Better Safe Than Sorry:
Smart Sheet Based Attendance System.

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Abstract

It is very important for the effective functioning of an organization to maintain its attendance record properly, and because of this very reason we have created Smart Sheet Attendance System which provide us finest of details about attendance record of university students.

Our core purpose of designing Smart Sheet Attendance System is to provide an easy way not only to automate all student's attendance related functionalities of a university but also to provide full functional reports to the top management of the university semester wise.

Smart sheet based attendance system provides an environment where you can manipulate data and information about student's attendance record easily.

smart sheet based attendance system is a simple platform where student's attendance record can be maintained easily by just scanning the attendance sheet and then import the scanned image in to the smart sheet based attendance system then our proposed system will automatically manage the record on its own and will create its excel sheet automatically and at the end of the semester it will provide semester wise detail structure of student's attendance record.

smart sheet attendance system is not time taking it saves the time of both students and teachers and make it easier for teachers to maintained the record of students properly in less time.

Problem Statement Hypothesis:

In our university departments, attendance of students is being conducted in such a way which is time taking and there is obvious chance of inaccuracies and because of these reasons we have decided to develop smart sheet based attendance system which will maintain the student's attendance record in a way which is easy to collect, maintain, and retrieve.

This was our main intention behind creating the smart sheet based attendance system to make it easier for the teachers to maintain the student record easily and quickly.

Approach

The required hardware to design our project is easy to maintain and easy to implement. It is of low cost and easy to get, and we have used these tools and technologies in order to complete our project:

Tools

Hardware Involved

Camera/Scanner
LCD/Monitor to Display (Personal Computer)

Software Involved
Adobe Photoshop (Design Sheet)
MATLAB R2013 (For Processing Sheets)
Excel (For Record Storage)

HARDWARE:

We have use two hardware:

Scanner:

As we, known scanner is a device, which converts a hardcopy into a soft copy.

Hardcopy can be a picture, magazine pages, posters, documents etc.

Laptop/Personal Computer:

As our application is desktop, it will require laptop or personal computer on which our software can run we are going to use personal computer or laptop for display purpose. When our sheet is processed then the Result will be display on Screen.

SOFTWARE:

The system includes the following Software:

MATLAB:

MATLAB is a high-level language provides us an interactive environment for numerical computation, visualization, and programming.

By using MATLAB, we can analyze data, develop algorithms, and create models and applications.

We can use MATLAB for a range of applications, image and video processing, including signal processing and communications, test and measurement, control systems, computational finance, and computational biology.

DESINGING IN MATLAB:

We are going to design our GUI in MATLAB so when we start MATLAB the desktop appears in its default layout.
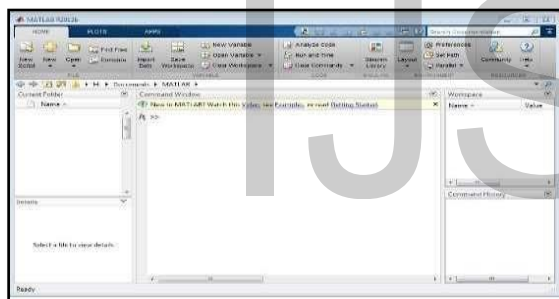
THE DESKTOP INCLUDES THESE PANELS:

- **Current Folder** — To access our files.

- **Command Window** — We can Enter commands at the command line, indicated by the prompt

    (>>).

- **Workspace** — We can Explore data that you create or import from files.

- **Command History** — We can View or rerun commands that you entered at the command line.
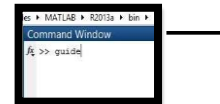
USE OF COMMAND WINDOW:

Then we are going to write guide in command window and will select the option blank GUI (default). GUI is graphical user interface which is a graphical display that enable a user to perform interactive tasks. The user of the GUI does not have to create a script or type commands at the command line to accomplish the tasks. The user of a GUI need not understand the details of how the tasks are performed.

