

Classifying Corner Defects from Square Ceramic Tile at Production Phase

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ABSTRACT

Ceramic tile is largely used in construction of floor at home, offices and shops and many other places. The image processing is playing an important role for find defect from the ceramic tile and industry maintaining the demand of market. In this paper we study classification of corner defect of square ceramic tile. Each corner follows the Pythagorean Theorem.

Keywords:- Air Traffic Control, Global Information System

I. INTRODUCTION

Image processing is a technique for conversion of an image in digital image and apply few operations on it, to get it we extraction of some important information from the image. Always the image processing techniques applying for two dimensional images only. Now today these technologies rapidly growing, Application of an image processing, now used at everywhere like business, medical, factory etc. The image processing is used in research for scientist and engineering in the computer science. Image processing uses three steps for processing of any image.

First, it importing the real time sensor or scanner or digital camera, secondly in the image we are manipulating, enhancement, compression, feature extraction from the ceramic tiles, at least generate result after applying different analysis on the image [1]. Image processing used in various applications like Glass industry, Textile industry, Ceramic tile industry for quality control, Animation in movies, Flex printing, Forensic lab, drone missiles, Expert system, Air traffic control (ATC). Global information system (GIS).

Classification of image processing in two types:

Analog image processing (AIP)

Analog image processing is the first part of image processing, this type of image we generate an image by using electrical signals. The electrical signals are increased or decrease the voltage display by some output devices [25]. In this the image is altered according to the appearance of image, brightness, contrast, sharpness and size of image [2]. Examples of analog image are TV set and Printer.

Digital image processing (DIP)

The image digitally converted by using a scanner or digital camera or real time sensor. The digital image is snapped by these devices [3]. Then we convert the digital RGB (Red, Green and Blue) image into Gray-scale of this we find the intensity level of image. The noise removes by using linear filters (mean filtering) and non-linear filter (median filtering). After removing noise from image we extract the feature by using a particular algorithm. By using algorithm we take decisive for the quality classification in the form of

image or in the form of data, in this way classification of digital image processing [4]. In two and three dimensional modeling of aircraft, advertisements, finding defect detection in different industries like Textile, Glass, Ceramic tile, bricks, medicines. Thus, digital image processing is many times better than the analog image processing. In figure 1.1 block diagram of image processing and also classification analog and digital image processing. In digital image processing system the image store in computer is in the form of binary (0 or 1). ‘0’ represents black color in the given image and ‘1’ represents white color in the given image.

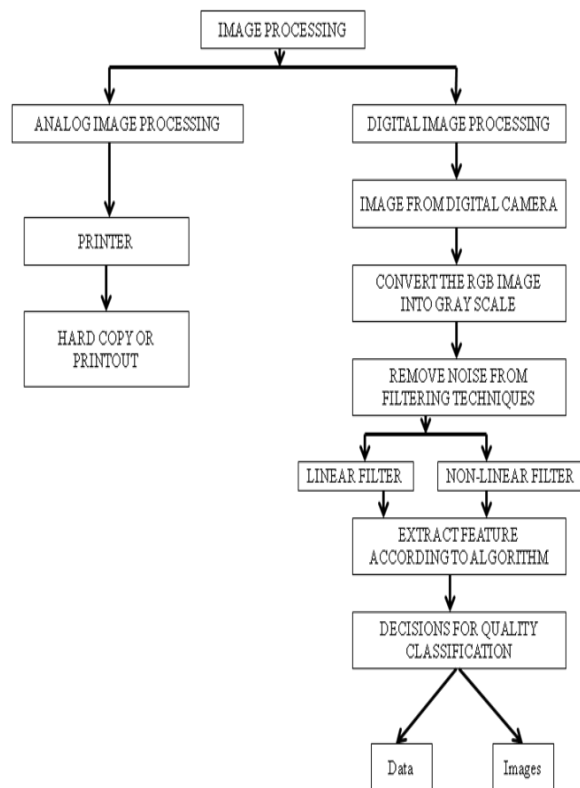


Fig.1: Classification of image processing

II. RELATED WORK

Yang Lei [5] image is processed by canny operator, Hough Transform is used to detect straight lines are selected from the margin of tiles, four intersection point these are the corner of tile. In ceramic tile each tile is scanned by two rows from vertically and horizontally scanning of the image. According to the Thresholding value find the right angle of each corner. After getting the corner of tile we compare the test image and referenced image.

Sunpreet Singh [6] the authors explain the roughness of quality types of defects are arise like cracks, holes, spot, shape of edges, presence of extra material and corner. According to this paper for finding the corner, we have used Morphological operation of ceramic tiles image. The corner defect may find by using the length and width of inner space.

Matic [7] for corner detection we start from center position of an image. For detection of real time counter edge and corner the authors’ suggests two methods: for edge using MASD and for corner detection using CMASD. By using this method we reduce the manufacturing cost and also quality control.

