Redistribution of Paid Channels Freely by Modifying Live Video

Prem Shanker Yadav
BBDNITM,
Department of Information Technology, Lucknow, India
Email:engg.prem@gmail.com

Manuj Darbari
BBDNITM,
Department of Information Technology, Lucknow, India
Email:manujuma@gmail.com

Abstract—**In digital television (DTV) broadcasting, service providers charge subscribing fee by scrambling the program with conditional access system as well as control the illegal receiving the charged program. If with any trick or method any local cable operator distributed a number of paid channels illegibly, it will result greatly on revenue of the broadcasters and related parties. In this paper, we describe a simple method for digitally detecting and mapping a number-strip flashing on screen in a video with that of another number-strip. Our work focuses on the illumination aspect of detection and replacement a part of video, that provide to modify a video and that further allows to redistribute of paid channels freely.**

Index Terms—**conditional access system, Ulead visual studio 7.0, opencv, finger print.**

I. Introduction

Digital content protection has grown into a huge issue over the past 20 years. As the ability to make and distribute perfect copies of digital contents becomes ubiquitous and cheap, content owners fear the widespread dissemination of their copyrighted materials over the internet, particularly over peer -to-peer systems that have proven hard to shut down. The advent of digital television (DTV) offers yet another benefit of the digital information age, and also threatens to open other means of digital infringement if user can freely capture and distribute broadcast TV shows and movies.

Programs broadcasted is captured from satellite through antenna by MSO (multi service operator) and again transmitted to LCO (local cable operator). Local cable operator further provides channels to the home users through cable, set top box.

In this paper our works is to track a number strip and then map it with another number strip in a live video. In other way, problem is to modify a live video. This modification results redistribution of paid channels as free. So it is a kind of an attack or piracy.

Manuscript received May 30, 2010; accepted July 26, 2010.

In section 1 introduction of problem is given. Section 2 describes about the related work of paper. In section 3 and 4 we discussed about the Proposed Work and Result. Conclusion is given in section 5.

II. Related Work

We can easily understand that how broadcasting signals are being sent with the help of CAS model [11]. In CAS, some program information is scrambled with control words to prevent illegitimate user from receiving normally [5]. The authorized subscribers can cooperation of the smart card and STB (set top box). The structure of conditional access system is shown as in the Fig. 1

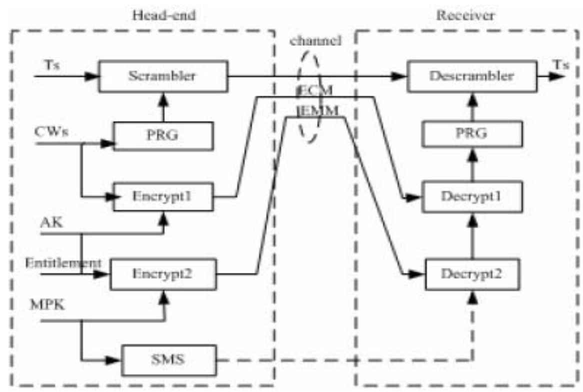


Figure 1. The Structure of Conditional Access System

The complete key management system is represented in Fig. 2. The audio and video are scrambled using a cycling control word (CW). Every fixed period (e.g. 10 seconds) an ECM (Entitlement Control Message) is transmitted together with this scrambled signal. These ECM's contain the control words encrypted with the service keys SK, which must be present in the descrambler box. The service keys are less frequently updated by EMM's (Entitlement Management Message), for example once a month. The service keys are encrypted with one or more individual unique keys,

doi:10.4304/jait.1.4.219-224

which are safely stored inside the smart card or descrambler box. Some attacks on the VC (video cipher) are, marketable fix, cloning etc.

