DEPARTMENT OF TELECOMMUNICATION ENGINEERING MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO

Project Instructions
Subject: Communication Systems (TL323)
Semester: 5th, 3rd Year (20TL Sec I)

Project Work:

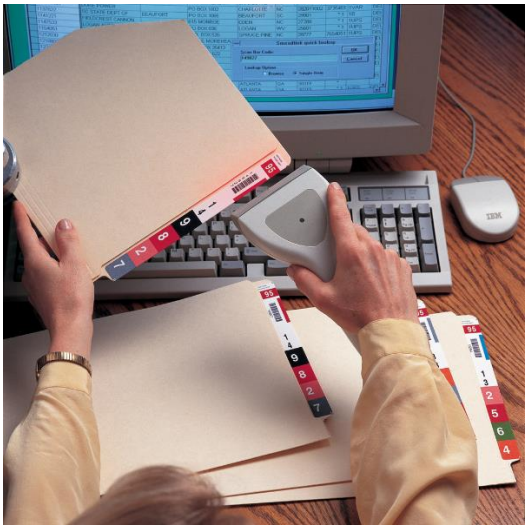
Title: ***File Tracking and Workflow Management.***

GROUP PARTICULARS (Group Leader 1ST)

S#	NAMES
1.	TAYYABA(20TL023)
2.	SYEDA BISMA (20TL113)
3.	SYEDA TOOBA (20TL085)
4.	FARZEEN (20TL021)
5.	FARWA RAIS (20TL029)

Objectives:

#	*Statement*	CLO	PLO	Taxonomy level
03	The objective of this project is to ***File Tracking and Workflow Management.***		4, 5, 9, 11	Organization – P6

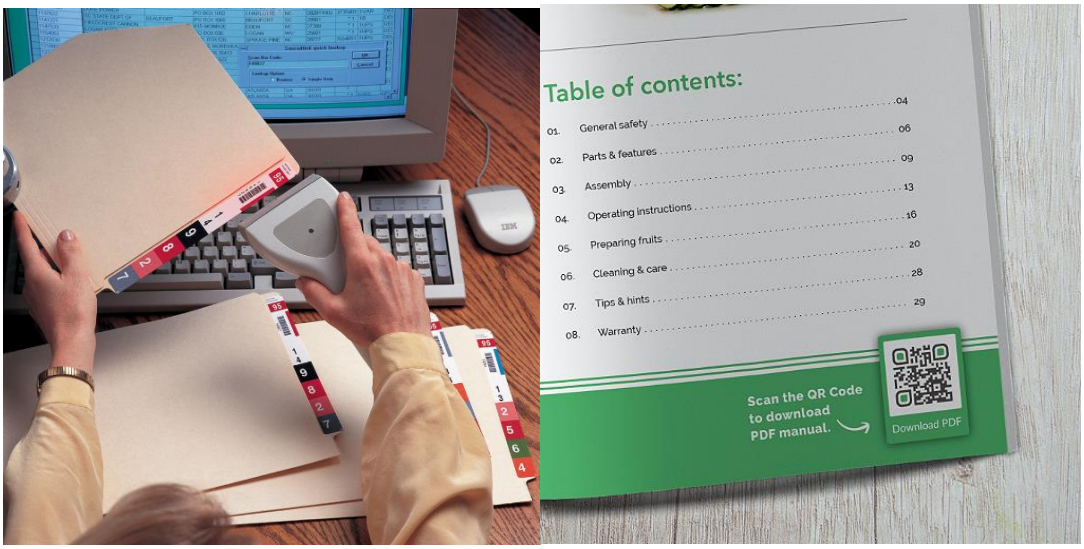


INTRODUCTION:

The rapid increase in the use of digital technologies has led to a significant reduction in the use of traditional paper-based document management systems. However, despite this shift, many organizations still rely on paper-based systems for tracking and managing important documents. This can be a cumbersome and time-consuming process, leading to inefficiencies and errors.

The purpose of this project is to develop a file tracking workflow management system that will be implemented in a university setting. The system will enable users to scan letters using a QR code and login details that are specific to them. This will help to ensure that documents are accurately tracked and updated in real-time, providing a more efficient and effective workflow management process. The system will be designed to update an Excel sheet, which will serve as a central repository for all scanned documents. This will allow for easy access and management of documents, as well as providing a record-keeping system for all incoming and outgoing correspondence.

This project will utilize modern technologies and methods to ensure that the system is user-friendly and accessible to all members of the university community. It will be designed to be flexible and adaptable to the changing needs of the university, while also providing a sustainable and cost-effective solution for managing important documents.