III. DEFECTS IN CERAMIC TILES

In ceramic tile different type of defect detection like: Crack, Pinhole, Spot, Blob, Corner, Glaze and Scratch [8]. These defects were found at the production phase:

- Crack: Due to extra pressure and heat at the time of production it may occur.
- Pinhole: When mixing the material of the tile some granular particles are mixed with it.

- Spot: Some technical fault drop of water is falls on the surface of tile.
- Blob: Improper coloring on the surface.
- Corner: Due to extra pressure and move it from one place to another at the time of production.
- Glaze: Improper color mixing or painting on the surface.
- Scratch: Friction of rough surface, it may occur.

IV. CLASSIFICATION OF CORNER DEFECTS

In ceramic tile many number of other defect, but in this paper we classifying only the corner defect from the square ceramic tile. In square ceramic tile classification of defect on the basis of it side length. In square shape we know all the sides are equal to each other it means the shape is in square shape. In square ceramic tile classification of defects in two ways:

Inside corner defects: This type of corner defect detection measure the length of X axis and Y axis, if sum of X and Y axis equal to the length of Hypotenuse means it follows the Pythagorean Theorem and this type of corner is normal, otherwise the sum of X and Y axis length is not equal or less the length of Hypotenuse means this type of corner is called inside corner defects.

$$\text{Length of X} + \text{Length of Y} < \text{Hypotenuse} \quad (1)$$

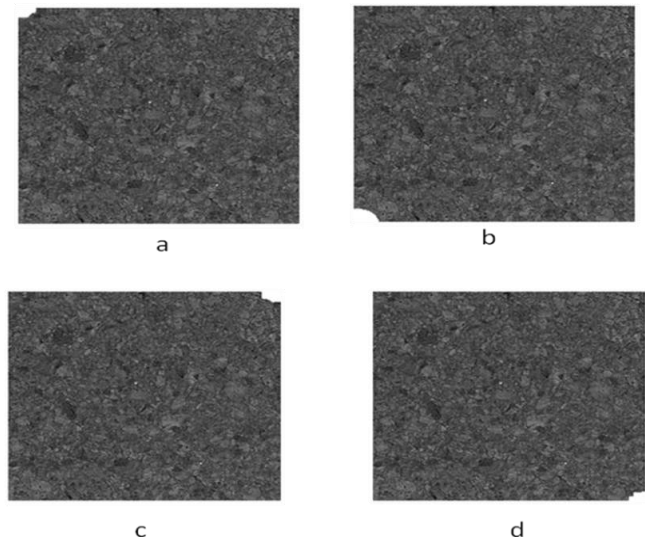


Fig.2: Inside corner defect of square ceramic tile

Outside corner defects: This type of corner defect detection measure the length of X axis and Y axis, if sum of X and Y axis equal to the length of Hypotenuse means it follows the Pythagorean Theorem and this type of corner is normal, otherwise the sum of X and Y axis length is not equal or greater than the length of Hypotenuse means this type of corner is called outside corner defects.

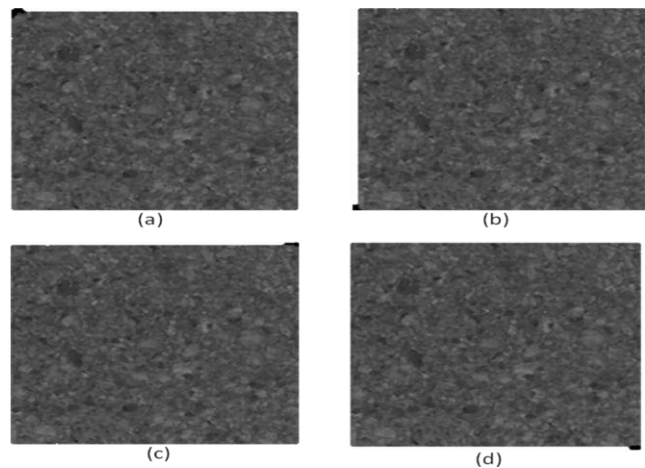


Fig.3: Outside corner defect of square ceramic tile

Length of X + Length of Y > Hypotenuse
(2)

V. CONCLUSION AND FUTURE

WORK

Image processing used in many industries for finding the defects detection. Now day's ceramic tiles industries developed very fast due greater demand of market and consumers. Thus in ceramic tile have different defects like Crack, Pinhole, Spot, Blob, Corner, Glaze and Scratch. In this paper we classification of different varieties of corner defect we found from the ceramic tile by follows the Pythagorean Theorem. Finally future work first we designed the concept model of quality maintaining machine. Second is after applying Pythagorean Theorem finds the angle of each corner of square ceramic tile.

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