DISTINCT TECHNIQUE IN MOBILE PHONES FOR USER FRIENDLY

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Abstract:- In many of the mobile applications, files are occupying more memory space. There are no in-built archives. Under this assumption, the goal is to develop a platform independent system that provides data compression utility in mobile phones and possibly by reducing the size of various kinds of files which help save memory space in the phone and enables a faster file transfer in turn saving time. In this abstract, I address the problem of memory space in mobile phones and also the need to develop a system that is based on the best software development practices of being distinct, effective and user friendly. It is an innovative idea in the field of mobile technology. The technology use to code should be J2ME as it is the first tool that combines the power of a large programming and the portability of a mobile phone.

Keywords – J2ME, Mobile Technology, Memory Space, Time.

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1. INTRODUCTION

The Cell Phones have become a part of our daily lives. They have evolved to such a point now, that they have more functions, than just making a call. Unlike personal computers, Mobile Phones do not have memory spaces in abundance. One of the most common problems faced by users is the limitation of memory available to them when using phones. Images, audio files and video files take up a lot of space, while data files take a little less; the user has to delete some of his important files to make space for new ones. The other problem is the amount of time taken to send & receive large files. It can be taken care of by compression. Thus if the file size were to be reduced it would take less time.

2. Software Solution for the problem statement "M-Archive"

It is a free file manager for cell phone series. It is capable and compatible to compress and decompress archives. The system is ideal for professional corporatists, hobbyist users, students or all other users of a mobile phone. Using **M-Archive** puts you ahead of the crowd when it comes to compression by consistently making smaller archives, this can be achieved very fast, saving disc space, transmission costs AND valuable working time. It makes it easy for you send files, compressed, via Bluetooth or GPRS. The technology used J2ME (ie. Java 2 Mobile Edition) is the first and only tool that combines the power of a large programming and the portability of a mobile phone to create a small and easy to use source code editor.

3. Study of Different Compression Algorithms

7-Zip is an open source file archive designed originally for Microsoft Windows, and later made available to other computer operating systems. 7-Zip operates primarily with the *7z archive format*, as well as being able to read several other archive formats. 7-Zip is used to create 7z format archives, with a .7z file extension. Each archive can contain multiple directories and files. As a *container* format, security or size reduction is achieved using a stacked combination of filters. These can consist of pre-processors,

compression algorithms and encryption filters. The core .7z compression stage uses a variety of algorithms, the most common of which are *Bzip2 and LZMA.*

Filzip supports seven different archive formats, allowing the user to add and extract files from the archives. These include ZIP, BH, CAB, JAR, LHA (LZH), TAR, and gzip. A handful of other formats are supported for extraction only, including ACE, ARC, ARJ, RAR, and ZOO. Files within most formats can be viewed without explicitly unpacking them, and can be removed or renamed within the archive. ZIP files may be spanned; that is, written to any number of files with a fixed maximum size so that they can be placed on removable media. The program has integration, and can create self-extracting executable archives for redistribution without licensing fees.

WinRAR is a shareware file archive and data compression utility developed by Eugene Roshal.. WinRAR supports support for RAR and ZIP archives, and unpacking of CAB, ARJ, LZH, TAR, GZ, ACE, UUE, BZ2, JAR, ISO, 7z and Z archives. It has the ability to create *self-extracting and multi-volume (split) archives*. Data redundancy is provided via *recovery records* and *recovery volumes*, even allowing reconstruction of damaged archives. Support is provided for advanced NTFS file system options and Unicode in file names. Optional archive encryption using *AES (Advanced Encryption Standard)* with a *128-bit key* can also be done.

WinZip natively uses the *PKZIP* format but also has various levels of support for other archive formats. It enables the creation, addition, extraction from ZIP archives. WinZip is the Configurable Microsoft Windows Shell integration. It *uses 128 and 256-bit key AES encryption*. It supports the bzip2 and PPMd compression algorithms and a special algorithm for audio files (based on WavPack), allowing smaller archives at the cost of a potential increase in compression and extraction times (especially when using PPMd). WinZip *does not support Unicode characters* in

RLE: Run-length encoding is a very simple form of lossless data compression in which runs of data (that is, sequences in which the same data value occurs in many consecutive data elements) are stored as a single data value and count, rather than as the original run. This is most useful on data that contains many such runs: for example, relatively simple graphic images such as icons, line drawings, and animations. The run-length code represents the original 67 characters in only 18. Of course, the actual format used for the storage of images is generally binary rather than ASCII characters like this, but the principle remains the same. Even binary data files can be compressed with this method; file format specifications often dictate repeated bytes in files as padding space. Common formats for run-length encoded data include *PackBits, PCX and ILBM.*

