Eponyms available in a variety of databases such as JFile or Handbase format for both Palm OS and Pocket PC. Uses 114 KB of memory.

Medical Mnemonics

<<http://www.medicalmnemonics.com/>>

Medical mnemonics is a database to aid in remembering the important details. Mnemonics have existed for a long time. This software expands the circles of sharing/exchange to a larger group worldwide and ensures useful mnemonics to be available to later learners. Users may add their own newmedical mnemonics via an onscreen keyboard. The stand-alone version is available for Palm OS only. There are two sizes of databases for the application. An unabridged version, which contains 1369 mnemonics, requires 85 KB application and 547 KB database, and a smaller abridged version, which contains 783 mnemonics, requires 85 KB application and 335 KB database for those with more limited space on their PDA. The AvantGo version is available for both Palm OS and Pocket PC. The AvantGo browser is available for download from AvantGo.com for free.

Medical Spanish

<<http://pbrain.hypermart.net/medfiles.html>>

This software contains common medical words and phrases for English-to-Spanish, including greetings, history taking, review of systems, physical examination, obstetrics/gynecology, anatomy, conditions, and medications. A pronunciation guide is included. Requires a doc file. Available for Palm OS only, uses 7 KB of memory.

Smartphone



A Smartphone is a mobile phone offering advanced capabilities, often With PC-like functionality (PC-mobile handset convergence). There is no industry standard definition of a Smartphone. For some, a Smartphone is a phone that runs complete operating system software providing a standardized interface and platform for application developers. For others, a Smartphone is simply a phone with advanced features like e-mail, Internet and e-book reader capabilities, and/or a built-in full keyboard or external USB keyboard and VGA connector. In other words, it is a miniature computer that has phone capability. Growth in demand for advanced mobile devices boasting powerful A collection of smart phones iPhone 3G, Blackberry 8820, Nokia N78, Nokia N81, Nokia N95, Nokia E65, Nokia N70 systems has outpaced the rest of the mobile phone market for several years.



Definition

There is no agreement in the industry about what precisely constitutes a "smart" phone, and definitions have changed over time. According to David Wood, EVP at Symbian Ltd., "Smart phones differ from ordinary mobile phones in two fundamental ways: how they are built and what they can do." Other definitions put different stresses on these two factors...

"With smart phones it's just one evolution in a series of evolutions, so it might be that the actual device at some point ... will become even smaller and we will not call it a phone anymore, but it will be integrated ... the deal here is to make the device as invisible as possible, between you, and what you want to do," says Sacha Wunsch-Vincent at the OECD.

Most devices considered smart phones today use an identifiable operating system, often with the ability to add applications (e.g. for enhanced data processing, connectivity or entertainment) - in contrast to regular phones which only support sandboxed applications (like Java The BlackBerry Storm,



made by Research In games). These Smartphone applications may be developed by the Motion manufacturer of the device, by the network operator or by any other third-party software developer, since the operating system is open. In terms of features, most smart phones support full featured email capabilities with the functionality of a complete personal organizer. Other functionality might include an additional interface such as a miniature QWERTY keyboard, a touch screen or a D-pad, a built-in camera, contact management, an accelerometer, built-in navigation Smartphone 2 hardware and software, the ability to read business documents in a variety of formats such as PDF and Microsoft Office, media software for playing music, browsing photos and viewing video clips, internet browsers or even just secure access to company mail, such as is provided by a BlackBerry. One common feature to the majority of the smart phones is a contact list able to store as many contacts as the available memory permits, in contrast to regular phones that has a limit to the maximum number of contacts that can be stored.

History

The first Smartphone was called Simon; it was designed by IBM in 1992 and shown as a concept product that year at COMDEX, the computer industry trade show held in Las Vegas, Nevada. It was released to the public in 1993 and sold by BellSouth. Besides being a mobile phone, it also contained a calendar, address book, world clock, calculator, note pad, e-mail, send and receive fax, and games. It had no physical buttons to dial with. Instead customers used a touch-screen to select phone numbers with a finger or create facsimiles and memos with an optional stylus. Text was entered with a unique on-screen.

