**Software for Automation**

Practicum Phase 1

Report

**Robotic Process Automation (RPA)**

Project 1: Tracking of Tenders (RPA-C-03)

**Summary**

Write briefly about RPA, the assigned challenge and your team’s solution.

Projects are the lifeblood of many enterprises and they are often issued as tenders by large multinational corporations (MNCs) or the Government. Hence, much time and effort are usually spent on searching through tender platforms such as ThunderQuote or GeBIZ. Due to the complexity of most tenders, the specifications were often prepared as attached documents by the client organisations. Therefore, it is obligatory to go through every single attachment to comprehend the tender completely.

However, this process can be very tedious and time-consuming and it emerged as an impediment. It was also highly manual and repetitive – tagging the process as mundane and uninteresting.

For these reasons, it was decided to adopt a Robotic Process Automation (RPA) solution to address the impediment. It was also concurred to focus on the GeBIZ platform for now as public projects are more reliable and creditworthy regardless of the economic sentiments.

**Challenges**

Due to the social restrictions imposed during the COVID-19 pandemic, there was limited face-to-face interactions with the facilitator and among the team members. Most of the discussions and liaison were done online via Zoom and other social media applications. Unfortunately, there was no one in the team who have had any experiences in tendering or exposures to the GeBIZ platform. The absence of a genuine beneficiary aggravated the circumstances that it was not likely to relate to the actual needs and this might have misdirected the entire design thinking process. Nevertheless, a persona was conceptualised for this project to fill the void.

Subsequently, it was noticed that the format of the tenders on GeBIZ were not standardised and this created complexity to the UiPath coding. The skills and knowledge acquired during the past three months were inadequate and too superficial to undertake the project. Henceforth, it was imperative to upgrade and upskill our knowledge and expertise in UiPath continually alongside the development of the project.

**Solution**

1. **Overview**

Summary of how your solution solves this industry challenge.

The solution comes from our UiPath program that comprises of a main program which is associated with a setup file and four auxiliary programs for supplementing the main program.

**Main Program(MainV4.xaml) and Setup File(setup.xlsx)**

1. Prior to the commencement, the GeBIZ portal must be login via SingPass once and this process has been automated by executing an auxiliary program from the project.

2. Upon starting the main program, the GeBIZ login status will be validated before fetching users defined keyword(s) from a setup excel file to search for the opened bidding opportunities on the GeBIZ opportunities portal.

3. The main program will data scrap 100% information from a detail page after navigate from an overview. User can opt to navigate to detail page from all the searched overviews or from selected overviews via the setup file.

4. All the scraped data are exported into 2 output excel files. One stores all non-tabulated data while the other stores both the tabulated and non-tabulated data from "Items To Respond". Two files are used due to the application of different data extraction methods.

5. The output excel files will be self-created if there are not exist. The scraped data from same keyword will be gathered under the same sheet named by the keyword. New data will append to the existing data if re-run the same keyword.

6. All the attached documents will be downloaded (regardless of number of copies or downloading pages) and move to auto generated folders named by the keyword and its search index number during run time. Long download time due to huge file size is handled with prompting for user's action to prevent exception error.

7. All the user's inputs and options including the Corrigendum Versions management (see below) are to be set upfront in the setup file to enable streamlined program execution without user intervention during runtime.

8. Explanation of user options in the setup file under sheet name: keywords

**KeyWords** : For user to input a search keyword or keywords list. If the cell is left blank, program will not activate keywork search on GeBIZ but perform data scaping directly from the existing (as-is) searched results on GeBIZ. (Blanked keyword sage example: user may perform advanced or customized search on GeBIZ until the desired overview results are achieved then run the program with blanked keyword in the setup file).

**UserIndexs** : User can enter "0" to scrape details for all the searched overviews or enter any other number to scrape the details only from selected overviews with the search index number same as the number entered under UserIndexs.

**UserDefultDownLoadPath**: User must update his PC's default download path here.

**skipMsgbox** : User can choose to turn off any messagebox pop-out(for status information) during runtime to streamline the program execution.

**printOneVersionOnly** : User can opt to download only one from the latest Corrigendum document instead of downloading all the available Corrigendum document.

**VersionCountlimit** : User can opt to limit the data scraping of Corrigendum versions to the latest one or up to max of 10.(note: some opportunities exhibit multiple corrigendum versions as high as >20 but usually only the latest versions are relevant) .

