

PhotoFrame based Educational Deliveries

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A suggestion was made in our earlier 'Smart Tips' that educational Text, Audio, Video material can be distributed through pen drives that can be viewed through Digital Photo Frames. This was suggested as a cheaper alternative to access the educational material that is already made available to the student on the Internet public domain. Many Educational media supports provided on public domain call for Broad Band delivery access and right computer systems to view them at students' end. The servers that are delivering this material have to support the required heavy Band Widths as per students' demand.

Indian Educational Media and the Global approaches

In continuation with international projects OLPC - One Laptop per Child, with the price tag of \$200, with a dream price ranges around \$100, some experts in India tried to create a product with Laptop features aiming at an unimaginably low price. Of course India has a reputation for creating ultra-cheap technologies, like Maruti, Tata Nano, the world's cheapest car at Rs100,000 (US\$ 2000)., likewise the country may create a cheaper computing solutions, one day.

Globally attempts are being made to flood the market with cheaper Laptops, Mobile phones with Notebook like features, and recently Digital Photo Frame based networking.

IBC2008 CONFERENCE, Amsterdam, Netherlands RMI Corporation, a leading provider of High Performance Processors for Communication and Media, announced a complete product solution for Home Media Players (HMP), extending new features and capabilities to the Digital Photo Frame market. RMI Corporation provides High-Performance Super System-on-a-Chip Processor solutions. The RMI's turnkey HMP application solution drives advanced product capabilities such as video streaming, wireless connectivity, increased on-demand content, home connectivity and enhancing the overall consumer experience. These solutions will have a price tag much higher than the planned cheaper solutions to reach out education on a mass scale.

Meanwhile there is a Google's operating system published known as Android, an open source OS, that can be used in mobile telephones and in notebooks. There is a loud thinking, why not into digital Photo Frames? Fujitsu and Japan's Macnica have teamed up on what they're calling a "Software Platform for Home Network Digital Photo Frames" based on Google's Android. Android based digital photo frames can be made to enhance the features to home networking, touch screens and some nifty photo processing.

All are general purpose usage not exactly aiming at Educational supports.

Old Laptops to Photo Frames

A study has been made to look at the work of hobbyists. Many tried as a hobby to convert old notebooks into digital photo frames. These Photo Frames are normally built to call

pictures of a disk, hard drive, or flickr account. It can be built using standard web tools (XHTML/CSS/Javascript/PHP), with that one can call pictures from servers, and the display modes can be fully controlled and audited. A powerful web interface can make media uploading to the frame easy, pretty straightforward and can be automated.

The Research Project

A research project has been taken up to produce Educational Photo frame with digital photo frame features using cheaper development motherboards, with low power requirements and with onboard processors. The objective is to bring the price as low as possible with features that can be easily realised with minimum training. Free open source operating systems are studied to work out further price reductions.

Operating system like Damn Small Linux has a nearly complete desktop, and a tiny core of command line tools. All applications in DML are chosen with the best balance of functionality, size and speed. Damn Small also has the ability to act as an SSH/FTP/HTTPD server right off of a pen drive, with fully functional desktop, and many GUI administration tools which are fast yet still easy to use.

What does DSL have?

XMMS (MP3, CD Music, and MPEG), FTP client, Dillo web browser, Netrik web browser, FireFox, spreadsheet, Sylpheed email, spellcheck (US English), a word-processor (Ted), three editors (Beaver, Vim, and Nano [Pico clone]), graphics editing and viewing (Xpaint, and xzgv), Xpdf (PDF Viewer), emelfm (file manager), Naim (AIM, ICQ, IRC), VNCviewer, Rdesktop, SSH/SCP server and client, DHCP client, PPP, PPPoE (ADSL), a web server, calculator, generic and GhostScript printer support, NFS, Fluxbox and JWM window managers, games, system monitoring apps, a host of command line tools, USB support, and pcmcia support, some wireless support.

DSL can be tailored for the EduFrame usage.