The iPhone, made by Apple Inc. "predictive" keyboard. By today's standards, the Simon would be a fairly low-end product, however its feature set at the time was incredibly advanced.

The Nokia Communicator line was the first of Nokia's smartphones starting with the Nokia 9000, released in 1996. This distinctive palmtop computer style Smartphone was the result of a collaborative effort of an early successful and expensive PDA model by Hewlett Packard combined with Nokia's bestselling phone around that time and early prototype models had the two devices fixed via a hinge; the Nokia 9210 as the first color screen Communicator model which was the first true smartphone with an open operating system; the 9500

Communicator that was also Nokia's first cameraphone Communicator and Nokia's first WiFi phone; the 9300 Communicator was the third dimensional shift into a smaller form factor; and the latest E90 Communicator includes GPS. The Nokia Communicator model is remarkable also having been the most expensive phone model sold by a major brand for almost the full lifespan of the model series, easily 20% and sometimes 40% more expensive than the next most expensive smartphone by any major manufacturer. The Nokia E71 smartphone running S60 3rd Edition, Feature Pack 1 UI on the Symbian OS third-party applications. Although the Nokia 9210 was arguably the first true smartphone with an open operating system, Nokia continued to refer to it as a Communicator. Smartphone 3.

In October, 2001 Handspring unveiled the Palm OS Treo smartphone, utilizing a full keyboard that combined wireless web browsing, email, calendar and contact organizer, with mobile third-party applications that could be downloaded or synced with a computer. In 2001 RIM released the first BlackBerry which was the first smartphone optimized for wireless email use and has achieved a total customer base of 8 million subscribers by June 2007, of which three quarters are in North America.

Although the Nokia 7650, announced in 2001, was referred to as a 'smart phone' in the media, and is now called a 'smartphone' on the Nokia support site, the press release referred to it as an 'imaging phone'. Handspring delivered the first widely popular smartphone devices in the US market by marrying its Palm OS based Visor PDA together with a piggybacked GSM phone module, the VisorPhone. By 2002, Handspring was marketing an integrated The Palm Treo Pro, a Windows Mobile smartphone called the Treo; the company subsequently merged with smartphone Palm primarily because the PDA market was dying but the Treo smartphone was quickly becoming popular as a phone with extended PDA organizer features. That same year, Microsoft announced its Windows CE Pocket PC OS would be offered as "Microsoft Windows Powered Smartphone 2002". Microsoft originally defined its Windows Smartphone products as lacking a touch screen and offering a lower screen resolution compared to its sibling Pocket PC devices.

Palm has since largely abandoned its own Palm OS in favor of licensing Microsoft's WinCE-based operating system now referred to as Windows Mobile. The HTC Dream, a smartphone running the ??? In 2005 Nokia launched its N-Series of 3G smartphones which Nokia

Android operating system started to market not as mobile phones but as multimedia computers. Out of 1 billion camera phones to be shipped in 2008, smartphones, the higher end of the market with full email support, will represent about 10% of the market or about 100 million units.

The Smartphone Summit semi-annual conference details smartphone industry market data, trends, and updates among smartphone related hardware, software, and accessories.

Android, a cross platform OS for smartphones was released in 2008. Android is an Open Source platform backed by Google, along with major hardware and software developers (such as Intel, HTC, ARM, Motorola and eBay, to name a few), that form the Open Handset Alliance.

The first phone to use the Android OS was the HTC Dream, branded for distribution by T-Mobile as the G1. The phone features a full, capacitive touch screen, a flip out QWERTY keyboard, and a track ball for navigating web pages. The software suite included on the phone Smartphone 4 consists of integration with Google's proprietary applications, such as Maps, Calendar, and Gmail, as well as Google's Chrome Lite full HTML web browser. Third party apps are available via the Android Market, including both free and paid apps.

In July 2008 Apple introduced its App Store with both for fee and free applications. The app store can deliver smartphone applications developed by third parties directly to the iPhone or iPod Touch over wifi or cellular network without using a PC to download. The AppStore has been a huge success for Apple and by June 2009 hosted more than 50,000 applications.[20] The app store hit one billion application downloads on April 23, 2009.

