iWave's Smarter Medical Devices with Windows Embedded Platforms for a healthier tomorrow

Imagine your last visit to a hospital. There are chances that are you remember encountering highly technical medical equipment — whether it was a patient monitoring system, a powerful MRI, an X-ray machine or even the computer system the technician or a nurse used to log a patient data and history. You may not realize that many medical devices are using the Windows Embedded platforms to help bring effective technology to not only in hospitals but also to clinics and homes around the world.

Why the Operating system is critical for Medical systems?

In recent years, there have been major efforts to streamline health care delivery through technological innovation. Such innovations include replacing paper records with electronic displays and introducing into the clinical environment, the devices that are smarter and more suitable for specific use cases.

The result has been two major areas of innovation in medical devices:

1. **Smarter devices:** Most monitoring and diagnostic devices appearing today are software driven. Device developers expend considerable effort building intelligence intodevices so that they do more than simply display output. Devices process readings and present data in ways that are more useful to health care providers making medical decisions.

   The Operating System within the device,provide the software architecture that enables the developers to optimize devices for their intended users and use scenarios. Energy efficiency is also very critical for small handheld medical equipment. Also the support for ARM architecture would make the devices more efficient and hence portable.

2. **Data integration:** A key driver in medical device design is the role played by electronics display, generally known as EMR(Electronic Medical records). These EMRs can be considered as replacement for traditional paper based patient records. Device integration with EMR systems iscritically important in the clinical setting. EMRs will enable the doctors/nurses/lab technician to obtain the required data at the touch of a bottom, hence increasing their overall efficiency.

Windows Embedded platforms (CE 6.0 and Embedded Compact 7):

Windows Embedded CE 6.0 R3 and Embedded Compact 7 are the latest in series of highly componentized, hard real-time operating system for small embedded devices. These platforms are 32-bit operating system that provides device manufacturers like iWave systems, the tools and innovative technologies to create consumer, enterprise and medical devices differentiated by an immersive user interface, a rich browsing experience, and a unique connection to Windows PCs, servers, and devices. These supports all four major CPU architectures namely ARM, MIPS, *SH4, and x86.

Windows Embedded platforms offers core operating services to support demanding real-time systemarchitecture required for medical systems. Windows CE can be used for over a range of devices ranging from handheld diagnosis machines to critical patient monitoring devices which needs real-time patient data capture and analysis round the clock.

Using the Windows Embedded CE development tool called Platform Builder (a plugin into Visual Studio 2005 development IDE),we can create a customized version of the OS, called an "image," that can be downloaded into the device. If the hardware is not available yet, we can run the image and debug the applications on the included ARM emulator which emulates the target device. That allows the application developers and the system software developers to work in parallel on the same project reducing the overall development time.

With broad wireless support for personal area networks (WPAN), local area networks (WLAN), wide area networks (WWAN)—including Bluetooth and 802.11—, and cellular networks (GSM/GPRS, CDMA), the devices developed on Windows Embedded based platform can stay connected anywhere, anytime. Hence these features are very important when the patient monitoring need to be done remotely by the doctor or physician through the device.

iWave Systems in Windows Embedded Platforms

1. Worked extensively from Windows CE 3.0 to latest Windows Embedded Compact 7 (Released in 2011).
2. Accomplished numerous critical project involving H/W board design, FPGA and WinCE BSP/Application development on iMX and Atom series of processors.

Achievements:

1. Microsoft Silver Partner in Windows Embedded, advantage of early access to latest releases of various windows embedded platforms.
2. First in industry to port WinCE 6.0 R3 on Freescale's i.MX27 Application processor.
3. Ported Windows Embedded Compact 7 successfully on Freescale's iMX515 and iMX53x processor platforms.
4. Delivered Silverlight based rich GUI solution to one of the esteemed customers

Projects based on Windows embedded platforms:

1. **Rail tracking system**: A critical real-time application to check the quality of railway tracks, developed on WinCE 6.0 R2 iMx27 platform. Board Design, BSP and application development was done in-house.
2. **Patient Monitoring system:** A real-time medical equipment developed on iMX27 Processor and FPGA for patient data capture and analysis, with WinCE 6.0 BSP, a VC++ front end application and Silverlight for rich GUI experience with touch user interface.
3. **Industrial HMI:** Web enabled handheld remote monitoring system for M2M communication developed on WinCE 6.0 R2 with iMX 51 platform.
4. **HMI for Infusion pump:** A medical drug infusion pumping machine developed on iMX27 with WinCE 6.0.
5. **Rugged PDA:**A WinCE 5.0 based GPS equipped Rugged PDA developed for Indian defence.Compliant with MIL-STD-810F& MIL 461E standards for EMI/Environmental / Durability for soldier tracking.
6. **CarPC:**A complete In-vehicle Infotainment solution in the form of a headrest PC based on WES2009/WinXP, with Wi-Fi, GPS and BT support enabled with Touch user interface.

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