# Abstract – 200 words

# Aim and Objectives

Provide a solution to the business analysts of Yusen logistics that help them to efficiently and accurately generate straightforward reports in shorter amount of time and show the business performance by visualise main business indicators for their customers and suppliers.

Motivation for the project

## Rationale for developing web based application

For Yusen logistics, it is essential to save time and costs on generating report.

And along with the growing files, macros in excel will experience serval crushes and will need more downtime to recover the system.

Why developing web based application

Flexibility

Keywords: web application development, python

The method for achieving this aim is creating a web based application running on local host which can be used to pull out data and generate reports in PDF format. This application enables users to obtain KPI indicators automatically and generate graphs for further analysis. Through the development of this application individuals would now be able to easily and quickly generate reports and deliver it to their customers and suppliers further their understanding of business performance.

# 1. Introduction

## 1.1 Background

In order to offer a straightforward feedbacks and to improve the communication with Yusen’s clients, Yusen logistics is looking for an efficient and automated solution to generate monthly report. At the moment, Yusen’s analysts using excel with VBA function that creating macros to produce and locate the data and generating graphs then compose the report. Due to all the business documents come from different countries and have not yet unified the reporting language, manual organizing is required and time wasting.

Though different languages reporting cannot be solved at this stage, it is also time consuming for analysts to locate history data to generating trending graphs for monthly report.

## 1.2 Report structure

The application will be used for processing KPI data from line haul sheet and in market sheet, generating reflective tables and graphs to compose a monthly report for clients of Yusen.

A performance indicator or key performance indicator (KPI) is a type of performance measurement. KPIs evaluate the success of an organization or of a particular activity in which it engages. a practical and objective measurement of progress. [] Often success is simply the repeated, periodic achievement of some levels of operational goal (e.g. zero damages, 10/10 customer satisfaction, etc.), and sometimes success is defined in terms of making progress toward strategic goals. []

Yusen presents their KPIs in financial value, productivity, risk and projection. Tables and charts are used to clarified general business objectives and corresponding performance metrics and indicators. Related analysis from notes area defines achievable targets. []

The first part of Yusen’s report, all the key facts it shows are from line haul sheet. The report starts with a user inputting key highlights of current month, including MMW performances of different hauliers, performances of IMC in different markets along with procurement and quality.

Line chart will show planning performance of all the line hauls through 12 months until current month. And a table will be shown to present the 12 KPI indicators of hauliers separately from current month.

Also the report will present the reasons of late arrivals, dispatches and late 1st hub arrivals, time of late arrivals/dispatches by either bar graph or line chart. Then the trending of arrivals, dispatch and 1st hub arrivals of different hauliers will be presented by different line charts. At the end of this part, 3 lines charts will be presented to show the difference between planned and actual vehicles they used, the average LFF per haulier and average pallets they used during the transportation.

In second part of the report, it focuses on IMC’s performances of different markets. It will compare IMCs’ number of outbound deliveries, number of handling units, total weight, number of returns, number of pallets and number of parcels that IMCs’ carried. Also it presents the percentages of the all the IMCs on time data, carrier- related on time and fully delivery data and OT and IF target data. Finally, it will show IMC s’ spending and their special costs pattern.

The report will end with projection of Yusen for the next business time period.

The report includes line chart for showing the trending, bar graph for volume metrics and pie chart for showing the proportion of late delivery.

The charts show different KPI indicators in several parts. Information that are going to be presented including time span and number of hauliers. Those two factors vary from part to part through the whole report. In some of the charts, only data of current month is required however it requires a full year data in any others. Applying different numbers of hauliers happens as well since part of the report only need the data of all the hauliers while the others expecting 4 or 5 hauliers each time.

## 1.3 Requirements

The solution to improve report generation should have following criteria:

1. Create a report template with same format of current reporting format that made with excel.
2. Reduce time of creating the report. Analysts now from Yusen now need 2 to 4 days to generate the report due to large amount of manual typing. Though it is evitable for the moment, they are looking forward to shorten the time of generating the relative graphs.
3. Generate report by customize time span easily and flexibly. For instance, user can generate monthly, quarter, annual report or other time periods they want.
4. Clients would like to have menus to choose related business performers, markets, MMW and month.
5. Clients want to have a click view section that they can hover to see over on the district map that shows some data of different area of one particular market.
6. No extra costs for creating the application.
7. Ideally the application could be benefit both goals of short term and long term.
8. The report will be in PDF format or similar format in the end.
9. The solution should be able to process data from excel or ERP system.