WORKING PRINCIPLE:

File tracking and workflow management are crucial components of any organization's operations. They involve the monitoring and control of files and documents as they move through various stages of a workflow. The goal of a file tracking and workflow management system using QR codes in Python is to increase efficiency and productivity by providing users with a streamlined and automated way to manage files and workflows. The system makes it easy to track files, manage workflows, and generate reports, while minimizing errors and reducing manual data entry.

- **QR code generation:** Unique QR codes are generated for each file that needs to be tracked. The QR code contains metadata about the file, such as its name, password, and status in the workflow.
- **QR code scanning**: When a file is checked in or out of the system, its QR code is scanned using a mobile device or a computer with a camera. The system reads the metadata encoded in the QR code and updates the database accordingly.
- **Workflow management:** The system tracks the status of each file in the workflow and notifies users when they need to take action. Workflows are defined in the system, specifying the steps that files must go through and the users responsible for each step.
- **User interface:** Users interact with the system using a user interface that allows them to check files in and out, view workflows, and generate reports. The interface is designed to be easy to use and intuitive.
- **Database management**: The system stores information about files, workflows, and users in a database. The database is designed to efficiently store and retrieve large amounts of data, and can be backed up and restored in case of data loss.

WORKING STEPS:

STEP 1: **(*LOGIN DETAILS*)**

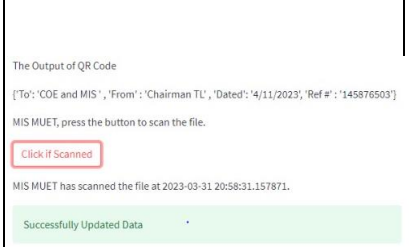
- *User navigates to the login page:* The user would navigate to a login page, which would be a part of the web-based user interface.
- *User enters their credentials*: The user would enter their username and password into the appropriate fields on the login page.

LOGIN DETAILS

ID No:	USER ID	USERNAME	PASSWORD
1	chairman_tl	Chairman TL	abcd
2	dean_feece	Dean Feece	efgh
3	coordinator_exams	Coordinator Exams	ijkl
4	director_finance	Director Finance	mnop
5	mis_muet	MIS MUET	qrst
6	icpc_muet	ICPC MUET	uvwx
7	vc_muet	VC MUET	muet

STEP 2: ***(VERIFIES CREDENTIALS)***

- *System verifies credentials:* When the user submits the login form, the system would verify their credentials against a database of registered users. Once they login have to design a QR code scanner to scan the file. QR scan Code is programed using python language.

CAPTURE	SHOW	QR CODE DATA
		

STEP 3: ***(ACCESS TO USERS)***

- *System grants access:* If the user's credentials are valid, the system would grant them access to the file tracking and workflow management system. This would scan the info of the user and then a button appears on the screen. that scans the user information.

- *System denies access:* If the user's credentials are not valid, the system would deny them access and display an error message on the login page.

STEP 4 : ***(QR CODE SCANNED INFO)***

- The information of the QR Code and time of the scan information should be shown on excel sheet.

To log in using a QR code with a file reader, you can follow these general steps:

- **Open a page and read a QR code:** we'll create a simple helper function called read_qr_code() to read the value embedded in the QR code that may (or may not) be present on each page. We'll pass the filename to the function holding the path to the file, then we'll use the cv2.imread() function to read the QR code. We'll then instantiate the cv2.QRCodeDetector() class and use the detectAndDecode() function to extract the data from the QR code, if one can be read. The detectAndDecode() function returns several values, but we only want the text stored in the QR code, so we're only returning the value part.
- **Run the QR code reader:** To test the function we'll load up a page of a lateral flow test result showing a QR code by passing the file path to the read_qr_code() function we just created, then we'll print out the value. This successfully extracts the correct digits from the QR code page using the QR code reader.
- **Read a directory of images and extract the QR code value:** the read_qr_code() function on each file, storing the filename and QR code value back to our dataframe. In just a few minutes, OpenCV can open, read, and detect the QR codes and store the outputs for you.