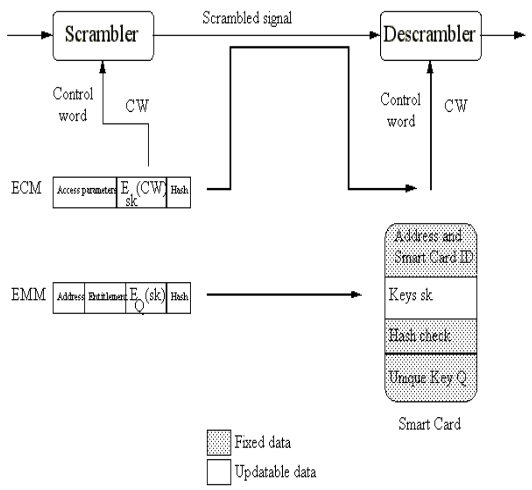


Figure 2. Key Management in a Pay TV system.

Since our work is combination of capturing the number strip, detecting and tracking finger print strip and mapping a new strip over the captured strip. Now we are discussing all these areas.

A. Capturing

Capturing the part of video is very important phase and it should be handled very-very carefully. Whatever we will use, Camera, Ulead visual studio 7.0 and any other hardware or software, should give fine and accurate result. We have sufficient techniques/methods to images processing using camera [4], [20]. We have also a lot of photo/image editing tools [1], [2], [3]. Ulead visual studio 7.0, software gives very effective result. Accuracy also depends on the system's configuration connected just next to set-top box.

Capturing a frame from a video sequence: OpenCV [12] is very affective tool in capturing images and also deal cery well with the video sequences.

1. OpenCV supports capturing images from a camera or a video file (AVI)
2. Initializing capture from a camera
3. CvCapture*capture= cvCaptureFromCAM(0); // capture from video device #0
4. Initializing capture from a file:
5. CvCapture*capture=cvCaptureFromAVI("infile.avi");
6. Capturing a frame:
7. IplImage* img = 0;
8. if(!cvGrabFrame(capture)){//capture a frame printf("Could not grab a frame\n\7");
9. exit(0);
10. Img=cvRetrieveFrame (capture); //retrieve the captured frame

To obtain images from several cameras simultaneously, first grab an image from each camera. Retrieve the captured images after the grabbing is complete.

1. Releasing the capture source:
2. cvReleaseCapture(&capture);

B. Detection/Tracking

There are many detection techniques are proposed [6]. One, the best of them, Edge combination approach is described as

Edge Detection: The first step is to detect edges in both the original image and its corresponding disparity/depth map. We use an implementation of Canny's edge detector provided by Matlab (version 6.5.1), which we modified to extract edges from color images. Also, for every edge pixel we gather information about the orientation of the corresponding edge at this location.

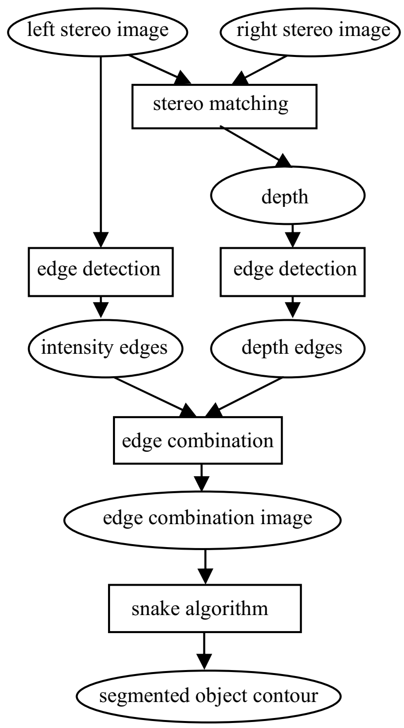


Figure 3. Overview of processing chain.

Edge Search: The original edge image (A) and the disparity edge image (B) are input to the Edge Combination procedure. For each edge pixel in A, we determine whether a corresponding edge pixel with a similar orientation can be found in B. We use a square search area with typical sizes between 4 and 12 pixels in one direction. To define similarity in edge orientation we usually employ a tolerance angle between 5° and 20°. We record every edge pixel in A that was found to have a corresponding edge pixel in B in order to include it in the edge combination image. In this way, we build up a "basic" edge combination image C.

Edge Linking: Mostly because of imperfect disparity information, some pixels in the comparing process will not match, leaving a gap in the reconstructed contour line. In order to close minor gaps of this type, we implemented an edge linking procedure which repairs broken edges in C, if a continuous edge in A indicates that the edge segments should be connected.