A team is step up to experiment with all available flavours of UNIX and select the one with following features:

- 1.Small in size to work with 1 or 2 GB pen Drive that can be integrated to the motherboards in future
- 2.Supports for wi-Fi and media streaming
- 3.Web interfaces
- 4.Supports for remote hardware handling

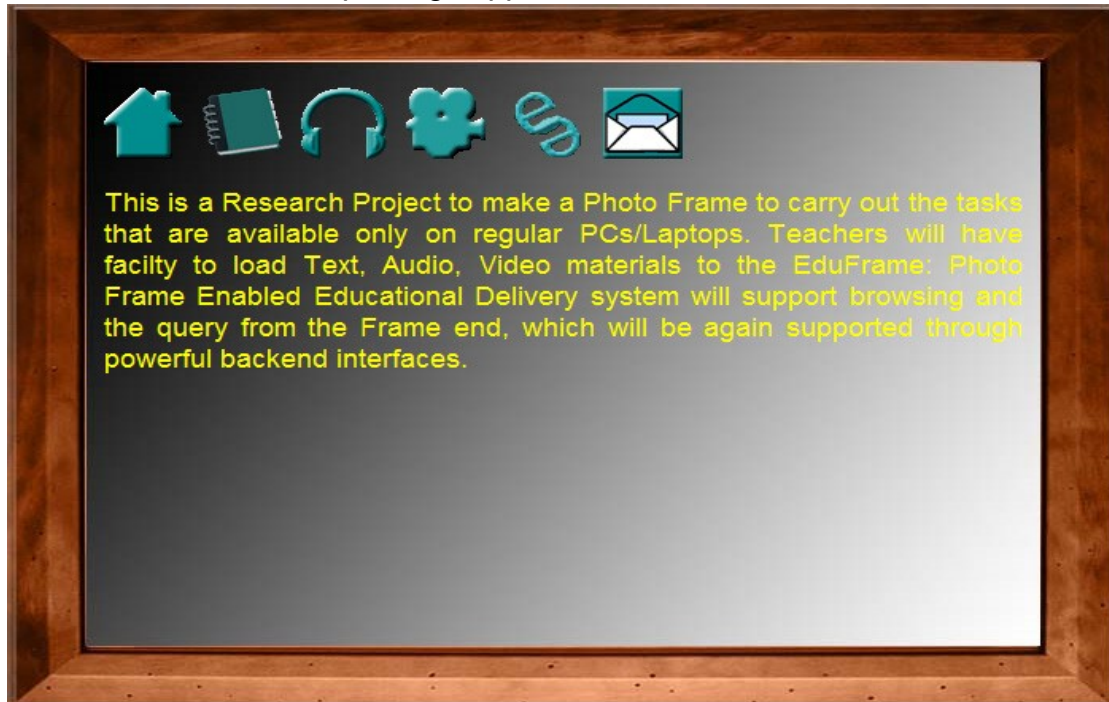
All supports should work on a cheap mother board that has no fans, low power consumption and built in Multimedia playing supports, Wifi, and other interfaces essential for EduFrame usage.

Along with these experiments an online support as front-end, and upload facilities as back-end is also attempted.

Suggested EduFrame System

The EduFrame will have three main features

- 1.Wi-Fi connectivity with internet access supports
- 2.Text, Audio, Video streaming supports
- 3.Document creation and posting supports



Front-end Main Screen

The system will have no hard disk; it may boot through internal EPROMs, or through Pen Drive, will use an appropriate open source operating system, to keep the price low.

The Operating system will have driving supports to fetch Intended Educational Material from predesignated sites and group them by Text, Audio, Video and useful links and display them on the EduPhotoFrames. The users can select them with remote devices and play them on the photo frame.

The project is in viewed in four phases:

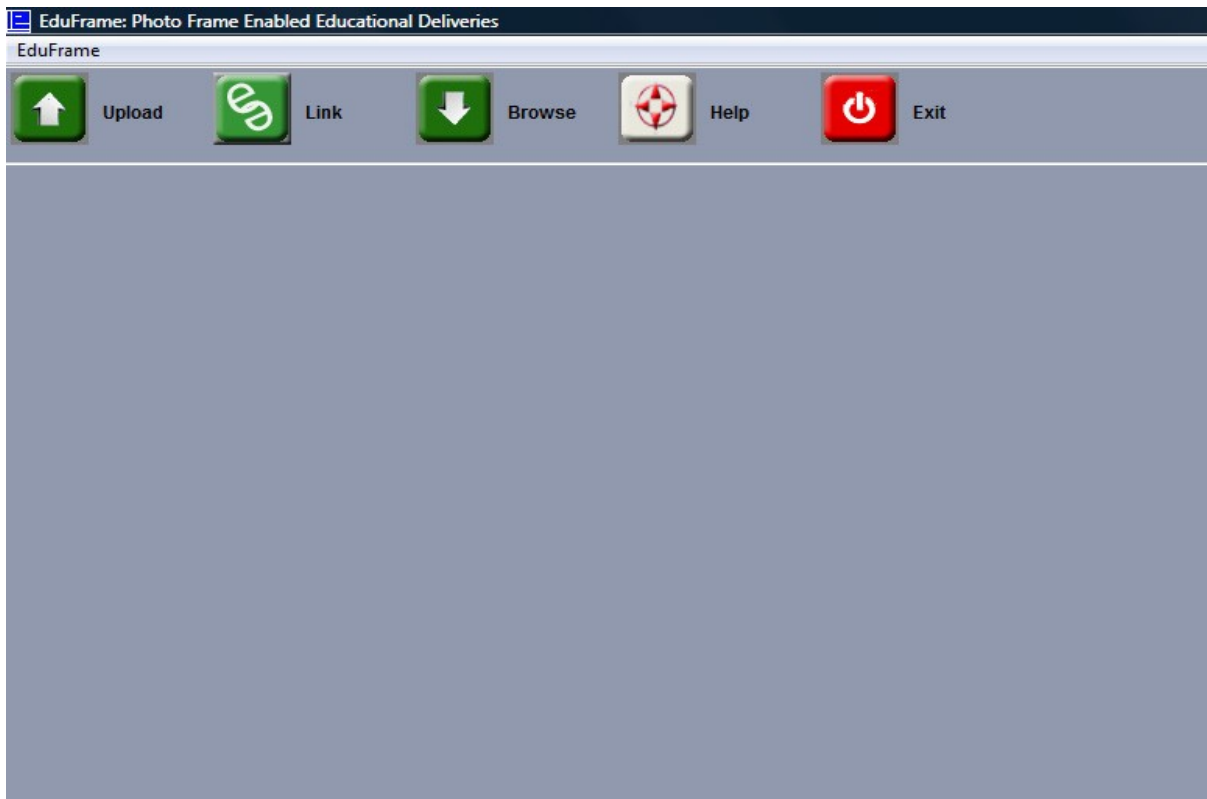
- 1.Hardware design and creation of a demo system
- 2.Operating system and Photo Frame interface development
- 3.Front-end for Net based Educational material viewing
- 4.Back-end for Educational material uploading

To start with the required software systems were developed using Laptops, and testing them with very small sizes of UNIX like operating systems on pen drives

They were tested with systems without hard disks, and with small 7 inch LCD screens. Remote keyboard and remote mouse supports are provided for Lesson selections.

The Back-end

A system known as EduFrame/BE has been developed again using open source software known as HMG MINIGUI. The EduFrame/BE can be downloaded from <http://cemca.org/eduframe>.



The user can upload Educational material optimised by EASYNOW technology on to the Internet streamer site.

The uploaded Educational Media components will be analysed automatically and database of deliverables will be created on the server by EduFrame/FE, Web-based software working on the experimental server.

The screenshot shows a window titled "MedLib Share Support" with a sub-header "EduFrame Upload Support" in red. The form contains the following fields and buttons:

- Upload File: A text input field with a "Get File" button to its right.
- Organisation Name: A text input field.
- Link Text on the Net: A text input field.
- Name of the User(Full): A text input field.
- E-Mail Address: A text input field.
- Source: A text input field.
- User Name(Entry): A text input field.
- Password: A text input field.
- Date of Upload: A text input field containing the value "09/08/2009".
- Remarks: A text input field.
- Buttons: A red "DownLoad" button (underlined) and a grey "Upload" button.

The users (Teachers) can select and upload Educational material on to the net database collections by using the UPLOAD facility of the EduFrame/FE.

The users have to provide mainly

- 1.The File to be uploaded
- 2.The Link Text

For the administrative supports other details are collected.

The system uploads the Educational material files in the form of PDF (Text), mp3 (Audio), or .WMV (Video), the corresponding reference text also uploaded.

Once uploaded, the EduPhotoframe/HW – the hardware will automatically pick them up for viewing.

A part from the TEXT, AUDIO and VIDEO files the teachers can also upload interesting LINKS, by providing the URLs, and the corresponding LINK descriptions. This may be from other sources.

The screenshot shows a web browser window titled "MedLib Share Support". The main heading is "EduFrame Link Support" in red. Below the heading is a form with the following fields:

- Link URL
- Link Text on the Net
- Organisation Name
- Name of the User(Full)
- E-Mail Address
- Source
- User Name(Entry)
- Password
- Date of Upload (pre-filled with 09/08/2009)
- Remarks

At the bottom left, there is a red "Download" link. At the bottom right, there is an "Upload" button.