1. Another sheet in the setup file named headers contains headers template with the column name replicate all the available labels found in the detailed information page on GeBIZ. The main program will read this template and fill up the datatable raw with the scraped data accordingly.

10. Click [MainV4 Program Demo](https://leemunhoi-gmail.tinytake.com/tt/NTU4NDY2NF8xNzM3NzI1MQ) to view the Demo for the MainV4 program.

**Auxiliary programmes**

These programs were designed for auto login to GeBIZ and in the event that more information for preliminary analysis and/or preparation are required:

Click the link for Demo for the Auxiliary Programs: [Auxiliary Programs Demo](https://leemunhoi-gmail.tinytake.com/tt/NTU4NDM2MF8xNzM3NjM1Mg)

1. *Credential\_Login.xaml*

A program that initiates the Firefox browser and login automatically to the GeBIZ portal based on the credentials that were setup in advance in the Windows Credential Manager. It was not incorporated in the main program as the login activity rarely needed during the process.

2. Extraction\_for\_KeywordCloseOverview.xaml

The purpose is to have a quick glance at historical information over the closed opportunities from the same keyword. It would provide a gauge about the possible monetary values of similar opportunities that are still open for bidding and be aware of the awarded parties. The table extracting method is use to scrape all the overview information up to maximum of 90 cases and be exported to excel file named: ProjectOverview\_KeywordClose.xlsx, to facilitate the analysis and comparison.

3. Extraction\_for\_KeywordOpenOverview.xaml

In case of the keyword searching resulted in more than a page of overview information from the open opportunities, this program can be used to extract all the overview information from multiple pages to a spreadsheet for user to perform 2nd level analysis and screening. The search index numbers of opportunities that user deemed relevant can then be input as UserIndexs in the setup file for main program to extract the detailed information. The extracted information is exported to output file named: *ProjectOverview\_KeywordOpen.xlsx.*

4. Extraction\_for\_TodayOpenOverview.xaml

The purpose of this program is to generate a concise report of all the available overviews of open opportunities of current date in the GeBIZ portal. The information of each opportunity will be presented in each row in the exported output file named – *ProjectOverview\_TodayOpen.xlsx.*

1. **Value and Impact**

How much time, money, lives your Solution saves? Be quantitative and qualitative in your response.

Our solution is the answer to the impediment in the search at the GeBIZ portal. The table below illustrated the comparison of time spent in minutes for a typical opportunity type on GeBIZ by an individual against RPA.

**Table 1: Comparison of time spent on GeBIZ by an individual against the solution**

|  |  |  |  |
| --- | --- | --- | --- |
| **An opportunity on**  **GeBIZ with** | **Time spent on each GeBIZ opportunity in minutes** | | **Time Savings**  **(%)** |
| **Individual** | **Solution** |
| Two attachments | 4.5 | 2.7 | 40.0 |
| Five attachments | 9.0 | 4.5 | 50.0 |
| Five attachments with latest corrigendum version | 10.8 | 5.1 | 52.8 |
| Four attachments with twenty items to respond | 10.5 | 4.5 | 57.1 |

The entire process is automatic as it extracts the designated keyword(s) and download folder path from the setup file. Imagine the difference in time required where information was prepared manually for ten such opportunities.

Moreover, the time that was used to gather the information could be utilised more productively or effectively to attend a meeting or reply to emails.

Furthermore, there is the risk of human error. Having to download numerous attachments across multiple opportunities might result in mistaking an attachment with the wrong opportunity.

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*In fact, research suggests that regardless of the activity or task being conducted, humans make between*

*3-6 errors per hour.*

*~ Dr Graham Edkins ~*

*<https://www.linkedin.com/pulse/human-factors-error-role-bad-luck-incident-graham-edkins>*

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1. **Evolution of Ideas and Prototypes**

Show how your ideas evolved. Feel free to add screenshots or images.

To facilitate the orientation of the project development, a persona was conceptualised to drive the design thinking process.

Hypothetical goals to accomplish, theoretical motivations and assumed needs were the main foundations which the RPA solution is developed upon.

A HMW statement was crafted to keep the end-result in mind whilst developing the solution.

Text

Description automatically generated

Figure 1: HMW Statement

It was also determined to limit the solution to GeBIZ only to serve the best interests of the persona.

The decision to data scrape all the information instead of selectively was because actual needs were unclear and it was easier to remove irrelevant information than to ascertain again back at the GeBIZ portal. However, this was done at the expense of time as longer duration was required.