C. Mapping

Several registration techniques of 2D and a 3D geometric model have been proposed so far. The first approach finds the point correspondences between the image and the model by using fiducially landmarks. Then the standard camera calibration techniques are applied to get the camera parameters from these correspondences [14, 17].The disadvantage of this method is that the marks destroy the texture. Instead of directly searching for 3D-2D point pairs, some registration techniques use reflectance images. Y.-Y Chung also suggests some important Video matting of complex scenes [19]. Cross-parameterization [15] and inter-surface mapping [16] propose a similar mapping approach of mapping between two surfaces, instead of between a surface and texture space, while Zhou et al. suggest a similar approach between a surface and multiple texture images.

III. Proposed Work

Our work is to capture a selected part from a live video and map another same sized image over that. Feature-based texture mapping [18] uses feature extracted and then mapping is performed but it is not performing well in live videos. Our Scheme is based on the Pixel to Pixel mapping.

The pixel is the smallest addressable screen element; it is the smallest unit of picture that can be controlled. Each pixel has its own address. The address of a pixel corresponds to its coordinates. Pixels are normally arranged in a two-dimensional grid, and are often represented using dots or squares. Each pixel is a sample of an original image; more samples typically provide more accurate representations of the original. The intensity of each pixel is variable. In color image systems, a color is typically represented by three or four component intensities such as red, green, and blue, or cyan, magenta, yellow, and black.

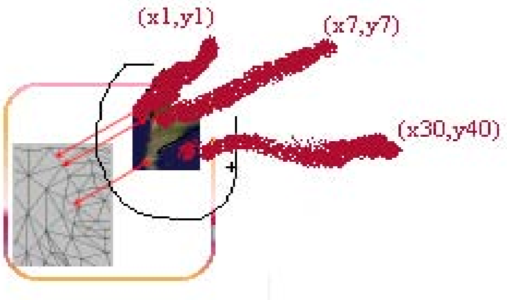


Figure 4. Pixel Representation of an image

As Fig. 4 shows, every pixel has a value corresponding to display video and according to their color (RGB). Every location on one of the rows and one of the columns is color sample, which is called a pixel. If the image size were say 1000x750 pixels (written as width x height by convention), then there would be 1000 columns and 750 rows of data values, or 1000x750 = 750,000 pixels total. For 24 bit color, each pixel's data contains three 8-bit RGB byte values, or 750,000 x 3 = 2,250,000 bytes. Every pixel is the same size, because a pixel is simply the color of the area between the grid lines. That area will be colored by the one corresponding RGB data value. The image data is just a series of RGB numeric color values in a grid of rows and columns. The composite of the three RGB values creates the final color for that one pixel area. In the RGB system, we know Red and Green make Yellow. So, (255, 255, 0) means Red and Green, each fully saturated (255 is as bright as 8 bits can be), with no Blue (zero), with the resulting color being Yellow.

Black is a RGB value of (0, 0, 0) and White is (255, 255, 255). Gray is interesting too, because it has the property of having equal RGB values. So (220, 220, 220) is a light gray (near white), and (40, 40, 40) is a dark gray (near black). Gray has no unbalanced color cast. Now focusing on one of the main concern, pixel mapping.

Pixel to Pixel mapping can be dividing in three ways.

1. Partial mapping
2. Exact mapping
3. Neighboring mapping.

Partial mapping provides to select randomly some boundary level pixels not the exact boundary pixels.

In partial mapping pixels are not overlapped with the same pixel value while same sized and valued pixels are mapped to same valued pixel to complete map the selected area in exact mapping. In neighboring mapping, we concentrate on the neighboring pixels (outside and inside) of the original pixel boundary. We used Exact and Neighboring Mapping to generate the perfect result and OpenCV provided platform to construct this mapping. We created an algorithm to achieve our goal. Algorithm is described in steps.