The Front-End: EduFrame /FE

The front-end supports are provided on the net in terms of server programming. The Main menu is already shown as Front-end Main Menu.

The front-end system has five main supports viz.

1. Text Delivery
2. Audio Delivery
3. Video Delivery
4. Link Delivery
5. Query Writer

These can be viewed through the Viewer link at <http://cemca.org/Eduframe/>

Media formats supported

The text deliveries can be carried out using PDF formats, Audio deliveries through mp3 and Video deliveries through WMV formats. Links can be the URLs which are directly linked by the system.

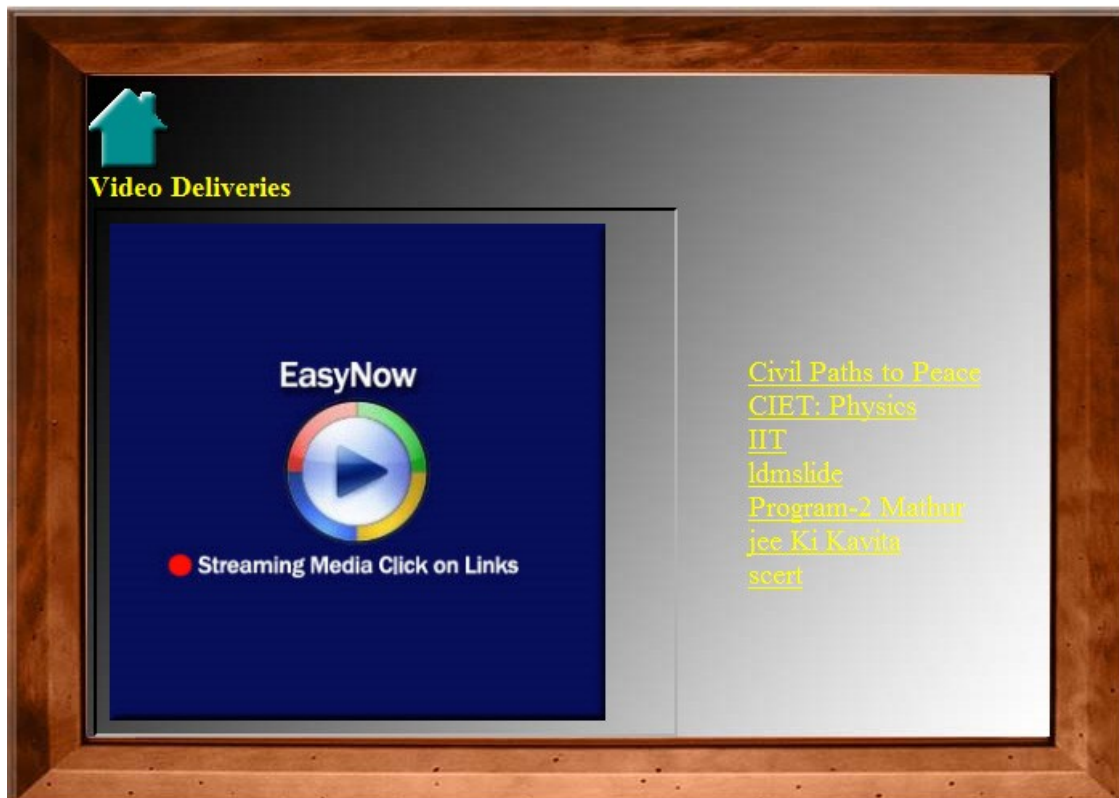
Audio Deliveries

Audio deliveries are made available, supported by YAHOO players, in the form individual clickable links as well as a PLAYLIST.



The Video Deliveries

Educational deliveries in Video form DVD (VOB), mpeg, Flash or any other formats are all converted into WMV forms streamable at 128 Kbs and loaded on to the system using the back-end support. Free Open source software is used for conversions.



One hour streaming files are of size 50 Mega bytes. The server EduFrame/FE supports display the uploaded Videos and can be selected through Frame Menu supports on EduFrame/HW.

Conclusion

The research experiments are in final stages of completion. Those who are interested may download the software provided for uploading and try out the Educational deliveries.

“ It's not computer literacy that we should be working on, but sort of human-literacy.
Computers have to become human-literate.”

~Nicholas P. Negroponte

Visit: <http://cemca.org/EduFrame/> for live Demos