There was also consideration to include the capability of emailing the spreadsheet and associated attachments but it was aborted at a later stage as it posed the risk of not receiving the email or flooding the mailbox of the recipient as the size and quantity of associated attachments of some opportunities were considerable.

A prototype was created but it was unstable. It was unable to locate the desired information for some opportunities and incompatible with some computers.

It was only after several fine-tuning that information for all opportunities were gathered successfully on most computers.

1. **RPA Flowchart**

Flow diagrams to help explain your solution.

|  |
| --- |
| Diagram, schematic  Description automatically generated |

**Conclusion**

Conclude with the value of RPA and recommendations for future improvements or enhancements.

The RPA solution increases productivity as the time that was spent browsing through the GeBIZ portal would be better utilised on other activities. It also eliminates the risk of human error of mistaking attachments to the wrong opportunity.

It is recommended to consult a genuine beneficiary to identify the actual needs and align the RPA programme to deliver practical value.

It would be constructive to expand the scope of the RPA solution in future to include ThunderQuote and such similar platforms to increase the sources for business opportunities.

**Appendix: Process & Methodology**

1. **Team Process and Methodology**

Design Thinking and/or Scrum. Add screenshots, photos and/or online links that would help ground your submission.

A design thinking process was adopted to shape the architecture of the programme.

**Persona**

Age : 36

Location : Singapore

Education : Degree

Job Level : Executive

Family Status : Married with kids

Work Experience : 9 years

Technical Literacy : Good

**Goals to accomplish**

1. To search for projects
2. Prepare its information in a spreadsheet for analysis and comparison

**Motivation**

1. Saves time by referring to a spreadsheet instead of looking through individual tenders to find suitability to bid
2. Unnecessary to perform the repetitive task of consolidating the details of each tender and downloading the associated attachments
3. Know who and how to contact when doubts or queries arise
4. Avoid missing out tender deadline
5. More time available to complete other tasks

**Needs**

1. An overall view of available tenders in a data table format to make comparison and analysis
2. An overall view of awarded tenders awarded in a data table format to make a gauge of contract value for similar tenders that are still opened for bidding
3. An overall view of tenders posted on the current date to grasp the newest available tenders

|  |  |  |  |
| --- | --- | --- | --- |
| **Source of businesses** | **How do we find tenders?** | **Challenges** | **Areas of Improvement** |
| GeBIZ | Search and scan for available/closed tenders | Need to login via SingPass every time  Tedious to look through each and every associated attachment | Saved SingPass credentials  Consolidate the information into a spreadsheet to ease sorting and referencing |
| Contacts | Ask for available tenders | Not always available | More time on socialising to improve on relationship |
| Networking | Ask for available tenders | Not always available | More time on socialising to improve on relationship |
| ThunderQuote | Search and scan for available tenders | Can be manpower intensive to look through all the details | Consolidate the information into a spreadsheet to ease sorting and referencing |
| B2B | Search and scan for available tenders | Not always available | Improve market awareness |

It was assumed that it would be in the best interests of the persona to focus on the GeBIZ platform for now as public projects are more reliable and creditworthy regardless of the economic sentiments.

HMW Statement

How might we enable the compilation of opportunities on the GeBIZ into spreadsheets for anyone who must source for suitable tenders periodically to bid so that he/she can be more productive and effective at work?

A prototype was created but it was unstable. It was unable to locate the desired information for some opportunities and incompatible with some computers.

It was only after several fine-tuning that information for all opportunities were gathered successfully on most computers.

1. **Challenges faced by team and resolutions**

Describe at least 2 challenges faced by the team and how your team resolves them.

There was no genuine beneficiary to the project so it was not possible to identify the actual needs. Therefore, a persona was conceptualised for this project to fill the void. However, this might disorient the design thinking process and it is still uncertain whether if the RPA solution created serves any practical benefits. Nevertheless, it is irrefutable that the spreadsheet generated provided the means to filter or sort for intangible benefits such as analysis and comparison.

The skills and knowledge acquired during the past three months were inadequate and too superficial to undertake the project thoroughly. It was imperative to upgrade and upskill our knowledge and expertise in UiPath continually to expand the scope of the RPA solution in future to include ThunderQuote and such similar platforms. Nonetheless, it served its purpose well within the limits of the GeBIZ platform.