A. Capturing the flashing strip

Cut the flashed number strip from video using some pixel cutting software like Ulead Visual Studio 7.0 and save it in bmp file format with name 6.bmp because this file is used in project with name 6.bmp.Now keep this bmp/jpg in the same path of software's Executable file. This cutting part has their pixels and they have specific coordinate values. As any display screen is arrangement of Pixels. Fig. 5 presenting a display screen, $P(x_1,y_1)$ is first pixel, $P(x_1,y_2)$ is second, $P(x_n,y_n)$ is last pixel in the display screen.

$P(x_1,y_1)$	$P(x_1,y_2)$	..	$P(x_1,y_n)$
$P(x_2,y_1)$	$P(x_2,y_2)$	..	$P(x_2,y_n)$
:	:	:	:
:	:	:	:
$P(x_n,y_1)$	$P(x_n,y_2)$	..	$P(x_n,y_n)$

Figure.5 Coordinate values of pixels (P) into a display screen

Captured strip can be written by the function F as written in "Eq. (1)". Where $P(X, Y)$ represents coordinates of pixel and k, j carries from 1 to n and representing rows and columns respectively. Here $\boldsymbol{f}$ is Integration function.

$$F = \boldsymbol{f}_k (\boldsymbol{f}j \, [P\,(X_k\,,\, Y_j)]\,). \quad (1)$$

B. *Evaluate coordinate values of pixels*

After capturing strip, now we calculate the each pixel's coordinate value and their intensities. From the captured strip, we calculate their pixel coordinate values and color intensities. In other words we can say that we create the templates of the captured strip. To achieve this task we designed the code using OpenCV library.

```
Void LiveProcess (IplImage *image)
CvSize imgSize;
CvFont font;
CvInitFont (&font, 0, 0.22f, 0.28f, 0, 0);
        IplImage* A = image;
        IplImage* B = image;
        imgSize.width = A->width;
        imgSize.height = A->height;
E = cvCreateImage (imgSize, IPL_DEPTH_8U, 1);
CvCvtColor (A, E, CV_BGR2GRAY);
        imgSize.width = B->width;
        imgSize.height = B->height;
F = cvCreateImage (imgSize, IPL_DEPTH_8U, 1);
CvCvtColor (B, F, CV_BGR2GRAY);
```

C. *Generate a dummy strip/number*

We create a dummy rectangle strip using evaluated coordinate values and intensities of pixels from the captured strip. We set the code to generate dummy strip, given as

```
CvRectangle (A, left_top, cvPoint (left_top.x +
F->width, left_top.y + F->height), CV_RGB (color1,
color2, color3),-1);
```

and we write any number on this designed dummy strip using the created code

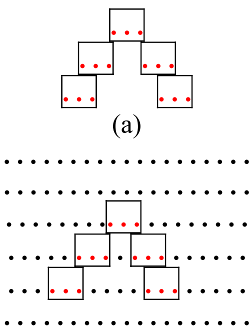
```
CvPutText (A, dnum, left_top, &font, CV_RGB
(numcolor1, numcolor2, numcolor3));
```

D. *Search position of flashing number*

A live video is a continuous sequence of frames of images. We search the position of the pixels of flashing number in frame with the help of templates developed in previous step. We find this result by creating the code given as:

```
G = cvCreateImage (cvSize (E->width-F->width+1,
E->height - F->height+1), IPL_DEPTH_32F, 1);
CvMatchTemplate(E,F,G,CV_TM_CCOEFF_NORMED);
```

We can easily see this in Fig. 6. Pixels are searched according to their coordinate and intensity values.



(a)

(b)

Figure.6 a) original image and b) same pixels a display screen

E. *Mapping*

We have almost completed the task. Now, the work is, only display the dummy strip over the position searched in previous step and write any number on this strip.

Now we can say, Final result is modified video. This modified video is then amplifies and distributed to home users. Dummy number is flashing in the place of fingerprint number over the display screen. Since fingerprint number is modified, diagnosis of the fingerprint number will not be correct.

On the basis of this algorithm we created a model, representing all the steps very clearly.

