An Image Processing Oriented Optical Mark Reader

Yasira Fathima[1], Prarthana Bhat[2], Vikshitha Amin[3], Mrs.Sucheta G.[4]
[1,2,3] *Student, Department of Information Science engineering, SCEM, Mangaluru*
[4] *Asst. Professor, Department of Information Science engineering, SCEM, Mangaluru*

***Abstract*- Competitive exams plays a key role in most of the professional courses. These competitive exams generally consists of multiple choice questions. The Optical Mark Reader can be used for calculating examination scores from these answer sheets. Image Processing is the processing of images to get the enhanced images or to extract useful information from it. By using this technique, we develop a system based on PC-type microcomputer which is connected to an image scanner. Initially the true answer keys are stored in the database. The scanned sheets are sent to the system which is pre-processed using noise reduction and skew detection techniques, which is then compared with the true answer keys for the generation of results. Based on this result, rank is generated and SMS is sent to the respective students.**

***Index Terms*- Image Processing, scanner, open CV.**

1. INTRODUCTION

Image Processing is the process of converting and image into a digital format and performing some operations on it so as to get a clear image or to extract some important facts from it. Image Processing is essential because human visual system cannot perceive the world in the same manner like how the digital device does. Image Processing is a type of Signal dispensation in which image is given as an input and the output obtained is image or certain features related to that image. OMR technology is a widely used technology in recent years. Nowadays this technology has been widely implemented in schools and colleges. Exams are being done using OMR software since by making use of this method, the conduction of exam is getting much affordable, strong, and easier.In the proposed system, the layout of the answer sheet is created by using sheet design based upon our requirements. The role of our developed software is to pre-process the scanned answer sheets using noise reduction and skew detection. These scanned answer sheets after pre-processing are compared with the real answer model that is being stored in the database and answer checking process takes place. In this checking of answer, the black pixels count is found and the highest value position is searched. This maximum value position is compared with the true answer model. After the completion of the answer checking process, the number of correct answers are counted and results are generated. Based on the generated results, rank is generated and SMS is sent to the student. The working of the developed software is dependent on two modes of operations, namely Learning mode and Operation mode. The Learning mode includes operations like Sending the scanned sheets to the system, Pre-processing of the scanned sheets, Comparison between true answer keys and answer sheets of the students. The Operation mode only deals with how to retrieve result from the answer form. In the manual process of evaluation of answer sheets, lot of errors can occur such as counting mistakes and many more. This process is also time consuming. The Image processing technique helps in the faster evaluation of the answer sheets. Hence the developed Image-Processing Oriented Optical Mark Reader is used for faster evaluation of answer sheets.

II. LITERATURE REVIEW

Many methods have been implemented for preventing copyright infringements based on different technologies. In this session is discussed about few of these works.

Krisana Chinnasarn and Yuttapong Rangsanseri proposed a paper on optical mark reader using image processing [1].This paper aims to develop a system which is used to calculate the marks of the candidates in the competitive exams.This has got two modes which is learning mode and operation mode.The learning mode is mainly associated with how the

computer understands the input and performs the automatic processing and the operation mode is associated with how to obtain the results based on processing.

Sumitra. B. Gaikwad proposed a paper on OMR Sheet Scanning using image processing[2].This paper proposes a method in which the answer sheet of the candidate will be sent for scanning and the scanned image will be taken to be the in- put.Using image processing the total number of correct answer, wrong answer and not answered questions will be separately displayed.Totaling of scores is also done.This paper avoids the use of costly hardware and saves time.

Astha Gupta and Sandhya Avasthi proposed a paper on low cost method to the OMR process for surveys and research using image processing [3].This paper analysis the new technique which overcomes the limitations of OMR process. It scans the hard copies of paper which are designed and marked in specific template and saves the scanned copy in JPEG format. This includes 4 basic steps namely template designing, image capturing and performing transformation and scaling. The solution has been designed making use of open source tool and technology to keep it platform independent.

Russul Hussein Hasan , Emad Abdul Kareem proposed a paper on Optical Mark Reader Based on Modify Multi-Connect Architecture MMCA using image processing [4]. This paper proposes a system that works on two phases which is training phase and identification phase.This method was able to recognize multiple option.The system is 99.96 % accurate and its gaining importance in the field of education.Here the extraction of data is performed based on two axis and the in the checking of answer the number of black pixels is evaluated and results are generated.

Krisana Chinnasarn Yuttapong Rangsanseri and Punya Thitimajshima proposed a paper on text/Graphics Images removal of salt and pepper noise[5].This paper proposed a system which will perform comparison between the real answer sheetand scanned sheet of the candidate.If the scanned sheet matches the original sheet the further processing takes place or else not. For the answer evaluating process the number of black pixels will be found and results will be sent to the candidate in the form of SMS.

Lawrence O'Gorman and R. Kasturi proposed a paper on analysis of document image[6].This paper proposed a system that aims to identify the graphical images of the plain sheet and to extract the important facts or information. Processing of text is mainly associated with characters of a document and processing of graphs is mainly associated with the graphical content like the regular expressions.

III.SYSTEM DESIGN AND IMPLEMENTATION

Architecture diagram aid us to understand, analyze and convey our point of view about the system structure and the user requirement that the system supports.

