



Data Collection Automation using Python and Leave Application Development at Perusahaan Otomobil Nasional Sdn Bhd

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ABSTRACT

This technical report presents an analytical and development study conducted at the Human Capital Strategy & Effectiveness Department of Perusahaan Otomobil Nasional Sdn Bhd (PROTON). The study focuses on two main operational improvements: automating data collection processes using Python and developing a digital Leave Application using Microsoft Power Apps. Initially, the department managed over one thousand employee data entries manually in Microsoft Excel, which was highly time-consuming. A Python script was developed to automatically transpose, clean, and convert this raw data into a newly structured Excel file. Furthermore, the existing offline leave application process was digitized to improve operational efficiency. A customized application was built using Microsoft Power Apps, integrated with Microsoft Power Automate to enable a dynamic, multi-level approval flow. The results indicate that the Python automation significantly accelerated data processing, while the Leave Application provided a seamless, multi-screen platform for employees to submit requests, check balances, and receive automated PDF approvals. Overall, these implementations successfully modernized the human capital workflows, demonstrating the practical value of programming and business analytics in corporate operations.

Keywords: FData automation, Leave application, Microsoft Power Apps, Perusahaan Otomobil Nasional Sdn Bhd, Python.

INTRODUCTION

Perusahaan Otomobil Nasional Sdn Bhd (PROTON) is a well-known automobile design, production, marketing, and sales company based in Malaysia. Established in 1983 as the nation's first budget car manufacturer, PROTON is headquartered in Shah Alam, Selangor, and operates manufacturing facilities in Proton City, Tanjung Malim. In 2017, Zhejiang Geely Holding Group acquired a 49.9% stake in Proton Cars with the goal of reviving the brand to become a leading automaker in Southeast Asia.

The Human Capital Strategy & Effectiveness Department plays a vital role in PROTON by tracking employee performance, managing career growth investments, and updating organizational data. *(Please insert Figure 3 here to show the Organisational Structure of the department)*. Within this department, specific tasks required expertise in business analytics and programming to optimize workflows. Two primary challenges were identified: the manual monthly transposition of over a thousand rows of PROTON Group data in Excel, and an inefficient, offline leave application system that required physical forms and manual managerial signatures. To address these issues, a Python programming approach was proposed for data automation, and Microsoft Power Platform tools were utilized to digitize the leave management system.

THE PROPOSED METHOD

Python Data Automation

Python, a general-purpose programming language, was utilized to handle the monthly data collection for the PROTON Group to process the raw data as shown in Figure 1. A Python script was developed to automatically transpose and convert the raw Excel data (see Figure 2 and 3). The script utilizes specific libraries to read the Excel file, skip unnecessary columns, rename headers, and reindex the data into a new DataFrame before exporting it to a newly generated file saved in a specified path on the computer.

Figure 1

Part of Data Collection PROTON Group

DATA AUGUST 2022	Division	Headcount	Basic Salary	Overtime	Fixed Allowance	Transport Allowance	Housing Allowance	Shift Allowance	Hazard Allowance	Meal Allowance	Car Allowance	Other Allowance	Laundry
ACE Sdn Bhd		23											
MM01-10140	Sales & Marketing	23											
3_Middle Management (SGS-8)		1											
4_Executive (SG1-4)		1											
5_Non Executive		21											
Acotech		5											
MY03-10000	Acotech Sdn Bhd	1											
5_Non Executive		1											
MY03-10001	Acotech Sdn Bhd	4											
3_Middle Management (SGS-8)		2											
4_Executive (SG1-4)		2											

Figure 2*Python Coding*

```

from pathlib import Path
import pandas as pd
import glob
from dateutil import parser

path_main= r'C:\\Users\\Ptnurmaziah\\Desktop\\PROTON\\proton.xlsx'

company=['ACE','Acotech','Avee','Smart','PESB','PONSB','PGSSB','PPCSB','PTMSB','MMSB','PCSB']
position=['1_Top Management (SG11-15)','2_Senior Management (SG9-10)','3_Middle Management (SG5-8)',
          '4_Executive (SG1-4)','5_Non Executive']
skip=['Company','Division','HC']

raw_data2=pd.read_excel(path_main)
new_df=pd.DataFrame()
comp=""

raw_data2.columns.values[0:3]=skip

raw_data2.columns=raw_data2.columns.str.strip()

if raw_data2.columns[0] not in skip:
    raw_data2.rename(columns={raw_data2.columns[0]:'Company'},inplace=True)

if raw_data2.columns[1] not in skip:
    raw_data2.rename(columns={raw_data2.columns[1]:'Division'},inplace=True)

if raw_data2.columns[2] not in skip:
    raw_data2.rename(columns={raw_data2.columns[2]:'HC'},inplace=True)

