

A Practical Implementation of Face Detection by using Viola Jones Algorithm in MATLAB GUIDE

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Abstract— MATLAB generates Graphical UIs as image windows made up of numerous human interfaces manage objects. You need to concept each and every goal to be able to action the action you intend that to accomplish whenever an individual triggers the particular component. In element, you need to be qualified to avoid as well as operate your own GUI. All of these jobs are completed by utilizing GUIDE, the MATLAB graphical user interface development atmosphere. We figure out the particular Viola-Jones algorithm, the premiere ever real-time face detection System. You can find three ingredients utilized in concert make it possible for a rapid as well as exact spotting: The particular integral image for characteristic calculation, Adaboost with regard to characteristic selection as well as a consideration, Cascade with regard to competent computational useful resource allocation. Here we explains a piece of equipment understanding approach for visual object detection which usually is capable of processing images extremely rapidly and achieving high detection rates.

Keywords— Adaboost, Face Detection, GUIDE, MATLAB, Viola-Jones.

I. INTRODUCTION

Almost as long as there have been user interfaces, there have been special software systems and tools to help design and implement the user interface software. Graphical User Interface (GUI) is an environment available with MATLAB that gives the option to the user developing software packages for personal and problem specific uses. It is a way of arranging information on a computer screen that is easy to understand and use because it uses icons, menus and a mouse rather than only text and programs written in high level language which is often not much handy for others except for programmers.

Face detection is used in a variety of applications, such as control and security applications, and identification systems. A face detector has to inform whether an image of arbitrary size contains a human face and if so, where it is. Face detection is a very essential biometric application in the region of image analysis and computer vision. The elementary face detection

method is AdaBoost algorithm with a cascading Haar-like attributes classifiers based on the structure proposed by Viola and Jones. Here we describes a machine Learning way for visible object detection which is capable of processing images extremely speedily and achieving higher detection rates. This process is distinguished by three main contributions. The first is the introduction of a new image representation called the Integral Image which permits the features used by our detector to be computed very speedily. The second is an acquisition algorithm, based on AdaBoost, which selects a small number of crucial visual attributes from a larger set and yields extremely effective classifiers. The third attempt is a method for combining increasingly more complex classifiers in a cascade which allows background regions of the image to be quickly discarded while spending more computation on promising object-like regions.

II. THEORY

“GUIDE” (Graphical User Interface for a Data Environment) is an interactive IDL widget-based package that enables users to retrieve selected sets of satellite instrument data and perform various types of graphical analyses on them, without writing a specialized program. GUIDE simplifies the task of laying out multiple plots on a page by using a page-editor to define and laying out multiple “panels” which contain the “plot objects”, and integrating data retrieval functions. GUIDE was developed in support of the POLAR CEPPAD (Comprehensive Energetic Particle Pitch Angle Distribution) experiment.

A “page editor” was devised to create and modify three components: the Page Description, the Panel Description, and the Plot Object. These components characterize the layout and content of all the plots grouped within the given page. The Page Description File contains information pertaining to the overall number, size, and relative location of panels for the given page, but not the actual contents of those panels that information is in the Panel Description Files. The Panel Description File contains all the necessary content descriptors for that particular panel including the name of the routine generating the plot for that particular panel and the input

parameters associated with it. The Fixed parameters include plot labels and titles, the number of series (lines) in a plot, or minimum and maximum flux values in a spectrogram. Input parameters required by the plot object are divided into two categories fixed and run-time. Finally, the Plot Object is a procedure, or collection of procedures, containing the actual

(IDL) code responsible for generating the specified plot, image, or any other pre-defined graphical object. At run-time, this module is called by the main GUIDE processing routine after it has set up system environment variables that define, for instance, window or viewport boundaries.