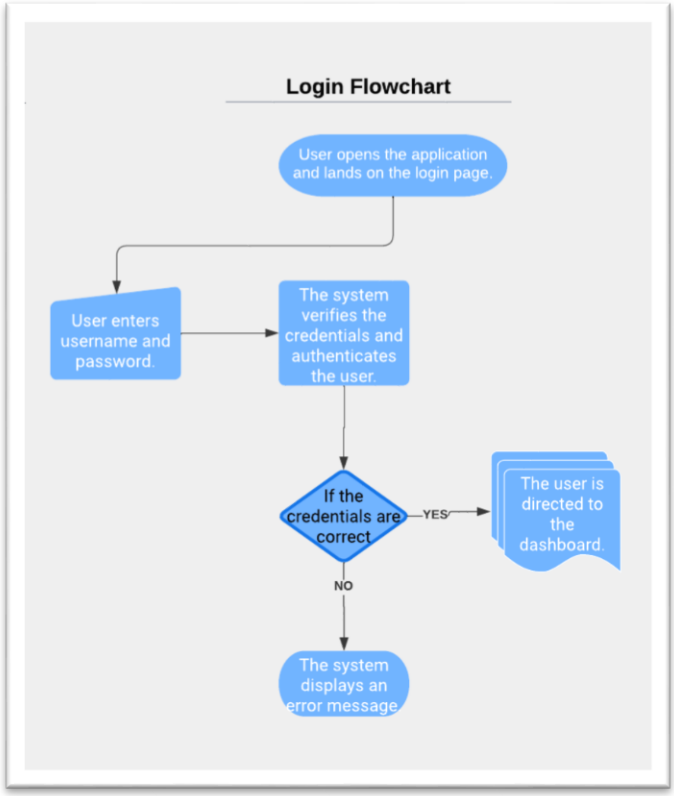
{'To': 'ChairmanTL and ICPC' , 'From' : 'DeanFeece' , 'Dated': '3/11/2023', 'Ref #' : '123253843'}	{'To': 'COE and MIS ' , 'From' : 'Chairman TL' , 'Dated': '4/11/2023', 'Ref #' : '145876503'}	{'To': 'MIS and Chairman TL ' , 'From' : 'ICPC' , 'Dated': '7/11/2023', 'Ref #' : '139876563' }	{'To': 'VC' , 'From' : 'Chairman' , 'Dated': '14/11/2023' , 'Ref #' : '1973527459'}

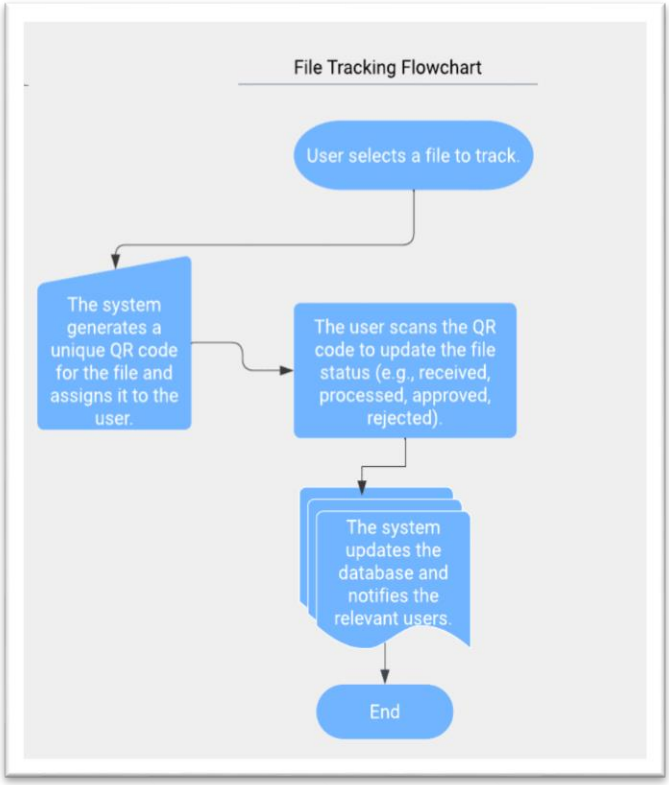
STEP 4 : ***(QR CODE SCANNED Contents)***