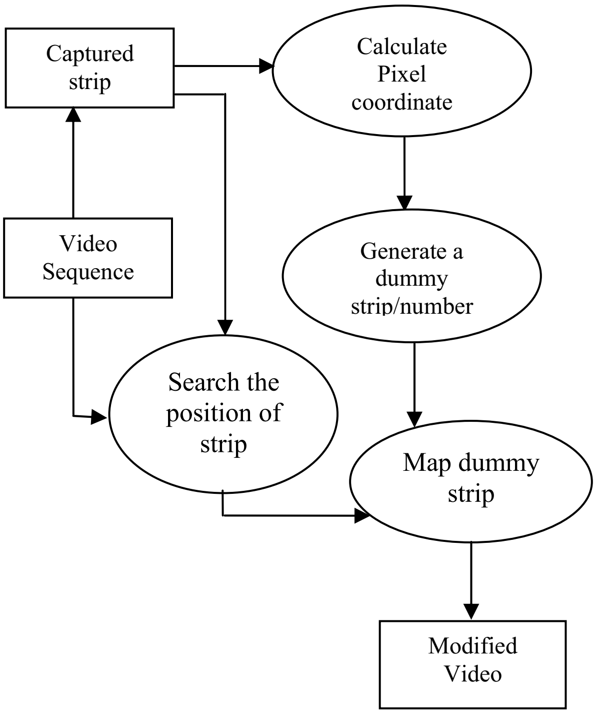


Figure7. Model for modifying live video

IV. Result

A number is flashing randomly at different places of the display screen as in Fig. 8. This number is called Fingerprint number used to restrict illegal distribution of channels. Our aim is to modify this number with another number.

Figure 8. Fingerprint number in a video clip.

We have achieved result by developing software tool with the help of .NET and OpenCV library. We need to install OpenCV library that will help to perform specific functions such as search, evaluate and mapping the pixels. We will first discuss the software user interface and then working of the software.

A. Software Interface

Video signals, from the SET-TOP box are inputted to the computer system, not to Television (TV). These video signals are then opened in the software.

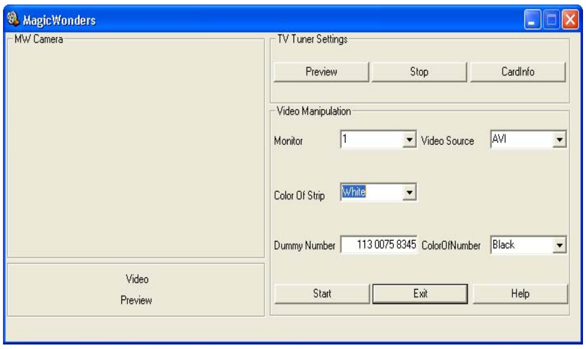


Figure 9. Software interface page

In Fig. 10 encircled part shows the signals coming from set-top box to system are controlled by TV Tuner Settings. CardInfo shows the list of channels coming on TV Tuner card and we can easily select any desired channel. Preview display the selected video in the section of screen of software. Encircled stop button is used to close the TV Tuner functioning.

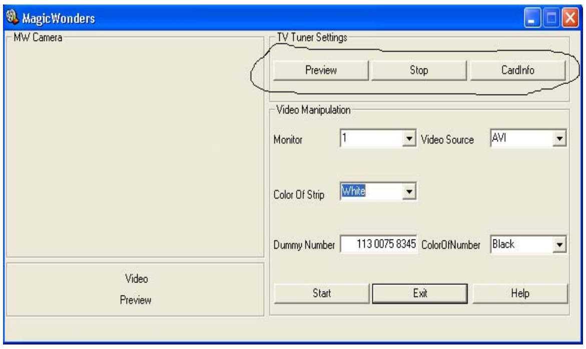


Figure 10. Front panel controls.

We open any program sequence in the software's screen as shown in Fig. 11. We can change the color of strip, color of the number and can write the desired dummy number by just interacting to the tool's interface.

B. Working of software

Working of software is very simple. We first open the video program or clip in the software screen by selecting the choice in the video source option button and finally clicked on start button.