Following the popularity of Apple's App Store, many other mobile platforms are following Apple with their own application stores. Palm, Microsoft and Nokia have all announced they will launch Apple-like app stores. RIM recently launched its app store, BlackBerry App The Palm Pre, a smartphone running the PalmWorld. webOS.

Operating systems

Operating systems that can be found on smartphones include Symbian OS, iPhone OS, RIM's BlackBerry, Windows Mobile, Linux, Palm WebOS and Android. Android and WebOS are in turn built on top of Linux, and the iPhone OS is derived from the BSD and NeXTSTEP operating systems, which all are related to Unix.

The most common operating systems (OS) used in smartphones by Q4 2008 sales are:

Symbian OS from Symbian Ltd. (47.1% Market Share Sales Q4 2008 [22]) Symbian has the largest share in most markets worldwide, but lags behind other companies in the relatively small but highly visible North American market.[23] This matches the success of its largest shareholder[24] and customer, Nokia, in all markets except Japan. Nokia itself enjoys 52.9% of the smartphone market. [25] In Japan Symbian is strong due to a relationship with NTT DoCoMo, with only one of the 44 Symbian handsets released in Japan coming from Nokia.[26] It is used by many major handset manufacturers, including BenQ, LG, Motorola, Samsung, and Sony Ericsson.[27] Various implementations of user interfaces on top of Symbian (most notable being UIQ and Nokia's own S60) are incompatible, which along with the requirement that applications running on mobile phones be signed[28] is hindering the potential for a truly widely accepted mobile

application platform. It has received some adverse press attention due to virus threats (namely Trojan horses).[29]

RIM BlackBerry operating system (19.5% Market Share Sales Q4 2008)

This OS is focused on easy operation and was originally designed for business. Recently it has seen a surge in third-party applications and has been improved to offer full multimedia support.

Windows Mobile from Microsoft (12.4% Market Share Sales Q4 2008)

The Windows CE operating system and Windows Mobile middleware are widely spread in Asia. The two improved variants of this operating system, Windows Mobile 6 Professional (for touch screen devices) and Windows Mobile 6 Standard, were unveiled in February 2007. Windows Mobile benefits from the low barrier to entry for third-party developers to write new applications for the platform. It has been criticized for having a user interface which is not optimized for touch input by fingers; instead, it is more usable with a stylus. However, unlike iPhone OS, it does support both touch screen and physical keyboard configurations.

Smartphone 5

iPhone OS from Apple Inc. (10.7% Market Share Sales Q4 2008)

The iPhone uses an operating system called iPhone OS, which is derived from Mac OS X. Third party applications were not officially supported until the release of iPhone OS 2.0 on July 11th 2008. Before this, "jailbreaking" allowed third party applications to be installed, and this method is still available. Linux operating system (8.4% Market Share Sales Q4 2008)

Linux is strongest in China where it is used by Motorola, and in Japan, used by DoCoMo. Rather than being a platform in its own right, Linux is used as a basis for a number of different platforms developed by several vendors, including Android, LiMo, Maemo, Openmoko and Qt Extended, which are mostly incompatible. PalmSource (now Access) is moving towards an interface running on Linux. Another platform based on Linux is being developed by Motorola, NEC, NTT DoCoMo, Panasonic, Samsung, and Vodafone.

Palm webOS from Palm Inc. and Palm OS/Garnet OS from Access Co. (0.9% Market Share Sales Q4 2008) Palm webOS is Palm's next generation operating system. PalmSource traditionally used its own platform developed by Palm Inc. Access Linux Platform (ALP) is an improvement that was planned to be launched in the first half of 2007. It will use technical specifications from the Linux Phone Standards Forum. The Access Linux Platform will include an emulation layer to support applications developed for Palm-based devices. Android from Google Inc. (Released 22 Oct 2008) Android was developed by Google Inc.. Its share of the smartphone market is still small because of its recent release date. Android is an Open Source, Linux-derived platform backed by Google, along with major hardware and software developers (such as Intel, HTC, ARM, and eBay, to name a few), that form the Open Handset Alliance. This OS, though very new, already has a cult following among programmers eager to develop apps for its flexible, Open Source, back end. Android promises to give developers access to every

aspect of the phone's operation. This lends many to foresee the promise of further growth for the Android platform. Marketshare data from Gartner report "Worldwide Smartphone Sales Reached Its Lowest Growth Rate With 3.7 Per Cent Increase in Fourth Quarter of 2008" Market share of Smartphone operating systems (as of November 2008) Smartphone 6