LZW: Lempel-Ziv-Welch is a universal lossless data compression algorithm. The algorithm is designed to be fast to implement but is not usually optimal because it performs only limited analysis of the data. The compressor algorithm builds a string translation table from the text being compressed and the code for the longest previously-encountered string is output and the extension character is used as the beginning of the next string. LZW compression provided a better compression ratio, in most applications, than any well-known method available up to that time. It became the first widely used universal data compression method on computers. Today, an implementation of the algorithm is contained within the popular *Adobe Acrobat software program*. LZW became very widely used after it became part of the *GIF* image format. It may also (optionally) be used in *TIFF* files.

Huffman Coding: In computer science and information theory, Huffman coding is an entropy encoding algorithm used for lossless data compression. Huffman coding uses a specific method for choosing the representation for each symbol, resulting in a prefix-free code that expresses the most common characters using shorter strings of bits than are used for less common source symbols. Huffman coding is equivalent to simple binary block encoding, e.g., ASCII coding. Huffman coding today is often used as a "back-end" to some other compression method. *DEFLATE*

(PKZIP's algorithm) and multimedia codecs such as *JPEG* and *MP3* have a front-end model and quantization followed by Huffman coding.

4. Deciding the Platform (OS)

Windows Mobile is a compact operating system combined with a suite of basic applications for mobile devices based on the *Microsoft Win32 API*. Devices that run Windows Mobile include Pocket PCs, Smartphones, Portable Media Centers, and on-board computers for certain automobiles. It is designed to be somewhat similar to desktop versions of Windows, feature-wise and aesthetically. Additionally, *third-party* software development is available for Windows Mobile. Windows Mobile runs on multiple hardware platforms including Pocket PCs, smartphones, Portable Media Center, and automobiles. These hardware platforms did not always exist from the inception of Windows Mobile. Windows Mobile 6 is meant to be similar in design to Windows Vista.

Palm OS (also known as Garnet OS) is an *embedded* operating system. Palm OS is designed for ease of use with a touch screen-based graphical user interface. It is provided with a suite of basic applications for personal information management. There are many successful applications that can be installed on a Palm OS device. As of August 2005, there are more than 20,000 *third-party* applications available for the Palm OS platform, which have various licensing types, including open-source, and various closed licensing schemes such as freeware, shareware, and traditional pay-up-front purchase.

Symbian OS is a *proprietary* operating system, designed for mobile devices, with associated libraries, user interface frameworks and reference implementations of common tools. Symbian OS was built to follow three design rules - the *integrity* and *security* of user data is paramount, user *time* must not be wasted, and all *resources* are scarce. Symbian OS has a *microkernel* architecture, which means that the minimum necessary is within the kernel to improve robustness, availability, and responsiveness.

The **S60 Platform** (formerly Series 60 User Interface) is a software platform for mobile phones that uses Symbian OS. The S60 software is a multivendor standard for smartphones that supports application development in *Java MIDP, C++, and Python*. An important feature of S60 phones is that they allow new applications to be installed after purchase.It supports *Java* (J2ME MIDP 2.0 commonly, but varies from phone to phone) applications and *Symbian C++* applications. Certain buttons are *standardized*, such as left and right select, Menu, Clear, and Input Settings.

5. Deciding the Technology

CarbideC++ is a software development tool for *C++* development on Symbian OS. Carbide is a new generation of mobile development tools from Nokia. More than just a new name, Carbide is a deliberate move to unify Nokia's mobile-development tools into a common framework. Carbide takes mobile development to a new level in terms of features and efficiency. Users now have one family for developing software for multiple platforms and multiple languages. Based on the open *Eclipse framework*, the Carbide offering can be extended with other *Eclipse plug-ins* and products. Currently it uses the same C++ compilers as *CodeWarrior* for production of emulator binaries. For target binaries it uses *GCC*, and supports *ARM RVCT* compilers. CarbideC++ generates appropriate make files rather than using the standard Symbian OS build tools. This has strong advantages in that it offers fast automatic rebuilds based on just the files which have changed.

AppForge MobileVB enables developers to use *Microsoft Visual Basic* and *Visual Studio* to write applications for *Pocket PC 2003* devices like the Hp iPaq and Dell Axim models. AppForge products and technology enable software developers to write mobile and wireless applications using the knowledge and resources they already have. AppForge's flagship product, MobileVB, provides Visual Studio developers the ability to write applications for more than 90% of the world's leading mobile and wireless devices including Palm OS, Pocket PC and Symbian devices.

