Optical Markup Recognition for Exam System

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Abstract—OMR technology has changed much in recent years. Now a day in school and colleges we use OMR technology. Exams are conducted using OMR answer sheet because by using this technology the conduction of exam is getting very easier, powerful, and cheap. In this system answer sheet layout is created by using sheet design depending upon our requirements. The role of scanner is just to scan the filled sheet and so any flatbed or ADF (Automatic Document Feeder) Scanner is used to scan the sheet. Basically we design software to check the answer sheet and display the results. Firstly the answer sheets are scanned through scanner and by using our software the answer sheets are checked and Results are displayed. In this system we don’t need to buy any specialized scanner by using any scanner we can do the required task. This project basically designed for our institute and we tried to make the system very user friendly. Also we can use it for more than one examination, as per the examination student entry will be added and Result displaying facility is provided as per our institutional requirements. Thus the results are stored in database as per examination.

As the system is used for examination the security concern is also provided with data import facility.

Keywords—OMR, ADF, OCR, ICR, SQL, MCQ

I. INTRODUCTION

1.1 Introduction To OMR:

Definition: OPTICAL MARKUP RECOGNITION (also called optical mark reading and OMR) is the process of capturing human-marked data from document forms such as surveys and tests.

OMR is a technology which uses hardware to detect the presence or absence of marks. This process is entirely automated, although it requires the use of specialist answer sheets, each of which is capable of holding 80 answers. A number of schools use an OMR system called Multiquest from Speedwell to do their optical mark recognition.

The most common use of optical mark recognition is to process student responses to a multiple choice exam, or responses to a questionnaire or feedback form. Typically the questions are provided on paper, and students mark their responses onto special pre-printed forms. These forms are then read automatically.
II. COMPONENT SELECTION AND DESIGN

2.1 Scanner selection
- This project eliminates the need to buy OMR reading machines or scanner
- By using any scanner available we can do the scanning of answer sheet
- System can be work on camera images also
- Cheaper ADF scanner is used to reduce system cost
- User friendly and flexible.

We are using HP SCANGET 2410 SCANNER for our project

2.2 HP scan jet 2410 scanner
- HP’s Scan jet G2410 is the cheapest scanner here, which makes it easier to forgive its drab looks and the way the lid's hinges lift out of their runners so easily.

![Figure 2 hp scan jet 2410 scanner](image)

Specifications of HP Scan jet G2410 Flatbed Scanner
- Operating System: Microsoft Windows 7, Windows Vista, Windows XP 32-bit and 64-bit, Windows XP x64, Windows 2000, Mac OS X v10.3.9, Mac OS X v10.4.11, 10.5, 10.6.
- Embedded Image Processing
- Optical Character Recognition (OCR)
- Interfaces : USB Port
  - Hi-Speed USB 2.0
- Machine Dimensions : Weight (Kg) : 2.2 kg

III. OVERALL SOFTWARE DESIGN

3.1 Programming language used: we use c# .net using visual studio
- C# is a multi-paradigm, object-oriented programming language encompassing strong typing, essential, declarative, efficient, class-based, and component-oriented programming disciplines. C# is one of the programming languages designed for the Common Language Infrastructure. C# is a well-designed and type-safe that allows C Sharp developers to build a wide array of secure and robust applications that run on the .NET Framework.
  - C# is based on reflection mechanism which is biggest advantage of C#.

3.2 A Forge Library
- AForge.NET is an open source C# framework designed for developers and researchers in the fields of Computer Vision and Artificial Intelligence - image processing, neural networks, genetic algorithms, fuzzy logic, machine learning, robotics, etc.
The framework is comprised by the set of libraries and sample applications, which demonstrate their features:

The framework is provided not only with different libraries and their sources, but with many sample applications, which demonstrate the use of this framework, and with documentation help files, which are provided in HTML Help format. The documentation is also available on-line.

**AForge.Imaging**, which is the biggest library of the framework so far, contains different image processing routines, which are aimed to help as in image enhancement/processing, as in some computer vision tasks:

- Linear color correction filters (RGB/HSL/YCbCr correction, brightness/contrast/saturation correction);
- Nonlinear color correction filters (contrast stretch, histogram equalization, color remapping, gamma correction);
- Image re-coloring filters (grayscale, sepia, hue modifier, rotate channels, invert);
- Pixel filtering by color (RGB, HSL, YCbCr color spaces);

### 3.3 Project database design diagram

![Database design diagram](image)

Above is the basic diagram for database design. Consists of 5 sections

- Correct answer
- Exam details
- Student details
- Student answers
- Exams appears

### IV. OVERALL SYSTEM DESCRIPTION

#### 4.1 Sheet design requirements:

**4.1.1. Registration number:**

Registration number is unique identity of the student appearing examination. On this basis we can search the detailed information of the student such as full name, phone number, gender, category etc. The number does not duplicate. Instruction for filling the sheet:

1. The sheet should not fold or crushed.
2. Use only black ball point pen only.
3. Use of pencil strictly prohibited.
4. Circles should darken properly and completely.
5. Provided with wrong and correct method of filling the details.