SMART PHONES AND PERVASIVE COMPUTING

A Smartphone is an electronic handheld device that integrates the functionality of a mobile phone, personal digital assistant (PDA) and other information devices. Imagine the number of pockets a person would need if he would have to carry a cell phone, a calculator, address book, music player, camera etc. A smart phone provides a solution to this problem. A smart phone can be developed by adding telephone features to an existing PDA or adding 'smart' functionalities of a PDA to a mobile phone. A key feature of a smart phone is that additional applications can be installed on the device. These applications can be developed by the manufacturer, the operator or any other third party like the user or any software developer. Thus unlike the conventional cell phones, a user can install, configure or run applications of their interests on the smart phone. Consider a standard cell phone with a built-in calculator application. A user has to use this calculator whether or not it's helpful for him or not. But if that phone were a Smartphone, the user could have installed any compatible calculator application he likes. Thus using a smart phone a user can make and receive phone calls, can interact with laptop and desktop Computers, access internet, send and receive emails, manage personal information, instant messaging, and data synchronization with applications like Microsoft outlook, play audio and video files and install applications of his choice. Additionally smart phones features also include GPS navigation tools and the ability to read business documents in a variety of formats like PDF.

Mobile phones have become a pervasive part of everyday life. People have mobile phones, smart phones or PDAs with them nearly always and anywhere. The primary aim of pervasive computing is providing information to the users anywhere anytime and on any device. Due to the proliferation of smart phones and PDAs and since they provide end to end communication in mobile networks, smart phones serve as important

Pervasive devices in ubiquitous environments. These smart phones can send and receive information via GPRS or Bluetooth and can even provide the user location via GPS (Global Positioning System). Today's mobile phone networks provide global ubiquitous wireless environments, satisfying most requirements of the pervasive computing information service delivery. Thus along with smart phones, pervasive computing brings the power of broadband communication to the shoppers, travelers, businessmen and others on the go. Smart phones also support many advanced interactive user interfaces. Many

projects have been developed to build interactive user interfaces like the My Grocer project.

4. VARIOUS PLATFORMS FOR SMART PHONES

An Application Development Platform or Framework is basically a collection of tools and libraries which enable developers to develop application targeting a hardware or software platform. Some of the well known application development platforms like Java, .NET framework target and get ported on various software platforms or operating Systems. BREW is a application development platform or framework which targets and get ported on various hardware platforms.

Handheld digital voice recorders



can be divided into two categories:

1) [consumer voice recorders](#) 2] [professional voice recorders](#).

Consumer level recorders are designed to record lectures or other long conversations that do not require editing. Professional level recorders are designed for authoring documents such as patient charts, correspondence and legal documents.

Most consumer level recorders lack the ability to edit recordings or append to existing recordings. Each time a [consumer level digital voice recorder](#) is started, a new audio file is created. Professional level recorders allow the author to start and stop recording repeatedly without creating a new audio file.

[professional level recorders](#)

have editing functions that allow users to add to and delete from recordings that are in process. Most also include advanced editing features like the ability to insert audio into the middle of an existing recording. Selecting a digital voice recorder for professionals such as doctors, lawyers, accountants and other professionals requires special consideration. First, only professional level recorders should be considered. Professional authors require the ability to start and stop recordings without creating a new audio file. More importantly professional authors require the ability to edit files in process.

A executive using a digital voice recorder to compose a document frequently records a few sentences or paragraphs and then decides to change what has been recorded. This requires the ability to back up and record over existing dictation. The process of recording and backing up can be very repetitive depending the style of the author. Therefore, it is critical that the process of backing up and recording over existing dictation be fast and easy. The most sophisticated professional voice recorders provide a slide switch to enable

this process. The slide switch is located on the side of the of the voice recorder and operated with the author's thumb. The slide switch on a professional digital voice recorder functions as follows:

· Up – Record · Neutral – Off · Down – Play · Hold Down - Backup

There are three brands of handheld professional digital voice recorders on the market today: Olympus, Philips and Grundig. Olympus and Philips are well established in the United States but Grundig is moving aggressively to penetrate the American market.