In Fig. 11, we are seeing, a number is flashing in the video sequence. Basically this is a strip and number is written over it. Number is 113 0075 8345 and black in color. Color of strip is white. Now we select the strip color, white, dummy number, 113 KLBUT 8345 and color of the number, RED. Clicked on the start button.

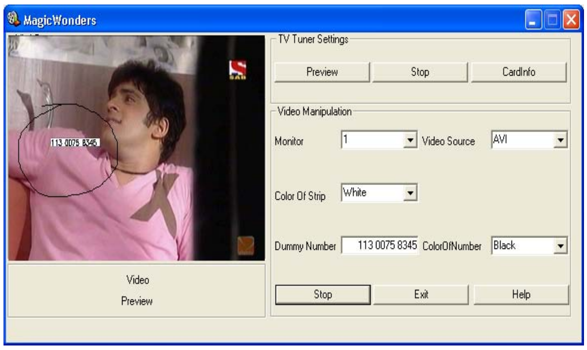


Figure 11. Capturing the strip.

We get the modified result shown in Fig. 12. Original number is mapped with the dummy number and this dummy number will flashing on the screen in the place of original number till the program's end.

Figure 12. Snap shot of mapping of dummy number.

This changed signal is amplified and transferred to the home users. If broadcaster or MSO is checking for any distribution piracy, they will trace the number that will be actually modified. Result will be incorrect checking. Since this number checking is to prevent illegal distribution, incorrect checking of the fingerprint number will allow local cable operators to redistribute channels freely.

IV. Conclusion

Our system provides a flexible, practical tool for distributing paid channels freely. Broadcaster or MSO send command to flash a number to check at which Set-top box signal is illegally distributed. As number is modified, actual point of attack is not recognized.

Project's performance heavily depends on the system used to capture and modify video. Speed of the system is very crucial point to get accurate result i.e. use RAM of the system as large as possible.

Cutting of the pixels of the flashing strip through Ulead Visual Studio 7.0 or by any other software pays great attention to achieve accurate target. A small mistake may create some zigzag between flashed and dummy number on the video screen. A very big limitation of the project is that if any Broadcaster/MSO uses a transparent strip of number then this software will not work correctly. But to flash a transparent strip is not an easy task because of their cost and complexity.

So for as at medium scale level this software is very accurate and affective.

ACKNOWLEDGMENT

First and foremost, I would especially like to thank all the members of DEN, Lucknow (Multi Service Operator) for their unaccountable guidance and valuable time to complete my research work.

My college management deserves a thank for providing a peaceful and free environment and for giving access to IEEE and other paid research sites.

REFERENCES

[1] Adobe Photoshop 7.0. http://www.adobe.com, Jan. 2010.
[2] Adobe Premiere Pro, http://www.adobe.com, Jan. 2010.
[3] Apple Final Cut Pro4.0.http://www.apple.com/finalcutpro/.
[4] Andrew J. Davison, "Real-Time simultaneous Localization and Mapping with a single camera".
[5] B.Macq and J.Quisquater, Cryptology for digital TV broadcasting. Proceedings of the IEEE, Vol 83,
[6] D. Markovic, and M. Gelautz, Experimental Combination of Intensity and Stereo Edges for Improved Snake Segmentation.
[7] E. P. Bennett and L. McMillan. Proscenium: A framework for Spatio-Temporal video editing.MM'03, pp 2-8, November 2003.
[8] F.Kamperman and B.V.Rijinsoever, "Conditional Access system Interoperability through software downloading", IEEE Trans.On Consumer Electrinics, Vol 47, No.1, pp.47-53, 2001.
[9] D. Markovic, and M. Gelautz, Experimental Combination of Intensity and Stereo Edges for Improved Snake Segmentation.
[10] E. P. Bennett and L. McMillan. Proscenium: A framework for Spatio-Temporal video editing. MM'03, pp 2-8, November 2003.
[11] F.Kamperman and B.V.Rijinsoever, "Conditional Access system Interoperability through software downloading", IEEE Trans. On Consumer Electrinics, Vol 47, No.1, pp.47-53, 2001.
[12] Intel Open Source Computer Vision Library, version3.1,2003.http://www.intel.com/research/mrl/research/opencv/
[13] Kraevoy and Sheffer, "Cross-Parameterization and Compatible Remeshing of 3d Models", in Proceedings of SIGGRAPH, pp.861-869, 2004.
[14] Schreiner, Asirvatham, Praun, And Hoppe, Inter-surface mapping. In proceedings of SIGGRAPH, pp.870-877, 2004.
[15] T.Jiang et al. Key distribution based on hierarchical access control for Conditional Access system in DTV broadcast, IEEE Trans, on Consumer Electronics,Vol 50, Feb 2004, pp.225-230.
[16] T. Darrell, G. Gordon, M. Harville, and J. Woodfill, Integrated Person Tracking Using Stereo, Color, and Pattern Detection //International Journal of Computer Vision. - 2000. - Vol. 37, No. 2. pp 175- 185.
[17] Tsai, R. Y., A versatile camera calibration technique for high accuracy 3d machine vision metrology using off-the-shelf tv cameras and lenses, IEEE journal of robotics and Automation 3, 4, 323-344, 1987.
[18] Xianwang, Quing Zhang, Ruigang Yang, Brent and Melody Carswell, "Feature-based texture mapping from video sequence.
[19] Y.-Y Chung, A. Agarwal, B. Curless, D. H. Salesin, and R. Szeliski.Video matting of complex scenes.SIG-GRAPH'02, pp 243-248, 2002.
[20] Zhang, A flexible new technique for camera calibration. IEEE Transactions on Pattern Analysis and Machine Intelligence, pp 11, 22, 1330-1334, 2000.