After selecting that these option will appear, which includes menus, toolbars, push buttons, radio buttons, list boxes, and sliders—just to name a few.
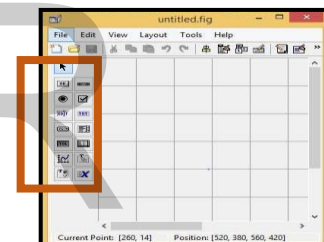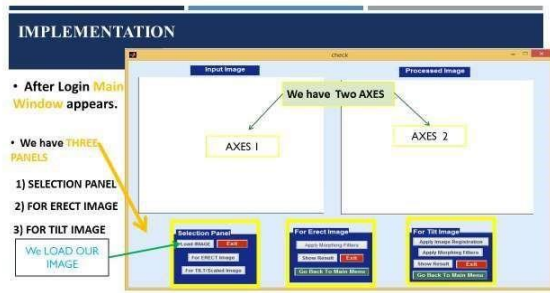


HOME WINDOW

LOGIN WINDOW

MAIN WINDOW

MICROSOFT EXCEL

Excel involves Excel Spreadsheets which is a collection of cells and where you keep and store the data. Excel sheet presents tables of values arranged in rows and columns that can be manipulated mathematically using both basic and complex arithmetic operations and functions.

Excel also offers programming support and here we will use MATLAB programming to be supportive for our project and it also contains sub-sheets within it.
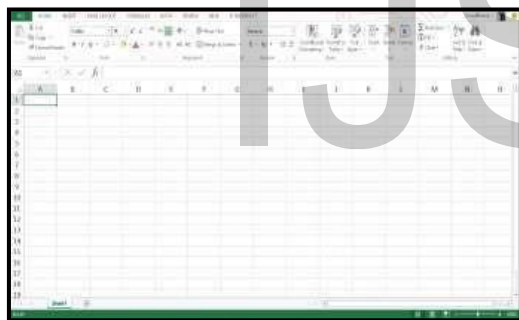
A simple sheet is to be designed in Microsoft Excel which is comprises of data including Department, Batch, Section, Subject, Date. Each roll numbers of the student are prescribed in rectangular box
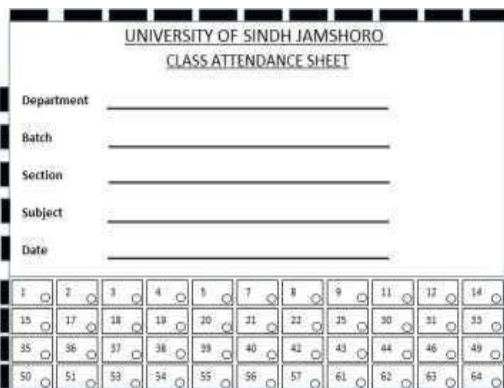
along with a small circle in the same box, used for marking presence or absence. The sheet also consists of the boxes like Department name, Batch, Section, Subject, Date. The sheet is specified within the borders to maintain the threshold of the sheet while scanning.

TECHNOLOGIES

Digital Image Processing:

Digital image processing deals with manipulation of digital images through a digital computer. It is a subfield of signals and systems but focus particularly on images. DIP focuses on developing a computer system that can perform processing on an image. The input of that system is a digital image and the system process that image using efficient algorithms, and gives an image as an output. The most common example is Adobe Photoshop. It is one of the widely-used application for processing digital images.

It is processing digital images by means of computer, it covers low-, mid-, and high-level processes

- low-level(DIP): inputs and outputs are images – reduce noise, image enhancement, sharpening etc.
- mid-level (Image Analysis): outputs are attributes extracted from input images – edges, contours etc.
- high-level(CV): an ensemble of recognition of individual objects

How it works:

An image has been captured by a camera and has been sent to a digital system to remove all the other details, and just focus on the water drop by zooming it in such a way that the quality of the image remains the same.
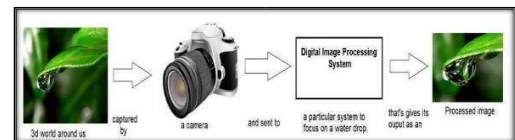
EXPECTED OUTCOMES

Plan of Actions:

The following table presents the different steps that need to be accomplished to develop the software application.

Steps	Tasks
Step 1	Review of existing technologies.
Step 2	Determine Requirements.
Step 3	Design the Sheets.
Step 4	Apply Morphing Filters.
Step 5	Apply Image Registration.
Step 6	Perform Segmentation.
Step 7	Process the Sheet.
Step 8	Enter the record of student presence or absence on EXCEL SHEET.
Step 9	Implement Graphical user interface (GUI).
Step 10	Testing the system on multiple Sheets.
Step 11	Documentation.