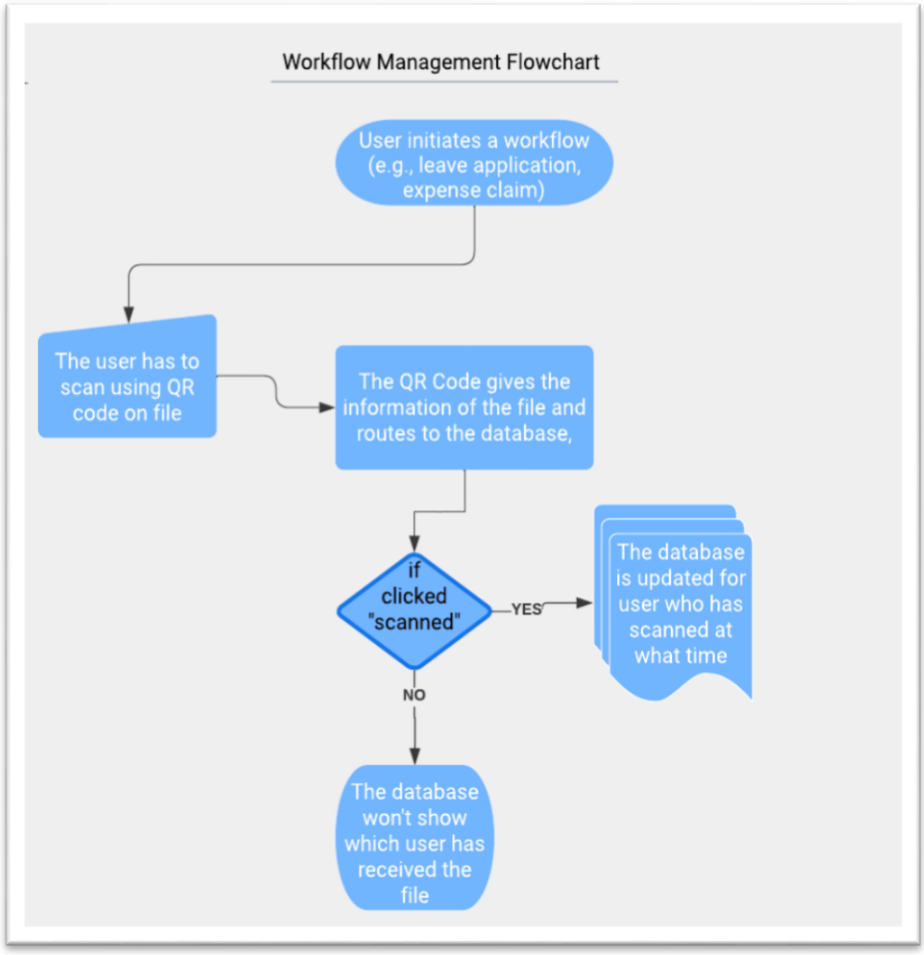
- the QR code having the (TO and FROM) information of any document,along with this the QR code code covering the information of reference number of document and the date of the reception of the document.
- All of this information is storing in the excel sheet. excel sheet create the rows and columns for all these fields(TO, FROM ,DATE & REFRENCE ID) and store the information. additionally, there are one more interesting feature of this app i.e. there is one button which appear after the scanning of the QR code that button enters the name of the person who signed in lastly.
- For example, output of the QRcode having the message that vice chancellor please click the button. so that when the button is selected the status of the user who scanned the document is updated in the excel sheet.

User authentication page of the application is also performing the amazing role. through the user log in detail we can easily identify the location of the document, where and by whom did the document is scanned last time. the user columns is filled or getting information in the excel sheet by the user log in through this log in details after scanning the app display the message of click the button to the logged in person after clicking on the button the user column in the sheet save the information.

FLOWCHART/PSEUDO CODE:







CODE FOR APPLICATION:

```
import streamlit as st
import streamlit_authenticator as stauth
import numpy
import cv2
from PIL import Image
import pandas as pd
from datetime import datetime

file_dict = {"Scanned By": []}


def qrcode(name):
# Initialize session state
if "captured_image" not in st.session_state:
st.session_state["captured_image"] = None

# Define app layout
st.subheader("QR Code Scanning Of files")
col1, col2, col3 = st.columns(3)

# Capture QR code image using camera input
with col1:
capture_qr_code = st.camera_input(
"Scan Your QR Code Here",
key="cameraQRCode",
help="Place the QR Code correctly the camera for better results",
)
if capture_qr_code:
st.session_state["captured_image"] = capture_qr_code

# Display input QR code image
with col2:
st.markdown("The Input QR Code")
if st.session_state["captured_image"]:
st.image(st.session_state["captured_image"])

# Decode QR code and display output
with col3:
st.markdown("The Output of QR Code")
if st.session_state["captured_image"]:
img = Image.open(st.session_state["captured_image"])
opencvImage = numpy.array(img)
qrCodeDetector = cv2.QRCodeDetector()
data = qrCodeDetector.detectAndDecode(opencvImage)
output = str(data[0])
st.write(output)

def scan_file(name):
file_dict["Scanned By"].append(st.session_state["name"])
st.write((f"{name} has scanned the file at {datetime.now()}."))
st.success("Successfully Updated Data")
# Define a function to scan the file and update the dictionary

st.write(f"{name}, press the button to scan the file.")
button = st.button("Click if Scanned")
if button:
scan_file(name)
s = output.replace("{", "")
finalstring = s.replace("}", "")
# Splitting the string based on , we get key value pairs
list = finalstring.split(",")
dictionary = {}
for i in list:
# Get Key Value pairs separately to store in dictionary
keyvalue = i.split(":")
# Replacing the single quotes in the leading.
m = keyvalue[0].strip("'")
m = m.replace('"', "")
dictionary[m] = keyvalue[1].strip("\"'")
dict2 = {
"User": st.session_state["name"],
"Status": "Received",
"Date-Time": datetime.now(),
}
```

```
dictionary |= dict2
dictionary |= file_dict
df                              =
pd.read_excel("datasheet.xlsx")
df    =    df.append(dictionary,
ignore_index=True)
df.to_excel("datasheet.xlsx",
index=False)


def login():
names = [
"Chairman TL",
"Dean Feece",
"Director Finance",
"Coordinate of Exams",
"ICPC MUET",
"MIS MUET",
"Vice Chancellor",
]
usernames = [
"chairman_tl",
"dean_feece",
"director_finance",
"coordinator_exams",
"icpc_muet",
"mis_muet",
"vc_muet",
]
passwords  =  ["abcd",  "efgh",
"mnop", "ijkl", "uvwx", "qrst",
"muet"]
hashed_passwords                =
stauth.Hasher(passwords).genera
te()
authenticator                   =
stauth.Authenticate(
names,
usernames,
hashed_passwords,
"some_cookie_name",
"some_signature_key",
cookie_expiry_days=30,
)
name,     authentication_status,
username                        =
authenticator.login("Login",
"main")

if
st.session_state["authenticatio
n_status"]:
test                            =
authenticator.logout("Logout",
"main")
st.write(f'Welcome
{st.session_state["name"]}')
st.title("FILE   TRACKING   AND
WORKFLOW MANAGEMENT")
qrcode(name)
elif
st.session_state["authenticatio
n_status"] == False:
st.error("Username/password  is
incorrect")
elif
st.session_state["authenticatio
n_status"] == None:
st.warning("Please  enter  your
username and password")


def main():
st.set_page_config(page_title="
CS Project APP", page_icon="📂",
layout="wide")
login()


if _name_ == "_main_":

main(
```

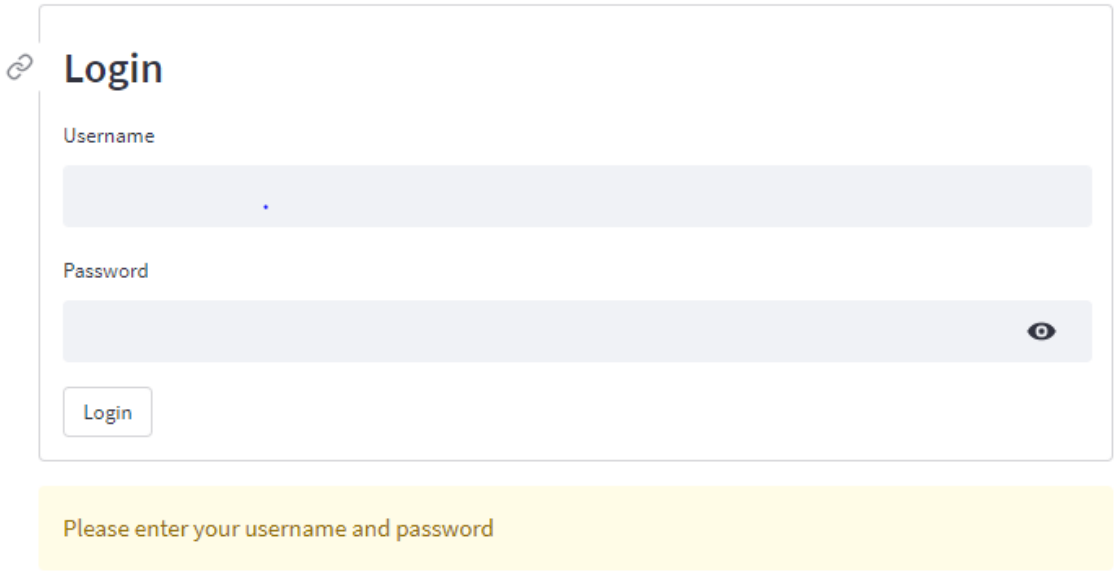
CODE EXPLANATION:

The code above is a Python script for a Streamlit web application that allows users to scan a QR code, retrieve data from it, and then update an Excel file with the scanned data. The application requires users to authenticate themselves using a predefined set of usernames and passwords before they can access the QR code scanner and update the Excel file.
Here is a breakdown of the code and how it works:

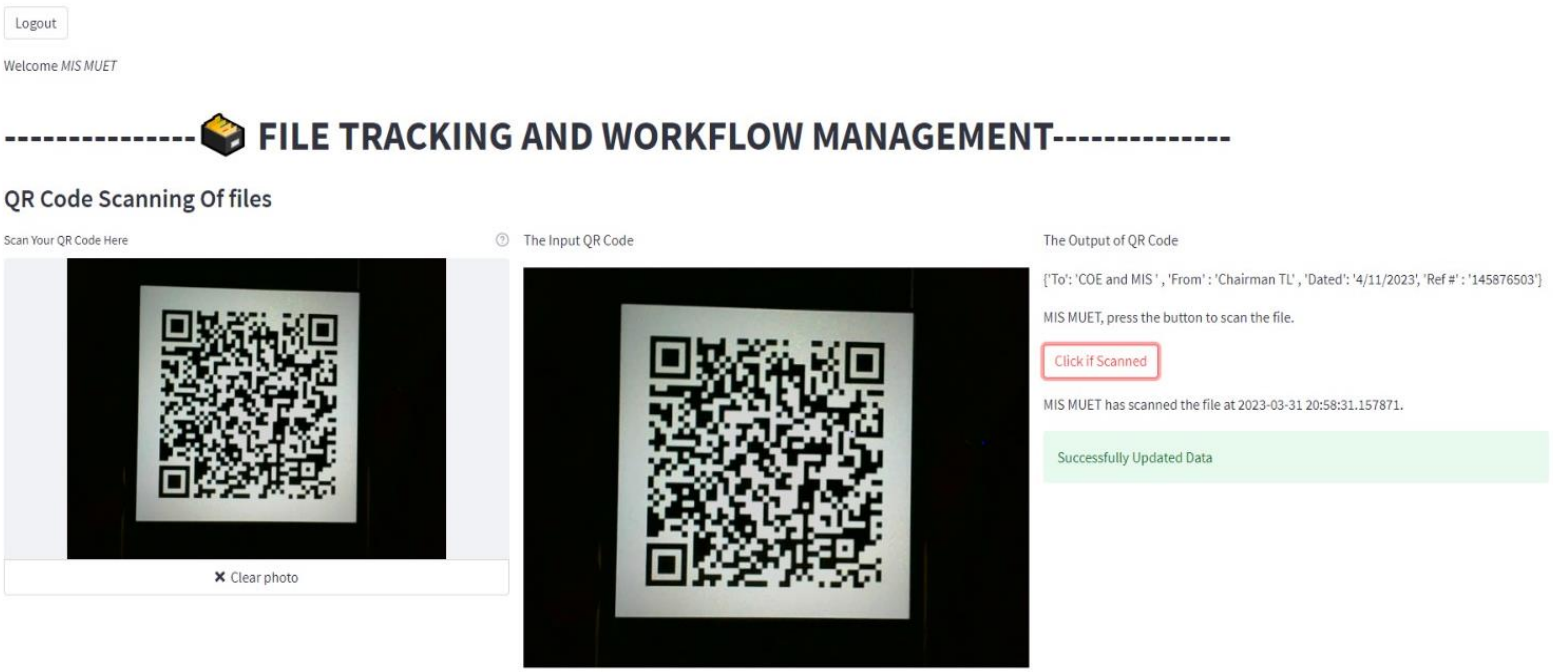
1. The necessary Python libraries and modules are imported, including Streamlit, OpenCV, NumPy, Pandas, and datetime.
2. A dictionary file_dict is initialized, which will be used to store the name of the user who scanned the file.
3. The qrcode function is defined, which creates the main interface of the web application. It first initializes the captured_image state variable to None.
4. The interface is divided into three columns using the st.columns() function. The first column contains a camera input that captures the QR code, the second column displays the captured QR code image, and the third column displays the decoded output of the QR code.
5. When the user clicks the "Click if Scanned" button, the scan_file function is called, which appends the name of the user who scanned the file to file_dict and displays a success message.
6. The decoded output of the QR code is then cleaned up and converted into a dictionary format. The dictionary is then updated with additional information, including the name of the user who scanned the file and the current date and time.
7. The updated dictionary is appended to an Excel file using the Pandas library.
8. The login function is defined, which authenticates the user using a predefined set of usernames and passwords. If the user is authenticated, the qrcode function is called to display the main interface. If not, the user is prompted to enter their credentials again.
9. The main function is defined, which sets the Streamlit page configuration and calls the login function to start the authentication process.
10. Finally, the if _name_ == "_main_": block calls the main function to run the Streamlit web application.