Prem Shanker Yadav belongs to the Sitapur since 30-jun-1984 and has done his B.Tech (graduation) in the field of Information Technology from Sri Ram Swoaroop Memorial College of Engineering and Management (S.R.M.C.E.M), Lucknow, Uttar Pradesh, INDIA in 2005 and M.Tech (post graduation) in the field of Information Security from Ambedker Institute of Technology, New Delhi, INDIA in 2009.

He is currently working as Assistant Professor in the department of computer science at Kanpur Institute of Technology, Kanpur. He holds a teaching experience of more than three years. Prior to his current assignment he has taught for one year in C.E.R.T, Meerut as lecturer and two years and five months in B.B.D.N.I.T.M, Lucknow.

Manuj Darbari is currently working as Associate Professor in Department of Information Technology at B.B.D.N.I.T.M (Babu Banarasi Das National Institute of Technology And Management), Lucknow.

He holds a teaching experience of more than ten years. Prior to his current assignment he has taught for one year in M.N.R.E.C Allahabad as lecturer and nine years in B.B.D.N.I.T.M. Lucknow in different positions. He has published ten papers in referred international and national journals.

Mr. Darbari is selected for marquis who's who in science and engineering 2003-2007.

Call for Papers and Special Issues

Aims and Scope

JAIT is intended to reflect new directions of research and report latest advances. It is a platform for rapid dissemination of high quality research / application / work-in-progress articles on IT solutions for managing challenges and problems within the highlighted scope. JAIT encourages a multidisciplinary approach towards solving problems by harnessing the power of IT in the following areas:

- **Healthcare and Biomedicine** - advances in healthcare and biomedicine e.g. for fighting impending dangerous diseases - using IT to model transmission patterns and effective management of patients' records; expert systems to help diagnosis, etc.
- **Environmental Management** - climate change management, environmental impacts of events such as rapid urbanization and mass migration, air and water pollution (e.g. flow patterns of water or airborne pollutants), deforestation (e.g. processing and management of satellite imagery), depletion of natural resources, exploration of resources (e.g. using geographic information system analysis).
- **Popularization of Ubiquitous Computing** - foraging for computing / communication resources on the move (e.g. vehicular technology), smart / 'aware' environments, security and privacy in these contexts; human-centric computing; possible legal and social implications.
- **Commercial, Industrial and Governmental Applications** - how to use knowledge discovery to help improve productivity, resource management, day-to-day operations, decision support, deployment of human expertise, etc. Best practices in e-commerce, e-commerce, e-government, IT in construction/large project management, IT in agriculture (to improve crop yields and supply chain management), IT in business administration and enterprise computing, etc. with potential for cross-fertilization.
- **Social and Demographic Changes** - provide IT solutions that can help policy makers plan and manage issues such as rapid urbanization, mass internal migration (from rural to urban environments), graying populations, etc.
- **IT in Education and Entertainment** - complete end-to-end IT solutions for students of different abilities to learn better; best practices in e-learning; personalized tutoring systems. IT solutions for storage, indexing, retrieval and distribution of multimedia data for the film and music industry; virtual / augmented reality for entertainment purposes; restoration and management of old film/music archives.
- **Law and Order** - using IT to coordinate different law enforcement agencies' efforts so as to give them an edge over criminals and terrorists; effective and secure sharing of intelligence across national and international agencies; using IT to combat corrupt practices and commercial crimes such as frauds, rogue/unauthorized trading activities and accounting irregularities; traffic flow management and crowd control.

The main focus of the journal is on technical aspects (e.g. data mining, parallel computing, artificial intelligence, image processing (e.g. satellite imagery), video sequence analysis (e.g. surveillance video), predictive models, etc.), although a small element of social implications/issues could be allowed to put the technical aspects into perspective. In particular, we encourage a multidisciplinary / convergent approach based on the following broadly based branches of computer science for the application areas highlighted above:

Special Issue Guidelines

Special issues feature specifically aimed and targeted topics of interest contributed by authors responding to a particular Call for Papers or by invitation, edited by guest editor(s). We encourage you to submit proposals for creating special issues in areas that are of interest to the Journal. Preference will be given to proposals that cover some unique aspect of the technology and ones that include subjects that are timely and useful to the readers of the Journal. A Special Issue is typically made of 10 to 15 papers, with each paper 8 to 12 pages of length.

The following information should be included as part of the proposal:

- Proposed title for the Special Issue
- Description of the topic area to be focused upon and justification
- Review process for the selection and rejection of papers.
- Name, contact, position, affiliation, and biography of the Guest Editor(s)
- List of potential reviewers
- Potential authors to the issue
- Tentative time-table for the call for papers and reviews

If a proposal is accepted, the guest editor will be responsible for:

- Preparing the "Call for Papers" to be included on the Journal's Web site.
- Distribution of the Call for Papers broadly to various mailing lists and sites.
- Getting submissions, arranging review process, making decisions, and carrying out all correspondence with the authors. Authors should be informed the Instructions for Authors.
- Providing us the completed and approved final versions of the papers formatted in the Journal's style, together with all authors' contact information.
- Writing a one- or two-page introductory editorial to be published in the Special Issue.

Special Issue for a Conference/Workshop

A special issue for a Conference/Workshop is usually released in association with the committee members of the Conference/Workshop like general chairs and/or program chairs who are appointed as the Guest Editors of the Special Issue. Special Issue for a Conference/Workshop is typically made of 10 to 15 papers, with each paper 8 to 12 pages of length.

Guest Editors are involved in the following steps in guest-editing a Special Issue based on a Conference/Workshop:

- Selecting a Title for the Special Issue, e.g. "Special Issue: Selected Best Papers of XYZ Conference".
- Sending us a formal "Letter of Intent" for the Special Issue.
- Creating a "Call for Papers" for the Special Issue, posting it on the conference web site, and publicizing it to the conference attendees. Information about the Journal and Academy Publisher can be included in the Call for Papers.
- Establishing criteria for paper selection/rejections. The papers can be nominated based on multiple criteria, e.g. rank in review process plus the evaluation from the Session Chairs and the feedback from the Conference attendees.
- Selecting and inviting submissions, arranging review process, making decisions, and carrying out all correspondence with the authors. Authors should be informed the Author Instructions. Usually, the Proceedings manuscripts should be expanded and enhanced.
- Providing us the completed and approved final versions of the papers formatted in the Journal's style, together with all authors' contact information.
- Writing a one- or two-page introductory editorial to be published in the Special Issue.

More information is available on the web site at http://www.academypublisher.com/jait/.