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Mobile Vision System for Palm Principal Lines' Features Extraction

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An automated intelligent mobile vision based technique for extracting features of principal lines' from low resolution mobile phone camera images is proposed in this paper. Principal lines of human palm provide rich feature information that can be used to analyze the behavior of individual humans as well as used as a biometric feature to authenticate them. An efficient, fast and robust method using gradient operations to filter out the principal lines from palm images is described. The implementation is divided into three major parts. The first part deals with the hand-image acquisition through mobile phones and preprocessing techniques before sending the captured palm image to the server. The second part applies preprocessing techniques at the server end to obtain palm as the region-of-interest. The last part handles the post-processing and extracts the principal lines from the palm using gradient operations along with connected region identification. The experiment shows that the proposed system works accurately for the captured images at different resolution from different mobile phones. The mapping between the extracted lines and the original lines is shown by sending the resultant image back to the mobile phones from the server and overlapping the extracted principal lines over the original captured colored palm image.

Keywords : Connected Region Identification, Gradient Operations, Image Filtering, Mobile Vision, Palm Print Extraction, Principal Lines Extraction.

1. INTRODUCTION

The technological advancements in the field of information technology has led to a continuous shift from the traditional manual systems to development of automated intelligent systems simplifying the human work and simultaneously performing equally efficient as them. Computer Vision (CV) is one such development that is applied in all the real world applications. CV means interacting with the real-world images to enhance the capabilities of humans in various research fields related to human-computer interactions. The growth have increased the demand for actual vision systems. With the availability of high-precision cameras, color displays, and hardware accelerated graphics, mobile phones have evolved into powerful image and video processing devices. Enhancing mobile phones by making them intelligent in one way or the other is promising, because they are in constant reach of the users and are thus available in many everyday situations. If image processing tasks can be performed on such devices, then they can be the most effective contenders for creating Mobile Vision (MV) systems.

In this paper, the main focus is given to developing an MV system that extracts the features of the principal lines from the images of human palm. Features in terms of length, angles, curve, breaks, branches, etc. can be used in many applications, such as in the field of biometrics to identify the individuals, or in palm matching [1], or for predicting the personality of the individual.

Human palm has numerous lines on it. Some are dark and long while others are short and dull. Apart from the presence of numerous lines on the palm, there are three primary lines that are present on every human palm. These

Table 2
Comparison of the Proposed Method with Existing Principle Line Extraction Methods

Methods	Accuracy	Execution Time
Tunkpien P *et al.*, [12]	86.18%	127msec
Sakdanupab *et al.*, [8]	85.49%	5.4sec
Proposed Method	**94.8%**	**2sec**

man palm with different camera based mobile phones. All such complex processing is performed on the server side to reduce the energy and computation cost of the mobile devices. The system is tested for 2 MP, 3.2 MP, 5 MP and 8 MP. The accuracy of the overall system is about 95%. An augmented layer is added on the original palm images of human to show the extracted principal lines displayed on the user mobile screen.

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