**4.1.2 Login**

Administrative will be having his unique id and password. When using login page user enters his login name and password with its user name it will be checked for password for that administrator.

#### 4.1.3 Register user:

In this section we can set the password for admin and other two users.

- Administration section can see and edit all the information
- Simple use can see the information but cannot edit any information
- Screenshot is given below

![Login form](image)
4.1.4 Logout:
In this section we can logout from one user after this we can login from another user Screenshot for this section given below.

4.1.5 Welcome Screen
Once login administrator can perform many tasks through this page
- An administrator can add and delete one or more exams
- An administrator can check student entry
- An administrator can create the answer sheet
- An administrator can search and update student details
- An administrator can process the student answer sheet
- An administrator can add appear student in exams
- An administrator can view score
- An administrator register for new user
- An administrator can change the password
4.1.7 Add exam:
In this section we can add one or more exam as per the requirement. Every exam has their unique Id. The Id is auto generated.
- Here the administrator can add the name of the examination to be conducted.
- Can add the passing marks of the examination.
- Can select the date of the examination.
The administrator save the examination record in database, the screenshot is as shown below.

![Register students form](image1)

Figure 11 Register students form

4.1.8 Create Answer sheet:
As per examination administrator have to create answer key for the examination
- The administrator has to select exam and according to that exam answer key to be filled.
- According to question number answers option wise i.e: A, B, C, D, E are selected.
- Question number section is provided only to understand the question (not compulsory to add question).

![Create answer sheet form](image2)

Figure 12 Create answer sheet form

4.1.9 Search and update student’s details
- In this section is used to search the student details.
- In registration number block after adding reg. no and clicking search button all the student details will automatically imported as per the block
- This data we first of all added in student entry block
- By adding this section the student search is very simple.
The screenshots are given below.

![Search students form](image3)

Figure 13 Search students form

4.1.10 Create Answer sheet
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![Create answer sheet form](image4)

Figure 14 Create answer sheet form
4.1.11 Search and update student’s details

- In this section is used to search the student details.
- In registration number block after adding reg no and clicking search button all the student details will automatically imported as per the block.

![Image of Search students form](image1)

**Figure 15 Search students form**

4.1.12 Add and appear students in exam

- Even if the student entry are more only the student appear in exam are selected to process on the answer sheet.
- We have to select the exam the other information like passing marks will automatically imported.
- By selecting registration number all entry will be displayed.
- After clicking on add button student entry will be confirmed.
- This section will added to avoid the confusion between the student entry and appear student.
- Here they appear student answer sheet will be processed further.

![Image of Exam details form](image2)

**Figure 16 Exam details form**

4.1.10 Process

- In this section the main task i.e the processing on answer sheet is done.
- The student scanned answer sheet a new the correct answer sheet both are compare to calculate the score.
- First of all we have to select exam name and click on search button.
- After that the exam appeared students will be displayed.

![Image of Generate result form](image3)

**Figure 17 Generate result form**
V. RESULT FORM

- After that click on next button
- Following window will be displayed
- Here we have to browse the image
- Then click on process and taskbar button
- Wait for some time
- Confirm registration no button is used to confirm the registration no.
- Due to this the answer sheet will be confirmed for student answer sheet
- Read paper button is used to read the blocks of filled answer sheet
- Then the numbers calculated block wise are stored in database to calculate the score.
- The screenshot is given below

Top Highest by:

In this section we can see the scores of the students. The scores are available category wise, gender wise, exam wise etc

- By clicking on search by button
- We can select the entry category wise, registration no wise etc
- In this block the highest scores are display
- Hence it will be very easy to manage the student scores
- By clicking on button only we can get merit list very quickly
- The screenshot of this button shown below

VI. CONCLUSION

This chapter discusses the development of the project, and explains how several decisions led to a successful implementation an automated tool for e-learning. The first section analyses the development of the project from requirements through to implementation, and the second section discusses future work. The following conclusions will we get from the overall system

- The system will give 100% accuracy if the bubble marking is proper
- Can show the result category wise, registration number wise etc
- The student registration number will get auto generated.

REFERENCES