FINAL RESULTS:

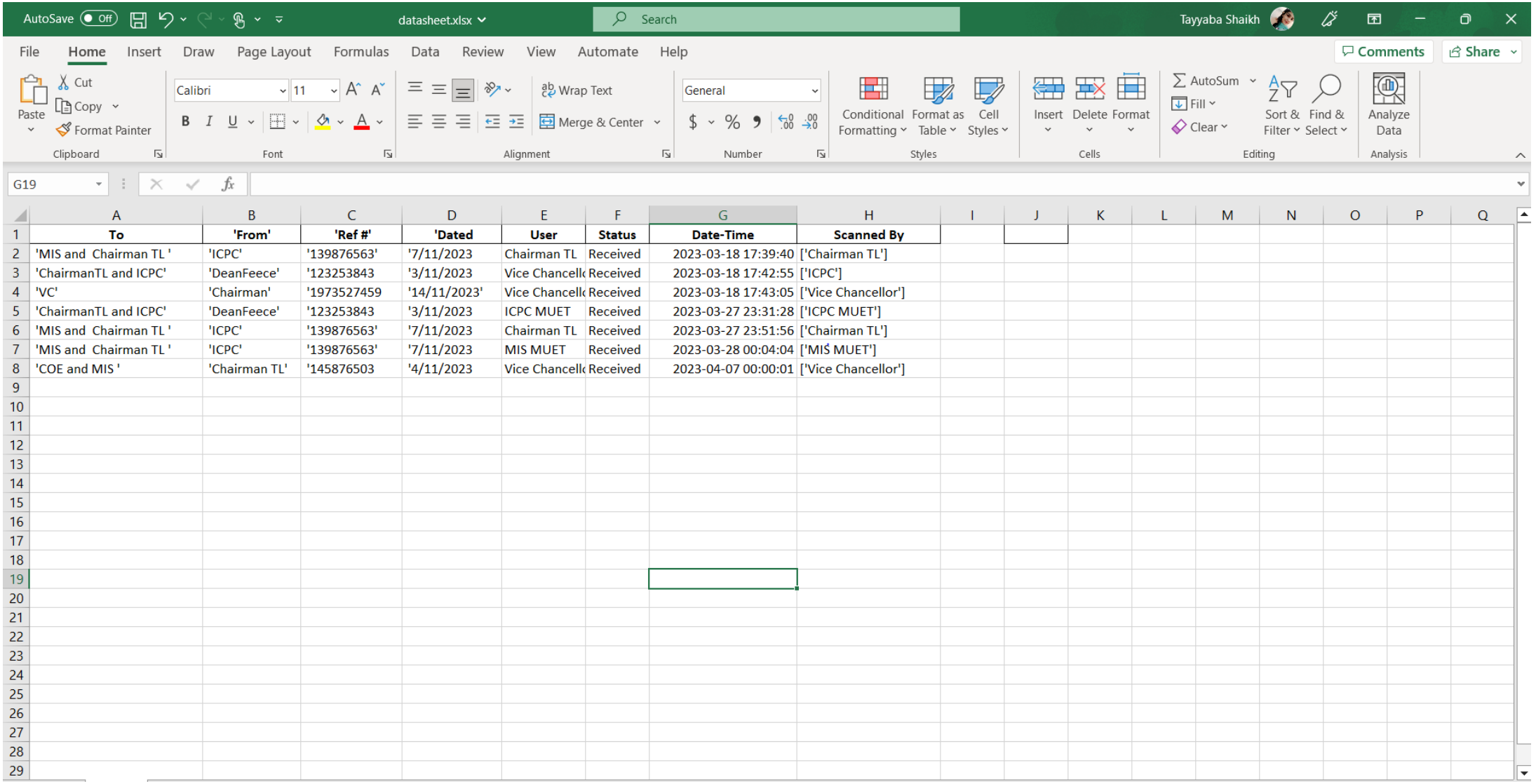
- ## WEBSITE LOGIN PAGE:



- ## WEBSITE MAIN PAGE:



- **DATABASE SCANNED RESULTS:**



AutoSave Off | datasheet.xlsx | Search | Tayyaba Shaikh

File Home Insert Draw Page Layout Formulas Data Review View Automate Help | Comments | Share

Paste | Cut | Copy | Format Painter | Clipboard | Calibri | 11 | Font | Wrap Text | Merge & Center | Alignment | General | Number | Conditional Formatting | Format as Table | Cell Styles | Styles | Insert | Delete | Format | Cells | AutoSum | Fill | Clear | Sort & Filter | Find & Select | Editing | Analyze Data | Analysis