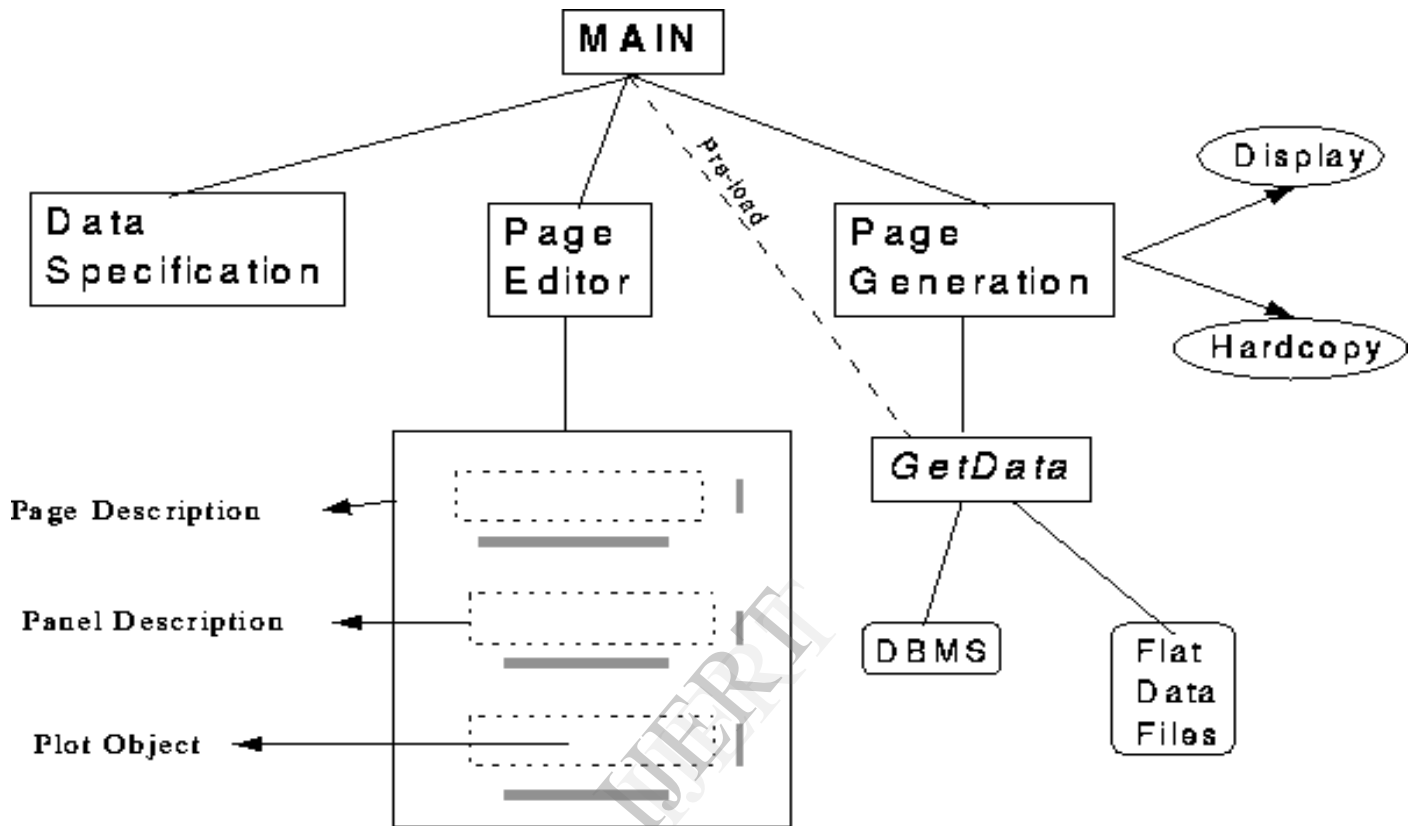


Fig. 1 Subsumptive architecture with respect to other functional aspects of GUIDE

III. OBJECTIVE AND PROBLEM STATEMENT

The main Objective of our research work is to develop an Application based on Viola-jones Algorithm Using MatLab GUIDE and evaluate the face detection process using the all possible color planes. So that advantages and application of all possible color planes can be combined together into a single proposed algorithm. The objectives of this research work is

- To develop an application this can browse the image of different possible extension and color plane.
- Secondly application can convert the image into any possible color planes.
- To compare the Face Detection capability of our Developed Application with Facebook's Face Detection capability.
- To improve the face detection capability of old and poor quality gray scale image of very large group.

IV. LITERATURE REVIEW

Automatically detecting human face provides an essential as well as difficult process in computer perspective research. The

response to this really is its huge application, as it is the very first of in the direction of smart perspective-based human computer interaction plus it is the very first phase of automatic face recognition method. Discovering human face was an arduous and also challenging job as it involves the numerous difficulties including picture dimensions, face size, face angle, posture, characteristics extraction, type and much more. With this you can find variety of strategies and algorithms are produced each and every features its own importance. The four kinds of face detection algorithms are as follows

A. Knowledge based method:

This technique is reliant entirely on the simple principles which usually identify the characteristics of the face and also the relationship (for instance distance) between them including there can be found an even intensity in the key region of the face and in addition eyes are symmetrical to one another.

B. Characteristics based method:

The main concept of this technique is to discover the characteristics of the face which are invariant or otherwise not impacted by any aspects for example variance in lighting circumstances, pose and others.

