

ARTIFICIAL INTELLIGENCE FOR UNEARTHING YARN BREAKAGE

M.AMMU BAKYA¹, S.PREETHI², P.SUGANYA DEVI³, S.VIMALA DEVI⁴, D.PRINCE WINSTON⁵

^{1,2,3} UG Scholars, Dept. of EEE, Kamaraj College of Engineering & Technology, Madurai, Tamil Nadu, India.

⁴ Assistant Professor, Dept. of EEE, Kamaraj College of Engineering & Technology, Madurai, Tamil Nadu, India.

⁵ Associate Professor, Dept. of EEE, Kamaraj College of Engineering & Technology, Madurai, Tamil Nadu, India.

Abstract-In India, textile industry has a unique position as a self-reliant industry and has a formidable presence in the national economy. It contributes to about 14% of manufacturing value-addition and it accounts for around one-third of gross export earnings. At present, in textile industry, if any yarn breakage occurs, the workers have to manually check the breakage in the yarn and have to rectify it. This process would take some time since it is difficult to detect the yarn breakage in large number of sections in the industry. By that time, large amount of yarn will be wasted. The power and time consumption will also be increased. As a result, profit of the Industry will be reduced. In this paper, an automatic system to detect the breakage in the yarn is proposed. This would help in quick detection of yarn breakage and thereby it can be rectified quickly. As a result, the wastage of yarn, power and time consumption will be reduced. Ultimately the profit of the Industry will be increased.

Key Words: camera slot interface, morphology, artificial intelligence, image processing, GSM.

1. INTRODUCTION

Artificial intelligence (AI) means “Intelligence demonstrated artificially by machine” thereby creating a systems that can learn ,think, understand and behave like humans AI is used to develop computer functions related with human intelligence such as problem solving, learning and reasoning. Artificial intelligence technique uses the information effectively in such a way that-

- It should be understandable by the people who give it.
- It should be comfortably alterable to correct errors.
- It should be helpful in many conditions though it is inaccurate or incomplete.

Image processing is a technique to conduct some actions on an image, in order to get an intensified image or to extract useful information from it. . In image processing, input is an image and image or property related with that image may be the output. It is a core research sector within computer science and Engineering disciplines too.

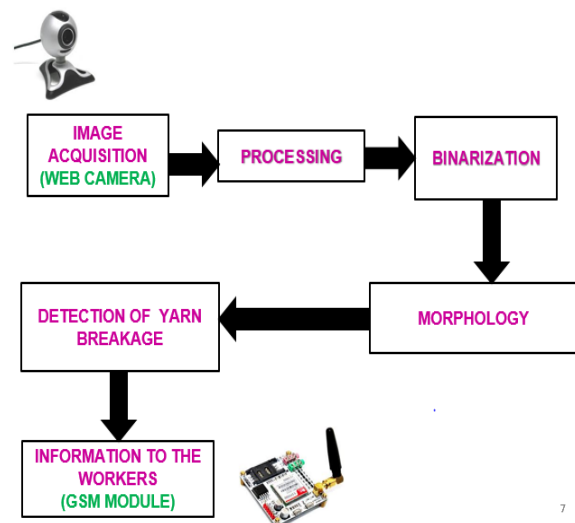
Image processing includes the following steps-

- Importing the image through image acquisition tools.
- Examining and altering the image.
- Output in which result may be manipulated image or report which is based on image examination.

Now a day, image processing is used in diverse techniques, this paper deals with the implementation of image processing actions on Raspberry Pi. The Raspberry Pi is an embedded system and it is a low cost single board computer used to decrease the complexity of systems in various applications. Raspberry Pi is mainly based on Python. Camera slot Interface (CSI) of Raspberry Pi is used to interface the raspberry pi camera. The Low and Dark contrast images captured by Raspberry Pi camera module are intensified or amplified in order to find the particular area of image.

A Web camera is a video camera or digital camera capable of taking still images as well as motion videos. Webcams can be either directly embedded into computers, laptops or can be connected to the FireWire or USB port on the computer. Once a web camera is activated, and the image it is pointed at visible on the screen of the computer, an image or video is captured.

2. BLOCK DIAGRAM



3. BLOCK DIAGRAM DESCRIPTION

The first step in the workflow sequence is an image acquisition. It can be done through web camera. Web camera is a digital camera that is connected to a computer. The image can be captured using this web camera. The captured image can be processed and the pixel image is converted into binary image. This process is known as binarization. The next step is morphology. *Morphology* is a broad set of image processing operations that process images and it filter the imperfections in an image. By analyzing the number of yarn in an given sample, the yarn breakage can be detected. The information is then sent to the workers through GSM(Global System for Mobile communication)module which can connected to the mobile phone for communication purpose.

4. MACHINE WORKING

An automatic system is designed to detect the yarn breakage in the textile Industry. In order to determine yarn breakage in a particular section, first the number of yarn in that particular section is found out. For this purpose, a program is written. When the program is run, it would show a web camera. In that web camera, a sample consisting of some yarn is shown. Then it would display the exact number of yarn present in that sample. For testing purpose, a sample with 10 yarns is taken.

In industry, there will be large number of yarn which can be divided into different sections. For analysis purpose, a section containing 10 yarns is taken into consideration. The camera is fixed in the blower which would move continuously. The camera will first capture the section containing 10 yarns. In case, the yarn count is less than 10, it will display the message as the particular yarn is not found in the particular section. For example, if 5th yarn is not found in the 1st section, it will display the message as the 5th yarn is not found in the 1st section. This would help the workers to quickly detect the position at which the yarn breakage has occurred; thereby it can be rectified quickly so that wastage of yarn can be reduced.

5. ADVANTAGES

- (1) Time consumption is less: An automatic system would help in quick detection of yarn breakage. As a result, the time taken by automatic system to detect the breakage is much lesser than the time taken by workers to identify the breakage in yarn.
- (2) Power consumption is less: As the yarn breakage is detected quickly, the power consumption is reduced. If there is any delay in identifying the yarn breakage, the power consumption will be more.
- (3) Manual work is reduced: Since the yarn breakage is detected by an automatic system, the manual work is reduced. This would help in avoiding the regular

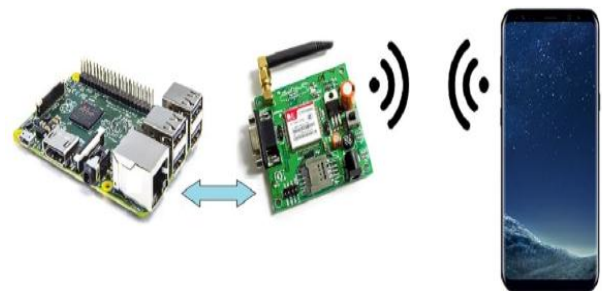
inspection of workers across large sections of yarn to identify the breakage.

- (4) Wastage of yarn is reduced: An automatic detection system would help in reducing the wastage of yarn because if the yarn breakage is not detected quickly, large amount of yarn will be wasted. By reducing the wastage of yarn, the profit of the industry will be increased.

6. LIMITATIONS

- (1) Intensity variation: The count of the yarn will be varied if it is exposed to different intensity. Therefore, the number of yarn will be varied according to the surrounding. This may generate an error.

7. FUTURE SCOPE



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