A Matlab Approach For Design Of Virtual Footwear

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Abstract: Image processing in the future will dramatically change the experience of the human brain. A vast number of applications, software, and techniques for image processing help extract complex image features. While image processing works beyond multidimensional today and see what the image actually contains. Many techniques that draw on images in real time, but the real core is image processing. This paper addresses an overview of technologies, tools and techniques for measurement of various foot images of human being and obtain the foot dimensions using image processing and EMD algorithm in MATLAB software. Measuring and valuing a distance between two points is important in the processing of objects. The idea is to make the Euclidean distance between two points a measure of how near (or distant) two points are to each other based on two ranges. Using this we can obtain the foot measurements with less efforts and in affordable price. The need to extract information from foot images and interpret their content was the driving factor in major footwear manufacturing industries and also in health care for proving artificial legs.

Keywords: Distances measurement, EMD algorithm, EDM techniques, Foot dimensions, Image processing, Multidimensional images, Virtual footwear.

1. INTRODUCTION

IN DIGITAL IMAGE PROCESSING THE IMAGE IS TRANSFORMED TO DIGITAL IMAGE AND OPERATIONS ARE PERFORMED TO IMPROVE THE IMAGE QUALITY AND OBTAIN USEFUL INFORMATION . Before detection, we use the edge detector to convert images into binary objects[1]. The changes in the image takes place automatically and depends on algorithms that had been designed carefully. Image processing is a discipline which includes contributions from various fields like chemistry, optical technology, physics and emerging electrical engineering. Image Processing also correlates with other fields like pattern recognition, artificial intelligence and human vision studies. Different image processing includes various steps like taking the image from an digital camera or optical scanner, analyzing the images and editing the image (data compression, photo enhancement and filtering), sharpeni ng the edges, eliminating noise, removing motion blur and gen erating the right image output[2]. The main objective in the development of image processing was to extract the required information from images and then interpret their content. Using distance metrics through linear features, a particular algorithm is used to identify group objects[3]. Image processing is used in a wide range of industries, including hospitals, engineering, military, consumer electronics, etc. The Image processing methods are mostly used in medicine such as digital radiography, functional magnetic resonance imaging (MRI), magnetic resonance imaging (MRI), positron emission tomography (PET) and computerized axial tomography (CAT). Complex image processing algorithms are used in many applications that are ranging from troops or equipment identification to missile command, classification and recognition of the objects. Blade recognition is an image processing technique to define the edges of artifacts inside images[4]. This functions by finding discontinuity of brightness[5]. Edge detection is used in different areas like computer vision, image processing and machine vision for object segmentation and gathering of information.

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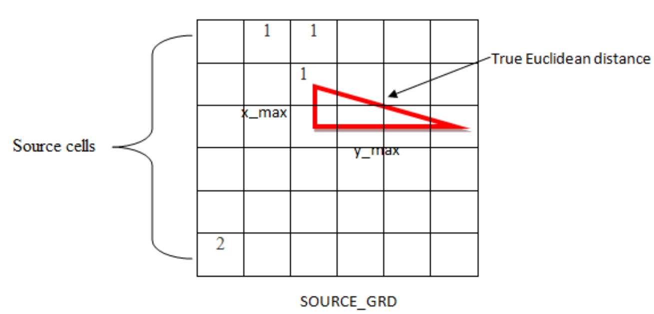
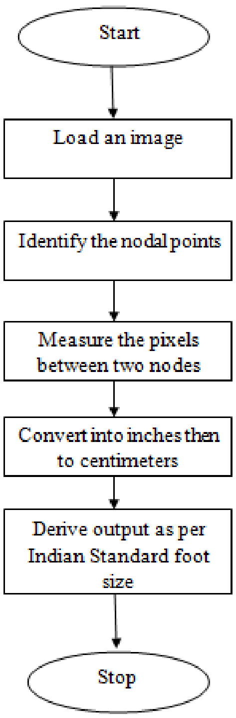
The color image is first split into three different channels such as R, G and B before processing in this standard color edge detection technique and the algorithm is then used for all channels, and finally all channels are combined together to generate the result[6]. One of the classic edge detection algorithms is the Sobel operator[7].We also deal with distances because the use of EDMs to calculate or estimate[8]. EDMs is a useful description of the point set and a starting point for the algorithm's growth. Recovering the original point configuration is a typical task: first it may come as a surprise that this involves nothing more than the symmetric matrix's own value decomposition (EVD). The ranges are bright[10]. There are a few ranges lacking. The distances are not labelled. There are two fundamental issues concerning the geometry of distance: (1) Whether it is an EDM or not is decided on the basis of a matrix, and (2) Given possibly incomplete set of distances, decide whether there is a point structure in the given embedding dimension— the smallest space comprising of the points producing distances. The input source data is a function class; before conducting the Euclidean analysis, it will first be transformed internally to a rast. The resolution is lower than the feature group's height or width, divided by 250, and the resolution can be set using the parameters of the output cell size. Optimization of EDM requires adequate geometric understanding of matrix spaces[12]. The euclidean distance is calculated from the center of the source cell to the center of the each sorrounding cells and the true distance is calculated for each cell[13]. The euclidean equation works:for the cells, the length is calculated by calculating the hypotenuse, for each cells x-max and y-max[15]