Olympus

has three professional level models: [Olympus DS5000](#), [Olympus DS-3400](#) And [Olympus DS-2400](#)

. Only the Olympus DS-5000 features a slide switch.



Philips

has four professional level models: [Philips LFH-9600](#) , [Philips LFH-9610](#) , [Philips LFH-9500](#) and [Philips LFH-9370](#).

Three of the Philips professional level recorders are equipped with a slide switch.



Grundig

also has four professional level models: Digta 420, [Digta 415](#) , [Digta 410](#) and Digta 405.

All three professional voice recorder brands use the DSS audio file format to record dictation. DSS is an acronym for Digital Speech Standard, an audio file format. DSS was jointly developed by Olympus, Grundig and Phillips in 1994. The DSS format is maintained by the International Voice Association

(IVA). The IVA was founded by Grundig, Olympus and Philips to ensure that all specifications are defined according to the standard. Dictaphone, Grundig, Olympus and Philips use the Digital Speech Standard file format (.dss) in their handheld audio recorders. In February 2007, Philips announced the The DSS Pro file format that offered improved audio quality.

All professional level recorders offer sufficient recording capacity which is determined by the size of the memory card. The use of additional memory cards provides essentially unlimited recording capacity. All professional recorders provide multiple folders permitting sophisticated file management. Authors occasionally store dictation in different file folders on the handheld unit. This organization is used to control which transcriptionist receives the dictation for transcription.

Summary

Only professional level recorders should be considered by doctors, lawyers and other executives. Professional level recorders offer advanced features required when authoring documents.

Professional Voice Recorder Features

- 1) Permit starting and stopping of recording without creating a new file;
- 2) Allow editing of existing recordings by either overwriting or inserting
- 3) Use a slide switch to facilitate the editing process
- 4) Support file management with multiple folders;
- 5) Connectivity that allows audio files to be transferred to a PC;
- 6) Provide software to transfer audio files to transcriptionists;
- 7) Noise canceling microphone to reduce background noise

Olympus ([DS-5000](#) , [DS-3400](#) and [DS-2400](#)),

Philips ([LFH-9600](#) , [LFH-9610](#),[LFH-9500](#) and [LFH-9370](#)) and

Grundig (Digta 420, [Digta 415](#),[Digta 410](#)

and Digta 405) offer professional level voice recorders.

CONCLUSIONS:

MOBILE HANDHELD DEVICES ARE INTENDED TO MAKE PHYSICIANS MORE EFFICIENT IN THEIR DAILY WORK, AND NOT COMPLETELY DEPENDENT ON THEM.

ALL THE INFORMATION AVAILABLE AT THE POINT OF TIME HENCE IT WILL REDUCE THE MEDICAL ERRORS TO AN CERTAIN EXTENT.

GADGETS ARE MADE SMALL AND LIGHT WEIGHT AND CONVENIENT TO CARRY, EASY TO USE AND MORE IMPORTANT EASY TO UPDATE.

IN US MEDICAL SCHOOLS PDA'S WILL BECOME AS POPULAR AS STETHOSCOPE.

ON THE WHOLE USE OF PDA'S IN WESTERN WORLD SPECIALLY INCREASED DUE TO ITS

*MOBILITY-[ON THE GO,24/7,SMALL,LIGHT]

*SIMPLICITY-[EASY TO USE AND UNDERSTANDING]

*VERSATILITY-[ABLE TO MEET VARIETY OF CHANGING NEEDS]

*FUNCTIONALITY [EXTENSIVE APPS]

EASY INTERCONNECTIVITY-[BEAM AND SYNC TO OTHER
USERS,DESKKTOP,NETWORK]

*ORGANIZATION-[COORDINATE AND CONSOLIDATES SCHEDULES AND TASK]

*LOW COST-[EXTREMELY COST EFFECTIVE RELATIVE TO OTHER FORMS OF
COMPUTER TECHNOLOGY].