C. Template based method:

In this approach numerous templates of faces are saved into the system. The input picture from which the faces is to be discovered is processed by making head outline that is elliptical (roughly) is created making use of edge detector and filters. From then on a contours (line joining the face characteristics) of the facial characteristics are drawn which provides the info regarding face as well as characteristics geometry.

D. Appearance-based methods:

Almost all strategies employed under appearance centered techniques possess common measures you can find Category of face as well as non face classes, pre-processing, understanding as well as post processing of the pictures.

V. EXPERIMENTAL DATA ANALYSIS

We have studied 10 different images which were consisting of 50 or more faces. We compare the image in different color plane by using our application and the very same image we uploaded in Facebook to detect the face automatically. The experimental Data Table is as follows:

TABLE I. EXPERIMENTAL DATA ANALYSIS

Sr. No.	Image Title	Color Plane	Total no of Faces	Face Detected By Using Our Application					Face Detected by Using Facebook
				RGB	Gray Scale	Red	Green	Blue	
1	Army Group	Gray Scale	78	-	78	78	78	78	0
2	Gentlemen	Gray scale	50	-	46	44	45	42	4
3	Gyan Vihar	Color	96	58	58	63	54	32	2
4	College Group	Color	227	43	44	45	40	36	0
5	Family Reunion	Color	203	158	161	172	168	147	0
6	Marriage	Gray Scale	50	-	14	16	16	15	0
7	Look Upside	Color	94	88	88	89	84	77	46
8	Old Family	Gray Scale	39	-	25	27	24	26	1
9	Couples	Color	128	107	109	119	111	73	6
10	Group 1992	Color	70	66	66	68	68	65	34

VI. RESULTS

To demonstrate the feasibility of the proposed method, we performed a series of experiments on the various color as well as gray scale images of different Quality, Size, Format (image extension), Resolution, Poses and Expression. Each and every image was experimented in all possible color planes and in the Facebook also.

In the experiments, the above table shows the effectiveness of Viola Jones algorithm in compare to Facebook's present face detection algorithm. Our experiment concludes that by changing the color planes of the image we can improve the efficiency of face detection by using viola jones algorithm. Further we also observed that the red color plane is most effective for face detection in compare to other color planes.

Facebook's face detection algorithm is generally more effective for the good quality color image having very less number of faces in the image. Our application is very much effective for face detection in old and poor quality image consist of very large group in any color plane.

VII. CONCLUSION

We have laid out our proposal of color plane conversion and multiple-face detection technique based on Viola and Jones algorithm in this paper. We have also built an application for the proposed color plane conversion technique and conducted a series of experiments to investigate the effective results. The proposed approach has proven to be effective. Since input images may be of different Quality, Size, Format (image extension), Resolution, Poses and Expression. The performance gain from the color plane conversion and using viola-jones algorithm for face detection is enormous. The experiment we have conducted validates this. Performance gains of up to around 48% to 100% in comparison with the other technique.

We are planning to perform further studies on adding more features and improvements. We are also interested to attach face recognition feature into our application as face detection technique is increasingly used. We are also trying to attach a face detector counter to count the number of faces detected.

REFERENCES

- [1] Yi-Qing and Wang, An Analysis of the Viola-Jones Face Detection Algorithm, *Image Processing On Line* ISSN 2105-1232.
- [2] Paul Viola and Michael J. Jones, Robust Real Time Face Detection, *International Journal of Computer Vision* 57(2), 137–154, 2004.
- [3] Paul Viola and Michael J. Jones, Rapid Object Detection Using a Boosted Cascade of Simple Features, *Computer Vision and Pattern Recognition* 2001.
- [4] Hadi Santoso and Reza Pulungan, A Parallel Architecture for Multiple-Face Detection Technique Using AdaBoost Algorithm and Haar Cascade, *Information Systems International Conference (ISICO)*, 2 – 4 December 2013.
- [5] Reinhard, E. Ashikhmin, M. Gooch B. and Shirley, P., 2001. Color Transfer between Images, *IEEE Computer Graphics and Applications*, September/October 2001, 34-40.
- [6] Gonzalez, R. C. And Wintz, P., 1987. *Digital Image Processing*, Addison-Wesley Publishing, Reading MA.
- [7] Y. Freund and R. Schapire, A decision-theoretic generalization of on-line learning and an application to boosting, *Journal of Computer and System Sciences*, 55 (1997), pp. 119-139.
- [8] Krishna Bharat and Marc H. Brown. "Building Distributed, Multi-User Applications by Direct Manipulation," *ACMSIGGRAPH Symposium on User Interface Software and Technology*, Proceedings UIST'94. Marina del Rey, CA, Nov, 1994. pp. 71–81.

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