The **J2ME** is a specification of a subset of the Java platform aimed at providing a certified collection of *Java APIs* for the development of software for small, resource-constrained devices. The **CLDC** (Connected Limited Device Configuration) contains a strict subset of the Java class libraries, and is the minimal needed for a Java virtual machine to operate. CLDC is basically used to classify myriad devices into a fixed configuration. When coupled with one or more profiles, the Connected Limited Device Configuration gives developers a solid Java platform for creating applications for consumer and embedded devices. *MIDP* (Mobile Information Device Profile) boasts *GUI API*, and *MIDP 2.0* includes a basic 2D gaming API. Applications written for this profile are called *MIDlets*. Almost all new cell phones come with a MIDP implementation.

6. Selection of Algorithm

Deflate Algorithm is a lossless data compression algorithm that uses a combination of the LZ77 algorithm and Huffman coding. **Lossless data compression** is a class of data compression algorithms that allows the exact original data to be reconstructed from the compressed data. This can be contrasted to lossy data compression, which does not allow the exact original data to be reconstructed from the compressed data. Lossless compression is used when it is important that the original and the decompressed data be identical, or when no assumption can be made on whether certain deviation is uncritical. **Deflation** is a means of compressing an octet sequence that combines the **LZ77** algorithm for marking common substrings and **Huffman coding** to take advantage of the different frequencies of occurrence of byte sequences in the file. **LZ77** algorithms achieve compression by replacing portions of the data with references to matching data that has already passed through both encoder and decoder. A match is encoded by a pair of numbers called a *length-distance pair*, which is equivalent to the statement "each of the next *length* characters is equal to the character exactly *distance* characters behind it in the uncompressed stream." The structure in which these data are held is called a *sliding window*, which is why LZ77 is sometimes called **Sliding window**

compression. **Huffman coding** uses a specific method for choosing the representation for each symbol, resulting in a prefix-free code (sometimes called "prefix codes") that expresses the most common characters using shorter strings of bits than are used for less common source symbols. The Deflation algorithm finds duplicated strings in the input data. The second occurrence of a string is replaced by a pointer to the previous string, in the form of a pair (distance, length). Distances are limited to 32K bytes, and lengths are limited to 258 bytes. When a string does not occur anywhere in the previous 32K bytes, it is emitted as a sequence of literal bytes.

7. Selection of technology

J2ME:

In computing, the Java Platform, Micro Edition or Java ME is a specification of a subset of the Java platform aimed at providing a certified collection of Java APIs for the development of software for small, resource-constrained devices such as cell phones, PDAs and set-top boxes. J2ME is aimed at machines with as little as 128KB of RAM and with processors a lot less powerful than those used on typical desktop and server machines. J2ME actually consists of a set of profiles. Each profile is defined for a particular type of device -- cell phones, PDAs, microwave ovens, etc. -- and consists of a minimum set of class libraries required for the particular type of device and a specification of a Java virtual machine required to support the device.J2ME has become a popular option for creating games for cell phones, as they can be emulated on a PC during the development stage and easily uploaded to the phone. This contrasts with the difficulty of developing, testing, and loading games for other special gaming platforms such as those made by Nintendo, Sony, Microsoft, and others, as expensive system-specific hardware and kits are required. Designed for cell phones, the Mobile Information Device Profile boasts GUI API, and MIDP 2.0 includes a basic 2D gaming API. Applications written for this profile are called MIDlets. Almost all new cell phones come with a MIDP implementation, and it is now the de facto standard for downloadable cell phone games.

IDE: The NetBeans IDE is an open-source integrated development environment written entirely in Java using the NetBeans Platform. NetBeans IDE supports development of all Java application types (J2SE, web, EJB and mobile applications) out of the box. Among other features are an Ant-based project system, version control and refactoring.

CONCLUSION

M-Archive software allows you to Compress and decompress files allowing you to store and retrieve data as and when required. It supports in saving memory space, better file transfer rate, user friendly and cost-Effectiveness. It supports compression in the following file format.   Text Files, Image Files,*(However, .jpeg* file type is originally compressed image file formats. When applied to compression they can still be condensed but to a minimal extent.) *Multi-media files and* Others like *sis, exe, jar, dat, bas* and such other recognized files.

REFERENCES

[1] J2ME, The Complete Reference by James Edward Keogh.
[2] Lossless Compression Handbook   by Khalid Sayood
[3] Data Compression: The Complete Reference by David Salomon
[4] NetBeans: The Definitive Guide by Tim Boudreau
[5] MIDP: File Connection API Developers Guide version 2.0; October 31st, 2006.