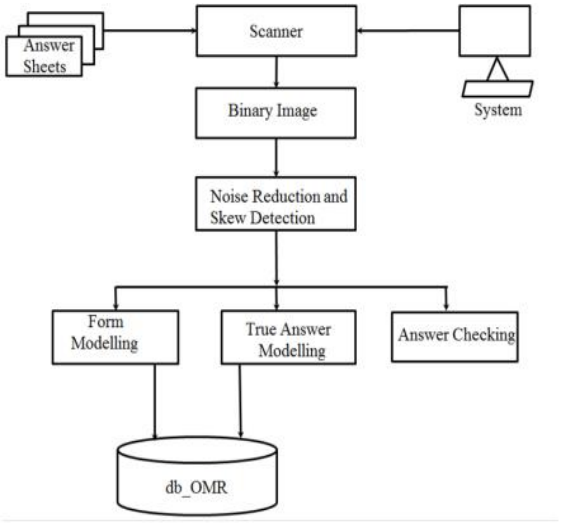

Figure 3.1:Architecture Diagram for Proposed System

In the proposed system, initially the true answer key will be stored in the database. The answer form of the student is sent as a binary digital image and pre-processed using noise-reduction and skew-detection. This mainly works in two modes namely learning mode and operation mode.In learning mde the model corresponding to each of the answer sheet is constructed by siignificantly collecting all horizontal and vertical lines in the blank sheet image. In operation mode each sheet fed to the systemhas to be identified by matching horizontal lines detected with every model.Then These processed sheets are compared with the true answer keys and answer checking process takes place in which number of black pixels is counted and maximum value position is searched and compared with true answer model. The position and size of the black pixels is stored in

form library. After answer checking process the results are calculated and SMS is sent to the student.

IV. RESULT ANALYSIS

Result and Analysis section deals with all the output obtained from all the various modules of the project. The analysis is specially meant to explain the inference of each output obtained.

Figure 8 gives accuracy result of each test whose accuracy is calculated after each of the processing of the scanned sheet by opical mark reader using image processing.

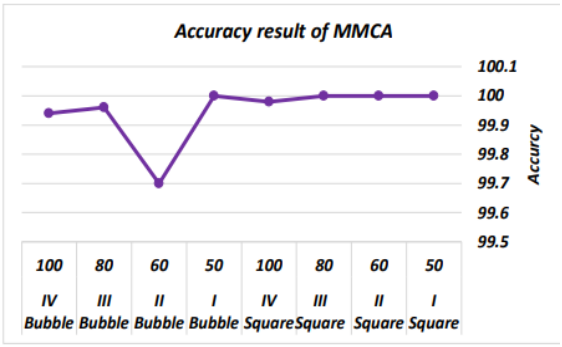

Figure 8: accuracy result of each test.

Figure 8 .Accuracy Result of Each Test

Figure 9 shows the processing time that is how fast the scanned sheets are processed automatically by optical mark reader and how fast the results are generated along with the rank.

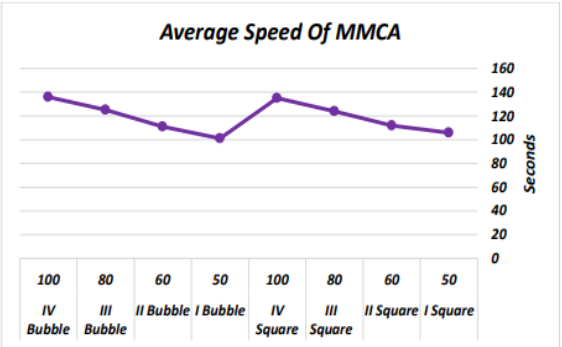

Figure 9: Process time of each test.

Figure 9. Process Time Of Each Test

V. CONCLUSION AND FUTURE WORK

OMR technology is the capturing of data technology used for self data entry into a computer. It is receiving importance in the field of education system. The system is designed with a simple user interface and it mainly focuses on reducing the cost. The input entered were been printed on the A4 sheets and this system eliminated the use of more expensive hardware components. The results and analysis proved that the system was 99.96% accurate

REFERENCES

[1] Y.Ranganseri, P. Thithimajshima and K . Chinnasarn"A single-pass algorithm for noise removal in binary document images, Proc 1998 IEEE Asia Pacific Conference on Communications/Singapore International Conference on CommunicationSystem,pp.673-675,1998.

[2] Ms.Sumitra B. Gaikwad, "Image Processing Based OMR Sheet Scanning", vol. 4, issue 3,march 2015

[3] Astha Guptha, Sandhya Avasthi " Image based low ccst method to the OMR process for surveys and research", vol. 2, issue-7,July 2016

[4] Rusul Hussein Hasan,Emad I Abdul Kareem " An Image Processing Oriented Optical Mark Reader Based on Modify Multi-ConnecArchitecture MMCA " , vol.2,Issue-7, July 2015.

[5] Stephen Hussmann, Leona Chan, C. Fung, M. Albrecht, "Low Cost and highspeed Optical mark reader based on Intelligent line Camera", Proceedings ofthe SPIE AeroSense 2003, optical pattern recognition XIV, Orlando, Florida,USA, vol. 5106, 2003

[6] K. Chinnasarn, Y. Ranganseri and P. Thitimajshima ,"Removing salt-and-pepper noise in text/graphics images Proc. 1998 IEEE Asia-Pacific Conference on circuits and systems,pp.459-462,1998..

[7] L. O'Gorman and R. Kasturi," Document Image Analysis IEEE Computer Society Press,1995