

# Iris Recognition Using Hough Transform Matlab Code

## Iris Recognition Based on Feature Extraction

Deepthi Rampally 2010 Biometric technologies are the foundation of personal identification systems. A biometric system recognizes an individual based on some characteristics or processes. Characteristics used for recognition include features measured from face, fingerprints, hand geometry, handwriting, iris, retina, vein, signature and voice. Among the various techniques, iris recognition is regarded as the most reliable and accurate biometric recognition system. However, the technology of iris coding is still at an early stage. Iris recognition system consists of a segmentation system that localizes the iris region in an eye image and isolates eyelids, eyelashes. Segmentation is achieved using circular Hough transform for localizing the iris and pupil regions, linear Hough transform for localizing the eyelids and thresholding for detecting eyelashes. The segmented iris region is normalized to a rectangular block with fixed polar dimensions using Daugman's rubber sheet model. The work presented in this report involves extraction of iris templates using the algorithms developed by Daugman. Features are then extracted from these templates using wavelet transform to perform the recognition task. Method of extracting features using cumulative sums is also investigated. Iris codes are generated for each cell by computing cumulative sums which describe variations in the gray values of iris. For determining the performance of the proposed iris recognition systems, CASIA database and UBRIS.v1 database of digitized grayscale eye images are used. K-nearest neighbor and Hamming distance classifiers are used to determine the similarity between the iris templates. The performance of the proposed methods is evaluated and compared.

An Improved Hough Transform Algorithm in Iris Recognition System Saeed Khorashadi Zadeh 2012

**Development of an Iris Authentication Algorithm for Personal Identification** Umme

Tahmina Tania 2015 Biometric systems differentiate people based on their uniquely characteristics manner. Among various biometric systems, iris recognition provides most reliable identification. In recent years, the development and practice of the field of iris recognition has expanded dramatically. Now it becomes a practical area of science and technology. The developments of core algorithm increase its practical applications. The research regarding iris recognition is not only focusing on ideal image where camera uses infrared illumination but also focusing on non-ideal image which has been taken in presence of visible lighting. It takes lot of user cooperation to capture an ideal image which makes the system time consuming. To make the system more user friendly, the algorithm to handle non-ideal image is essential. The main aim of this research work is to develop an algorithm which can locate iris from both ideal image and non-ideal image. Three major steps of the iris recognition system are localization of iris, normalization of iris and feature extraction of iris. The Hough Transform and image thresholding technique has been applied to localize iris in a given eye image. The Hough Transform shows excellent performance to localize iris in an ideal image. However, Hough Transform fails to perform accurate localization for non-ideal image. On the other hand, image thresholding techniques show relatively good performance for both ideal and non-ideal image. The isolated iris region is then transformed from Cartesian to polar form by using Daugman's integral operator. Finally to encode the feature into a binary template 1D Log-Gabor filter has been used. A simple Boolean Exclusive-OR operator (XOR) function has been applied to check whether two binary templates are from same image or not. To validate the performance of the algorithm both ideal and non-ideal eye images have been used. Image from CASIA Iris Interval database has been used to validate the performance of algorithms for ideal image and image from UBIRIS database has been used to validate the performance of algorithms for non-ideal image.

On a set of 138 different combinations, the algorithm shows 0% false acceptance rate. However, observation on 94 same class variations shows 4.25% false rejection rate. Therefore, the iris recognition algorithm proves to be a consistent and precise biometric technology.

*Swarm Intelligence for Iris Recognition* Zaheera Zainal Abidin 2021-11-24 Iris recognition is one of the highest accuracy techniques used in biometric systems. The accuracy of the iris recognition system is measured by False Reject Rate (FRR), which measures the authenticity of a user who is incorrectly rejected by the system due to changes in iris features (such as aging and health condition) and external factors that affect iris image, for instance, high noise rate. External factors such as technical fault, occlusion, and source of lighting that causes the image acquisition to produce distorted iris images create error, hence are incorrectly rejected by the biometric system. FRR can be reduced using wavelets and Gabor filters, cascaded classifiers, ordinal measures, multiple biometric modalities, and a selection of unique iris features. Nonetheless, in the long duration of the matching process, existing methods were unable to identify the authenticity of the user since the iris structure itself produces a template changed due to aging. In fact, the iris consists of unique features such as crypts, furrows, collarette, pigment blotches, freckles, and pupils that are distinguishable among humans. Earlier research was done by selecting unique iris features. However, these had low accuracy levels. A new way of identifying and matching the iris template using the nature-inspired algorithm is described in this book. It provides an overview of iris recognition that is based on nature-inspired environment technology. The book is useful for students from universities, polytechnics, community colleges; practitioners; and industry practitioners.