After completing these things, we are going to test our proposed attendance system

1. Admin login.
2. Scanner is used to scan the image.
3. Erect image after Scanning.
4. Rotated or Scaled image after scanning
5. Image registration is applied on rotated image to make it straight.
6. Erect image is passed through morphing filters
7. After straightening rotated image is passed through morphing filters.
8. Image segmentation to segment out attendance portion into separate rows and columns.
9. Threshold values are calculated.
10. Excel Sheet used to store the absence and presence record of student automatically.
11. Record is retrieve when required.

GUI is designed in such a way that it can work in two modes.

1. **Sheet is erect.**
2. **Sheet is Rotated or Erect.**

1. Erect Sheet:

After loading an image if it is erect then it checks only for filtration. Because when we scan, the sheet there might be certain Noise. Therefore, for noise removal we use Morphing Filters. After this Sheet is processed and record of student absence or presence is stored on Excel sheet automatically.

### 2. Rotated or Scaled Sheet:

After loading an image if it is erect then it does not directly check for filtration but first it applies Image Registration Algorithm to straighten the rotated image. This rotation is may be due to angle change while capturing the image from camera or mobile phone. After performing image registration similar task is performed as on erect sheet. Filters are applied for noise removal. After this Sheet is processed and record of student absence or presence is stored on Excel sheet automatically.

Noise Removal Algorithm:

Morphing filters will be apply on imported image in order to remove noise from the attendance sheet.

- Resultant image would me much sharper and clear.

- It will make text more visible too.
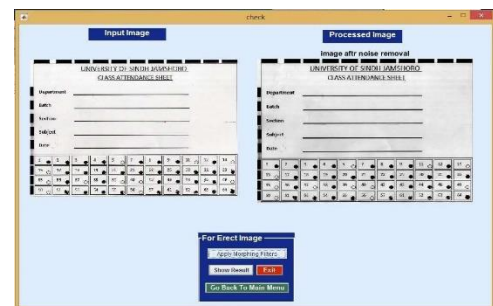
Segmentation:

After removal of noise from the attendance sheet further processing will be done by clicking show result button option.

- Perform Region Based Segmentation Algorithm, when noise removal from the Attendance sheet is completed.

- Region Based Segmentation Algorithm will segment out whole sheet

- We will process the attendance portion of the Sheet.

- Segmented portions are like.
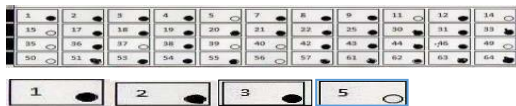
Marking of Roll Numbers as Present or Absent:

After processing attendance sheet would be like this


Description of Processed Sheet:

We have defined roll number of each student in a rectangular box, which consist of roll number and small circle for marking the attendance of the student by filling the small circle.
Now we are going to discuss all-important factors, which are important and necessary for the identification of student attendance record so that there should not be any misconduct while marking the attendance.

There are some cases regarding the marking of our sheet which are:

Case 1: When the Roll number is Present:

To distinguish about the presence of a student, teacher will have to fill the circle inside the rectangular box with a pen marker etc. When the student is present the output will show the green signal as shown in the fig:
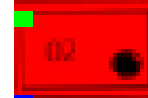
Case 2: When the Roll number is absent:

When the circle inside the rectangular box is not filled with the marker, pen etc. the system will read it as absent if the teacher wants to mark a student as absent they will leave the circle inside rectangular box. It will be counted as absent, the output will be shown by the red signal in the corner of the rectangular box as shown in the fig:
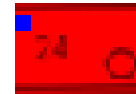
Case 3: When the rectangular box is not filled properly:

When the rectangular box is not filled properly it will be counted as absent, for this teachers have to be careful while taking the attendance so that it may not mark any absent of any student who is present. An example is shown in the fig:

Storage of record in Excel File Automatically:

BEFORE

Before processing Excel Sheet is empty and
lecture completed is zero

AFTER

After processing Excel Sheet is, generate and all
the record present on the attendance sheet is
stored on excel sheet.