```

Figure 3*Python Coding*

```

last_cols = [col for col in raw_data2.columns if col not in skip]
new_index=skip + last_cols
raw_data2=raw_data2.reindex(columns= new_index)
for i,x in enumerate(raw_data2['Company']):
    temp={}
    if comp==x:
        div=raw_data2.iloc[i,1]
        cost_center=x
        continue
    elif x == 'ACE' or x=="ACE Sdn Bhd":
        div="Group Manufacturing"
        cost_center='ACE'
        comp="ACE Sdn Bhd"
        continue
    elif x in company:
        comp=x
    elif x not in company and x not in position:
        div=raw_data2.iloc[i,1]
        cost_center= raw_data2.iloc[i,0]
    elif x in position:
        pos=x
        hc=raw_data2.iloc[i,2]

    for a,b in enumerate(raw_data2.columns):
        if (b in skip) or (raw_data2.iloc[i,a] == 0):
            continue
        temp[b]=raw_data2.iloc[i,a]
    for p,o in temp.items():
        new_df = new_df.append({'Company': comp, 'Division':div, 'Position Group':pos, 'Headcount':hc,
                                "Items":p, "Amount":o, "Cost Center":cost_center}, ignore_index=True)
new_df.to_excel('C:\\Users\\Ptnurmaziah\\Desktop\\PROTON\\proton1.xlsx')

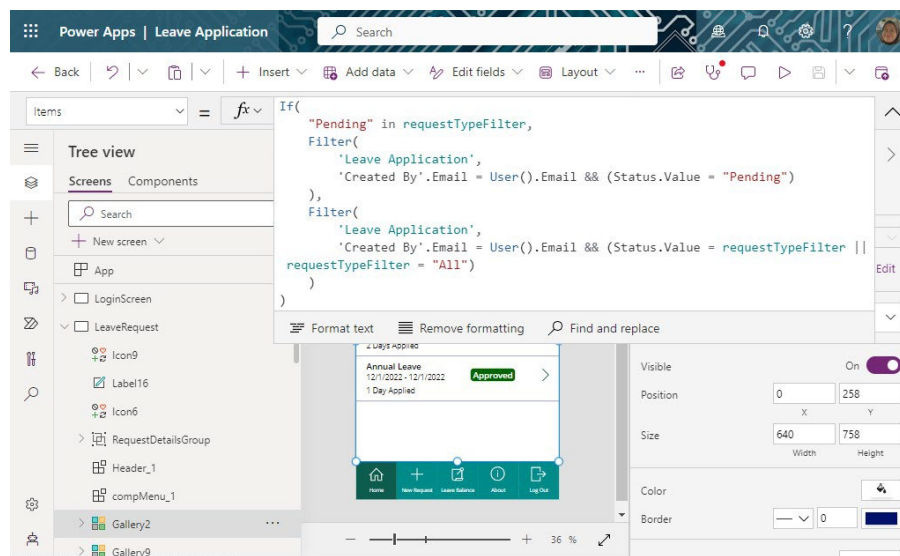
```

Leave Application Development

To replace the manual leave form process, a customized digital application was built using Microsoft Power Apps. The app restricts access exclusively to PROTON staff via email authentication. The system integrates several connectors, including SharePoint lists, Office365Users, and Office365Outlook, to serve as data sources (see Figure 4).