### **An Improved Hough Transform Algorithm in Iris Recognition System** Saeed

Khorashadizadeh 2014-06-03 The security is an important aspect in our daily life whichever the system is considered, security plays vital role. The biometric person identification technique based on the pattern of human iris is suitable to be applied to access control and provides strong

e-security. Iris recognition is one of important biometric recognition approaches in human identification is very active topic in research and practical application. Iris Recognition System consists of Acquisition, Localization, Feature Extraction and Feature Matching phases. Circular Hough Transform is one the best suitable algorithm in segmentation phase, but as a result of having two for-loops in its structure; CHT algorithm consumes high time processing and uses high storage capacity. These drawbacks make it hardly appropriate for real time applications of iris recognition system. To improve time and storage complexity, firstly, a pre-processing of CUHK iris image dataset is done to eliminate unnecessarily regions and secondly, a radius table is created based on pupil size variation of CUHK iris image dataset. The results show at least 40% efficiency in time complexity and minimum 20% efficiency in storage complexity.

*Advances in Pattern Recognition* José Francisco Martínez-Trinidad 2010-12-22 Annotation. This book constitutes the thoroughly refereed proceedings of the Second Mexican Conference on Pattern Recognition, MCPR 2010, held in Puebly, Mexico, in September 2010. The 39 revised papers were carefully reviewed and selected from 89 submissions and are organized in topical sections on computer vision and robotics, image processing, neural networks and signal processing, pattern recognition, data mining, natural language and document processing.

*Computer Analysis of Images and Patterns* Ainhoa Berciano 2011-08-19 The two volume set LNCS 6854/6855 constitutes the refereed proceedings of the International Conference on Computer Analysis of Images and Patterns, CAIP 2011, which took place in Seville, Spain, August 29-31, 2011. The 138 papers presented together with 2 invited talks were carefully reviewed and selected from 286 submissions. The papers are organized in topical section on: motion analysis, image and shape models, segmentation and grouping, shape recovery, kernel methods, medical imaging, structural pattern recognition, Biometrics, image and video processing, calibration; and tracking and stereo vision. [Signal and Image Processing for Biometrics](#) Amine Nait-Ali 2012-12-17 The aim of this book

is to deal with biometrics in terms of signal and image processing methods and algorithms. This will help engineers and students working in digital signal and image processing deal with the implementation of such specific algorithms. It discusses numerous signal and image processing techniques that are very often used in biometric applications. In particular, algorithms related to hand feature extraction, speech recognition, 2D/3D face biometrics, video surveillance and other interesting approaches are presented. Moreover, in some chapters, Matlab codes are provided so that readers can easily reproduce some basic simulation results. This book is suitable for final-year undergraduate students, postgraduate students, engineers and researchers in the field of computer engineering and applied digital signal and image processing.

**Advances in Pattern Recognition** José Francisco Martínez-Trinidad 2010-09-13 Annotation. This book constitutes the thoroughly refereed proceedings of the Second Mexican Conference on Pattern Recognition, MCPR 2010, held in Pueblly, Mexico, in September 2010. The 39 revised papers were carefully reviewed and selected from 89 submissions and are organized in topical sections on computer vision and robotics, image processing, neural networks and signal processing, pattern recognition, data mining, natural language and document processing.

**An Approach Towards Iris Localization for Non Cooperative Images: A Study** Iris localization is the most important part of iris recognition which involves the detection of iris boundaries in an image. A very important need of this effective security system is to overcome the rigid constraints necessitated by the practical implementation of such a system. There are a few existing techniques for iris segmentation in which iris detection using Circular Hough Transform is the most reliable and popular and it has been implemented in this project. But there is a shortcoming in this technique. It does not perform well and does not give high accuracy with images containing noise or occlusions caused by eyelids. Such kind of images constitute non cooperative data for iris recognition. To provide acceptable measures of accuracy, it is critical for an iris recognition system to overcome various noise effects

introduced in images captured under different environment such as occlusions due to eyelids. This report discusses an approach towards less constraint iris recognition using occluded images. The Circular Hough Transform is implemented for few images and a novel approach towards iris localization and eyelids detection is studied.