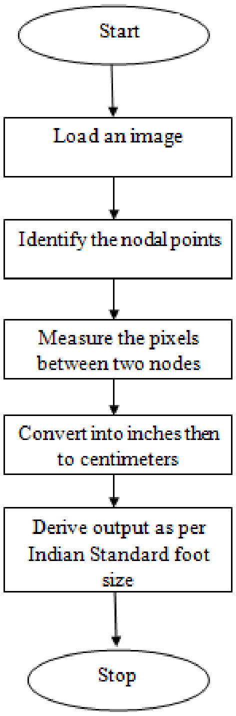


2 METHODOLOGY:

A digital image is a two-dimensional function f(x, y), where ' x ' and ' y ' are the spatial coordinates and 'f', the amplitude at this point is called the intensity of the object in any pair of coordinates. If all finite binary numbers are 'x', ' y' and 'f' amplitude values, then the image is referred as a digital image. The digitization of the coordinate values is called as' sampling,' and quantification is referred to as the digitization of amplitude values. The sampling or quantization product is a real number vector. Euclidean distance matrices (EDMs) are square-to-point matrices. They are mainly used in machine learning, psychometrics, crystallography, wireless sensor networks, etc. Given the utility of EDMs, in the signal processing community they continue to be insufficiently understood. Our target in a succinct tutorial is to rectify this mishap. The basic characteristics of EDMs, such as rank or (non)definiteness to be reviewed and demonstrate how to use the various EDM properties to model algorithms to complete and denote distance data. The algorithms also deals in proposing few applications for recovery phases, echo reconstruction, ultrasound tomography and microphone location calibration. Through EDMs can easily deal with ones own problems, we strive to easily track readers through spelling out the simple algorithms.



Size	Centimeters
6	25
7	26
8	27
9	28
10	29
11	30
12	31



At first we will load the image that has been captured using digital camera or any other capturing source. Then the nodal points will be identified as per the requirement. Then measure the Euclidean distance from center of source cell to the center of the surrounding cells. Convert the obtained results into required standard measurements. This process can be applied to all the distance measuring processes.

3 RESULTS AND DESCRIPTION:

We are using MatLab distance tool kit to find the size of the foot. This tool kit generates the scale and we can adjust that scale between the two positions. For that we are capturing the picture with 72 DPI resolution and with constant distance from that we can calculate the size of the foot. In this project we are taking pictures of the foot in the two angles down angle and side angle from a distance of 60 centimeters and a resolution of 72 DPI. From MatLab we get the distance in pixels and that pixels is changed into Indian standard foot size using below formulas.

1 pixel = 0.01041667 Inches

1 inch = 2.54 Centimeters

Indian Foot Size chart:

Consider the image you want to measure and then identify the nodes between which you want to measure the distance. Apply the EMD algorithm using matlab tool. The output from matlab is in pixels format. Based on conversion of lengths we are converting pixels to inches and inches to centimeters based on that conversions we are going to find the length of the foot, fore foot, hind foot values.

Foot Length:

Value from matlab 1336.74 pixels
1336.74 pixels =0.01041667 * 1336.74 inches
=13.9243794558 inches
13.9243794558 Inches = 13.9243794558 * 2.54 centimeters
=35.3679238177 centimeters
Calculated size = 35.3679238177 centimeters
=35 centimeters
Original size = Calculated size – 6 Centimeters
=35-6 cm
= 29 cm.
From Indian standard foot size chart we can find the exact size of our foot
Indian Standard foot size for 29cm = 10
So we are maintain constant distance between the object and the source for obtaining accurate results.

Fore foot Length:

485.96 pixels =0.01041667 * 485.96 inches
=5.0620849532inches
5.0620849532Inches =5.0620849532* 2.54 centimeters
= 12.8576957811centimeters
Calculated size = 12.8576957811centimeters
Fore foot length = Calculated size – 3 Centimeters
=12.85 -3 cm
= 9.85 cm

Hind foot Length:

239.73 pixels =0.01041667 * 239.73 inches
=2.4971882991inches
2.4971882991Inches = 2.4971882991* 2.54 centimeters
= 6.34285827971centimeters
Hind foot Length = 6.34285827971centimeters
=6.34centimeters

4 CONCLUSION:

This algorithm can be used in real-time applications to help you get precise foot measurements. This is primarily used in shoes and medical industries to show artificial legs. Without wasting time, consumers can gain extensive experience and get their goods according to their comfort. Instead of using high-end scanners that cost a lot, we can provide customer service at a nominal price using image processing algorithm. A simple matlab tool kit can be used to measure face length, body height and any size of an item. This methodology can be extended for measuring other human dimensions like face, arms, human height and other objects.

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