Figure 4

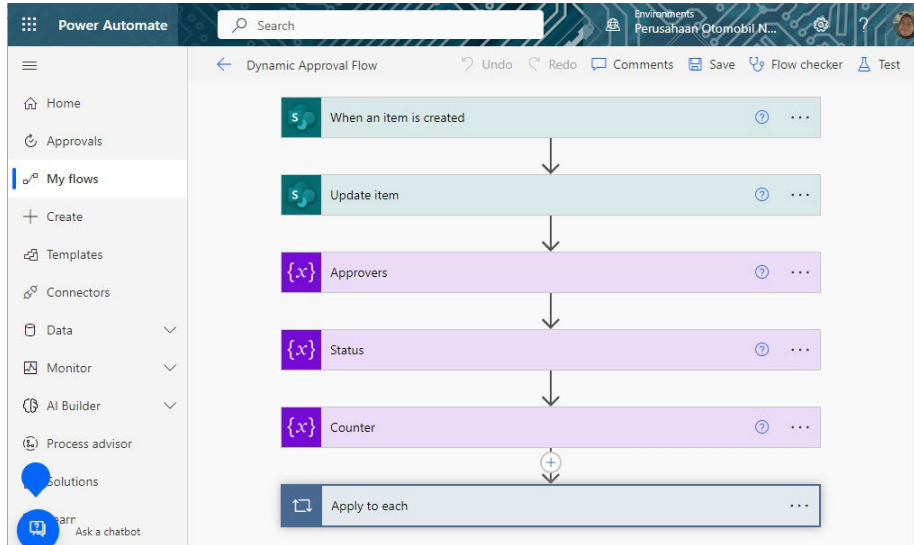
Leave Application in Edit View



Additionally, Microsoft Power Automate and Microsoft Teams Approval were integrated to establish a dynamic, multi-level approval flow (see Figure 5). The flow sequentially notifies assigned approvers; if any approver declines the request, the loop terminates immediately, and the status updates to "Decline". If approved, the request routes to the next person in the queue until fully authorized, sending the final status notification to the user via email or within the app.

Figure 5

Dynamic Approval Flow in Power Automate



EVALUATION AND RESULTS

Data Automation Results

The execution of the Python script successfully automated the data formatting process. The output generated a newly structured Excel file that categorized variables such as headcount, basic salary, and allowances precisely by company division and position group (see Figure 6). This automated conversion proved to be significantly faster and more accurate than transposing the large datasets manually.

Figure 6

Part of The New File of Collection Data PROTON Group

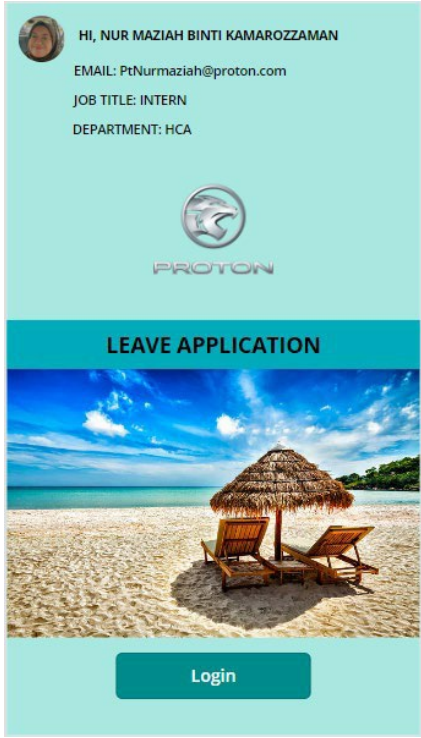
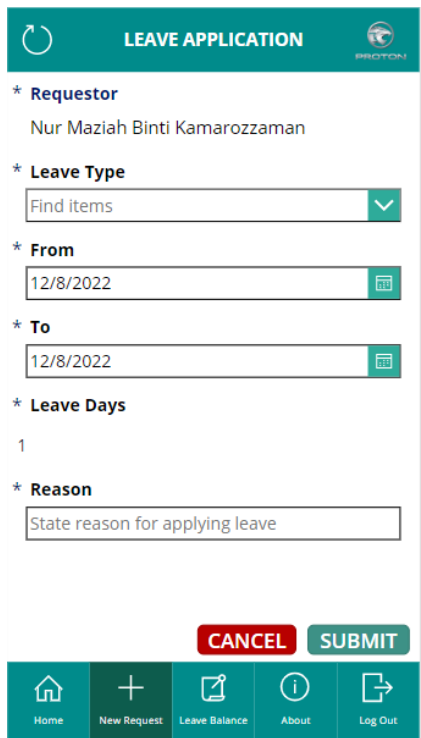
Month	Company	Division	Position	Headcount	Items	Amount	Cost Center
1/1/2022	ACE Sdn B	Group Ma	3_Middle	1	Basic Salary	8114	ACE
1/1/2022	ACE Sdn B	Group Ma	3_Middle	1	Other Allowance	1500	ACE
1/1/2022	ACE Sdn B	Group Ma	3_Middle	1	EREPF_N	1164	ACE

Leave Application Results

The deployed Leave Application provided a comprehensive and user-friendly interface divided into multiple functional screens (See table 1).