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1	**To**	**'From'**	**'Ref #'**	**'Dated**	**User**	**Status**	**Date-Time**	**Scanned By**									
2	'MIS and Chairman TL '	'ICPC'	'139876563'	'7/11/2023	Chairman TL	Received	2023-03-18 17:39:40	['Chairman TL']									
3	'ChairmanTL and ICPC'	'DeanFeece'	'123253843	'3/11/2023	Vice Chancell	Received	2023-03-18 17:42:55	['ICPC']									
4	'VC'	'Chairman'	'1973527459	'14/11/2023'	Vice Chancell	Received	2023-03-18 17:43:05	['Vice Chancellor']									
5	'ChairmanTL and ICPC'	'DeanFeece'	'123253843	'3/11/2023	ICPC MUET	Received	2023-03-27 23:31:28	['ICPC MUET']									
6	'MIS and Chairman TL '	'ICPC'	'139876563'	'7/11/2023	Chairman TL	Received	2023-03-27 23:51:56	['Chairman TL']									
7	'MIS and Chairman TL '	'ICPC'	'139876563'	'7/11/2023	MIS MUET	Received	2023-03-28 00:04:04	['MIS MUET']									
8	'COE and MIS '	'Chairman TL'	'145876503	'4/11/2023	Vice Chancell	Received	2023-04-07 00:00:01	['Vice Chancellor']									
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▪ SAMPLE FILE FOR TESTING QR CODE SCANNER:

MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY
JAMSHORO, SINDH, PAKISTAN
Phone No. 022-2109010 Fax: 022-2771403
Email: ag.kandhir@admin.muet.edu.pk

ISO-2008 CERTIFIED

Deputy Director
Procurement

No. & date: DD(Proc.)/MUET/JAM/-77, 02-04-2015

Scan Here

Dear Chairman and Vice-Chancellor,

I hope this letter finds you both in good health and spirits. As the Dean of the Faculty of Economics and Business Studies, it is my pleasure to write to you today regarding a matter of great importance.

Firstly, I would like to reference this letter as "**1973527459**" and mention that today's date is **14/11/2023**

As you may be aware, our faculty has been actively engaged in research and academic activities that have garnered attention both nationally and internationally. However, in recent years, we have faced challenges in securing sufficient funding to support these activities.

I am writing to request your assistance in securing additional funding for our faculty. This funding is necessary to support our ongoing research initiatives, recruit new faculty members, and provide our students with the resources they need to succeed.

Furthermore, I would like to highlight the impact that this funding would have on our ability to attract and retain top talent in the field of economics and business studies. By providing our faculty members with the necessary resources, we can ensure that they are able to conduct cutting-edge research and provide our students with a world-class education.

In conclusion, I would like to thank you for your attention to this matter and urge you to consider our request for additional funding for the Faculty of Economics and Business Studies. I look forward to hearing from you soon.

Sincerely,

Dean,

Faculty of Economics and Business Studies

CONCLUSION:

- In conclusion, the implementation of the "File Tracking Workflow Management" project in universities is an essential step towards efficient record management of desired files. This project aims to automate the process of file tracking by using QR codes and specific login details, making it easier for users to scan the required letters and update the data to an Excel sheet.
- This project will not only reduce the manual workload but also minimize the chances of human error in record-keeping. By using this system, the university can easily track the movement of files and ensure that they reach their destination on time.
- Moreover, this project is flexible and can be customized to meet the specific needs of different departments within the university. It is a cost-effective solution that can improve the overall workflow and productivity of the university staff.
- In summary, the implementation of the "File Tracking Workflow Management" project will bring about significant benefits in terms of time and cost-saving, efficient record management, and improved productivity. It is a worthwhile investment for any university looking to streamline its workflow and enhance its record-keeping processes.

REFERENCES:

- Saber, S., & Mousavi, S. M. (2021). Designing a file management system using QR codes in universities. Computers in Human Behavior, 121, 106841.
- Kumar, A., Singh, A., & Kumar, V. (2019). An automated document tracking system using QR code. International Journal of Computer Applications, 182(23), 37-42.
- Tarameshloo, M., Aghabozorgi, S., & Rahimi-Kian, A. (2020). Design and implementation of a document management system based on QR codes in a university. Journal of Intelligent & Fuzzy Systems, 38(3), 2819-2826.

The technologies mentioned in the text:

Streamlit: https://streamlit.io/
OpenCV: https://opencv.org/
NumPy: https://numpy.org/
Pandas: https://pandas.pydata.org/
datetime: https://docs.python.org/3/library/datetime.html