**Iris Recognition Using Support Vector Machines** Kaushik Roy 2006 In this thesis, an iris recognition system is presented as a biometrically based technology for person identification using support vector machines (SVM). We propose two approaches for iris recognition, namely: The approach I, which is based on the whole information of iris region and the approach II, where only the zigzag collarette region is used for recognition. In approach I, Canny edge detection and Hough transform are used to find the iris/pupil boundary from eye's digital image. The rubber sheet model is applied to normalize the segmented iris image, Gabor wavelet technique is deployed to extract the deterministic features and the traditional SVM is used for iris patterns classification. In approach II, an iris recognition method is proposed using a novel iris segmentation scheme based on chain code and zigzag collarette area. The Multi-Objectives Genetic Algorithm (MOGA) is employed to select features extracted from the normalized collarette region by log-Gabor filters to increase the overall recognition accuracy. The traditional SVM is modified to asymmetrical SVM to treat False Accept and False Reject differently. Our experimental results indicate that the performance of SVM as a classifier is better than the performance of classifiers based on feed-forward neural network using backpropagation and Levenberg-Marquardt rule, K-nearest neighbor, and Hamming distance.

**Enhanced Iris Recognition System For Person Identification** Gaganpreet Kaur 2013-01 In the present work, many methods are combined to build a reliable and fast method for feature extraction in iris recognition system. Reliable techniques for iris image enhancement and circle detection are used. These techniques can then be used to facilitate the further study of the statistics of iris. Also a program coding with MATLAB going through all the stages of the iris

recognition is built. It is helpful to understand the procedures of iris recognition and demonstrate the key issues of iris recognition. The Hamming distance has been employed for classification of iris templates, and two templates have been found to match if a test of statistical independence failed. The system performed with perfect recognition and resulted in false accepts and false reject rates of 0.01% and 0.61% respectively. The accuracy of the system is found to be 99.38%. Therefore, iris recognition is reliable and accurate biometric technology.

### **Information Science and Applications**

**(ICISA) 2016** Kuinam J. Kim 2016-02-15 This book contains selected papers from the 7th International Conference on Information Science and Applications (ICISA 2016) and provides a snapshot of the latest issues encountered in technical convergence and convergences of security technology. It explores how information science is core to most current research, industrial and commercial activities and consists of contributions covering topics including Ubiquitous Computing, Networks and Information Systems, Multimedia and Visualization, Middleware and Operating Systems, Security and Privacy, Data Mining and Artificial Intelligence, Software Engineering, and Web Technology. The contributions describe the most recent developments in information technology and ideas, applications and problems related to technology convergence, illustrated through case studies, and reviews converging existing security techniques. Through this volume, readers will gain an understanding of the current state-of-the-art information strategies and technologies of convergence security. The intended readers are researchers in academia, industry and other research institutes focusing on information science and technology.

### *Comparison of Various Segmentation*

*Techniques in Iris Recognition* Prateek Verma 2012-05 Iris recognition is regarded as the most reliable and accurate biometric identification system available. Iris recognition system captures an image of an individual's eye, the iris in the image is then segmented and normalized for feature extraction process. The performance of iris recognition systems highly depends on

segmentation. Segmentation is used to locate the correct iris region in an eye and it should be done accurately and correctly to remove the eyelids, eyelashes, reflection and pupil noises present in iris region. In our book we are comparing two segmentation methods namely, Daughman's algorithm and Hough Transform. Iris images are selected from the CASIA Database, then the iris and pupil boundary are detected from rest of the eye image, removing the noises. The segmented iris region was normalized to eliminate dimensional inconsistencies between iris regions by using Daugman's Rubber Sheet Model. A comparative analysis is made of the two methods to find out the better method.

### Design and Implementation of Iris Pattern Recognition Based on Wireless Network Systems

Thura Ali Khalaf 2019-06-04 Master's Thesis from the year 2016 in the subject Computer Science - Technical Computer Science, grade: 81, , language: English, abstract: The goal of this thesis is to propose a fast and accurate iris pattern recognition system based on wireless network system. This thesis presents three parts; in the first part, Libor Masek algorithm is enhanced to achieve higher recognition rate. Another method of iris pattern recognition is proposed which named genetic algorithm. The two used iris pattern recognition methods are compared according to their accuracy and execution time. When testing persons of the Chinese Academy of Sciences Institute of Automation (CASIA) database, both methods achieved 100% recognition rates because there is at least one image sample for each person, which is correct matched and there is no person that is false matched. But when testing image samples per persons of CASIA database, the genetic algorithm achieved higher recognition rates and lower error rates than Libor Masek algorithm. It has been found, that the recognition time of genetic algorithm is less than Masek algorithm. The second part presents an iris image compression/decompression by using Principal Component Analysis (PCA) for compression process and Inverse Principal Component Analysis (IPCA) for decompression process. It has been proven that PCA is the most suitable method for compressing iris images because of its ability to reduce their size while

maintaining the good quality of the reconstructed images. Reconstructed images using IPCA have low compression ratios (CRs) and high Peak to Signal Ratios (PSNRs), which leads to good quality. For more security, a multi-stage image compression is performed in order to protect network's transmitted data from hackers because hackers cannot guess how much the image has been compressed. The third part, includes wireless network system consisting of one central Personal Computer (PC) and four Personal Computers (PCs) that communicate with each other through router device. The central PC takes the responsibility of monitoring and controlling the PCs of the whole network. All network PCs communicate with each other by using Transmission Control Protocol /Internet Protocol (TCP/IP) protocol suite that use client-server sockets to transfer images between PCs on the network.