Table 1

Output Leave Application

Results	Discussion
	Main Page: Main page of the app consists of information of the user's name, email, job title and department.
	New Request Page: This page is the form to request leave which employee requires to fill the leave type, dates of leave and the reason of applying leave.



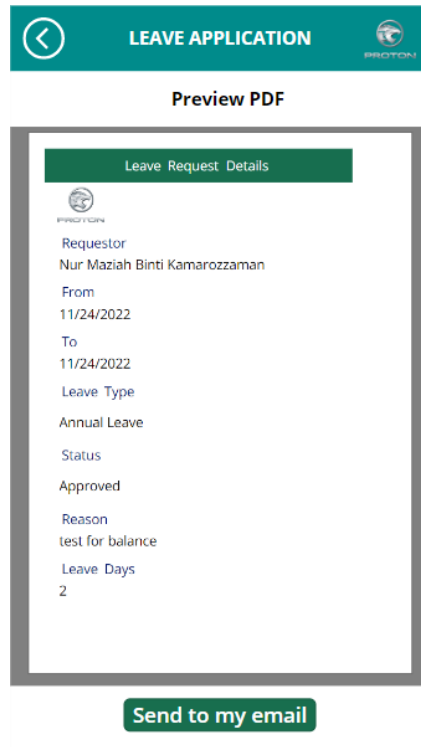
Home Page:

This page shows the status of user's all leave requests. User's can also filter the status by clicking the button on the above of the page and a print button at the header to print the page.



Leave Request Details Page:

This page shows the specific leave request that user's click on the Home page. There is also a print button on the header if the user wants to print it.



Preview PDF Page:

This page will preview the PDF of the leave details in the leave request details page. It will send to user's email when the user click the "Send to my email" button.



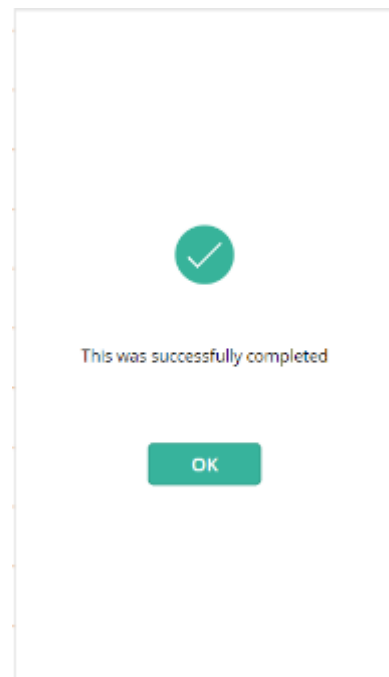
Leave Balance Page:

This page consists of user's leave balance for every leave type. It will automatically calculates the balance when the admin updates in the leave balance list.



About Page:

This page shows the leave type description in general.



Success Page:

This screen will appear when user's successfully submit their leave request and get their PDF to their email.

The application successfully divided the user experience into logical segments:

- The "Main Page" displays the user's name, email, job title, and department.
- The "New Request Page" allows employees to select the leave type, input dates, and state the reason.
- The "Home Page" filters and lists the status of all requests (Pending, Approved, or Declined).
- Users can also view specific request details, generate a PDF preview that is sent directly to their email, and automatically track their allotted days on the "Leave Balance Page".
- Upon successful submission, a "Success Page" visually confirms the action.

The multi-level approval flow executed flawlessly, eliminating the delays historically associated with physical document routing.

CONCLUSION

The industrial training at PROTON provided valuable exposure to practical business analytics and corporate human resource operations. Transitioning from academic software tools to industry-standard programming, the application of Python in a real-world setting proved highly effective in solving data processing bottlenecks. Furthermore, the successful development of the Leave Application utilizing Microsoft Power Apps and Power Automate demonstrated how digital transformation can streamline manual, time-consuming workflows into efficient, automated systems. These automated solutions not only improved the operational efficiency of the Human Capital Strategy & Effectiveness Department but also enhanced the overall employee experience regarding leave management. Future recommendations include expanding the use of the Power Platform to digitize other manual human resource forms and administrative processes within the organization.

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