**Soft Computing Applications** Valentina Emilia Balas 2015-11-02 These volumes constitute the Proceedings of the 6th International Workshop on Soft Computing Applications, or SOFA 2014, held on 24-26 July 2014 in Timisoara, Romania. This edition was organized by the University of Belgrade, Serbia in conjunction with Romanian Society of Control Engineering and Technical Informatics (SRAIT) - Arad Section, The General Association of Engineers in Romania - Arad Section, Institute of Computer Science, Iasi Branch of the Romanian Academy and IEEE Romanian Section. The Soft Computing concept was introduced by Lotfi Zadeh in 1991 and serves to highlight the emergence of computing methodologies in which the accent is on exploiting the tolerance for imprecision and uncertainty to achieve tractability, robustness and low solution cost. Soft computing facilitates the use of fuzzy logic, neurocomputing, evolutionary computing and probabilistic computing in combination, leading to the concept of hybrid intelligent systems. The combination of such intelligent systems tools and a large number of applications introduce a need for a synergy of scientific and technological disciplines in order to show the great potential of Soft Computing in all domains. The conference papers included in these proceedings, published post conference, were grouped into the following area of research:

Image, Text and Signal Processing Intelligent Transportation Modeling and Applications Biomedical Applications Neural Network and Applications Knowledge-Based Technologies for Web Applications, Cloud Computing, Security, Algorithms and Computer Networks Knowledge-Based Technologies Soft Computing Techniques for Time Series Analysis Soft Computing and Fuzzy Logic in Biometrics Fuzzy Applications Theory and Fuzzy Control Business Process Management Methods and Applications in Electrical Engineering The volumes provide useful information to professors, researchers and graduated students in area of soft computing techniques and applications, as they report new research work on challenging issues. Fundamentals of Image, Audio, and Video Processing Using MATLAB® Ranjan Parekh 2021-04-15 Fundamentals of Image, Audio, and Video Processing Using MATLAB® introduces the concepts and principles of media processing and its applications in pattern recognition by adopting a hands-on approach using program implementations. The book covers the tools and techniques for reading, modifying, and writing image, audio, and video files using the data analysis and visualization tool MATLAB®. Key Features: Covers fundamental concepts of image, audio, and video processing Demonstrates the use of MATLAB® on solving problems on media processing Discusses important features of Image Processing Toolbox, Audio System Toolbox, and Computer Vision Toolbox MATLAB® codes are provided as answers to specific problems Illustrates the use of Simulink for audio and video processing Handles processing techniques in both the Spatio-Temporal domain and Frequency domain This is a perfect companion for graduate and post-graduate students studying courses on image processing, speech and language processing, signal processing, video object detection and tracking, and related multimedia technologies, with a focus on practical implementations using programming constructs and skill developments. It will also appeal to researchers in the field of pattern recognition, computer vision and content-based retrieval, and for students of MATLAB® courses dealing with media processing, statistical analysis, and data visualization. Dr. Ranjan Parekh, PhD

(Engineering), is Professor at the School of Education Technology, Jadavpur University, Calcutta, India, and is involved with teaching subjects related to Graphics and Multimedia at the post-graduate level. His research interest includes multimedia information processing, pattern recognition, and computer vision.

*Face, Expression, and Iris Recognition Using Learning-based Approaches* Guodong Guo 2006  
*Iris Detection Using Circular Hough Transform* Shamsulfakhar B. Abdul Ghani 2006

**Image Analysis and Recognition** Aurélio Campilho 2014-10-09 The two volumes LNCS 8814 and 8815 constitute the thoroughly refereed proceedings of the 11th International Conference on Image Analysis and Recognition, ICIAR 2014, held in Vilamoura, Portugal, in October 2014. The 107 revised full papers presented were carefully reviewed and selected from 177 submissions. The papers are organized in the following topical sections: image representation and models; sparse representation; image restoration and enhancement; feature detection and image segmentation; classification and learning methods; document image analysis; image and video retrieval; remote sensing; applications; action, gestures and audio-visual recognition; biometrics; medical image processing and analysis; medical image segmentation; computer-aided diagnosis; retinal image analysis; 3D imaging; motion analysis and tracking; and robot vision.

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