Enterprise resource planning ERP is a system that uses modern information technology to manage the functions of various company divisions and to create transparency in the process. It helps to optimize a company’s important core business processes is the fast and precise retrieval, integration and collection of information. Those data can be export to delimited a text file or a plain text file. []

# 2. Application development

## 2.1 Initial idea

Considering the requirements above and time limitation for this project, creating a python written application that automatically pull out the certain data that match user’s inputs then generate relative tables and graphs would be helpful to improve the current report generation process. With continuous communication with Yusen, considering their working system now is go through an updating phase, in the future it would be a well-rounded internet based system. under such circumstance, a web based application would be a better choice for Yusen to implement for their long term benefit. For instance, the application would directly access the database to obtain certain data instead of having all files stored in the computers.

web application or web app is a client–server software application in which the client (or user interface) runs in a web browser. [1]

in order to support the online feature for future a web framework called flask will be used. Flask is a micro web development framework for Python [3]. It allows the application works remotely online or on the local host. For current circumstance, this application will run locally.

With the data sets get bigger, it is difficult to find the history data or even some current monthly data. Analysts would have to look through the whole file or using excel filtering and pivot table to get the data they need. In order to solve the problem, pandas’ library will be used to help process data easily. And for generating graphs, matplotlib will be applied.

In this application, formulas for calculation are predefined, the application will do the calculation and filter process as when accept inputs from users. And with those input data, related information will be pulled out to generate graphs or tables.

## 2.2 Developing tools

## Since the company requires the application is free of charge, this application will use python as the programming language with assists from other open source python libraries like pandas for data manipulation and matplotlib for data visualization. Python’s libraries add extra features without interfering with the native python language, lighten the python scripts and save time for creating an application. []

### 2.2.1 Pandas

Pandas is one of the popular an open source python library. It is a Flexible and powerful data analysis, manipulation library. The library can read records in CSV (comma-separated values), Excel, HDF, SQL, JSON, HTML, and Stata formats; Pandas places much emphasis on flexibility, for example, in handling disparate cell separators. Moreover, it reads directly from the cache or loads Python objects serialized in files by the Python pickle module. [] according to Yusen, their data come from different sources. The data might come from excel, database and ERP system which support different format. Using pandas can help to solve this problem.

### 2.2.2 Matplotlib

Matplotlib is a python based 2D plotting library, a full-featured modern object-oriented programming language suitable for large-scale software development. matplotlib produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. matplotlib can be used in python scripts, the python and ipython shell (ala MATLAB®\* or Mathematica®†), web application servers, and six graphical user interface toolkits. It is a free open source for graphing. User can change all details of the plots, modify ticks, labels, spacing customize the graphs.

### 2.2.3 Flask

Flask is a "microframework" primarily aimed at small applications with simpler requirements. It is clearly used most often in smaller projects with just one or two functions.  Also It allows to add functionalities as needed. []

## 2.3 Method for application development

To ensure the success of application developing, choose a suitable development method to is crucial to the project. There are a number of different methodologies for developing. For instance, waterfall linear model, agile, scum and spiral etc.

### 2.3.1 Selection of Methodology

The following methodologies were considered:

#### Waterfall model

#### Agile

The Waterfall Model was first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases.

Waterfall model is the earliest software developing life circle approach that was used for software development.

The waterfall Model illustrates the software development process in a linear sequential flow; hence it is also referred to as a linear-sequential life cycle model. This means that any phase in the development process begins only if the previous phase is complete. In waterfall model phases do not overlap. []

The waterfall does not allow for much reflection or revision and involve the clients only in testing stage. This would not cope with the changing requirements. []

Agile model promotes adaptive planning, evolutionary development, early delivery, and continuous improvement, and it encourages rapid and flexible response to change. []

Agile encourage customer collaboration since the requirements cannot be gathered completely in the beginning of the project due to various factors, continuous customer interaction is very important to get proper product requirements. Also it focused on quick responses to change and continuous development. []

When choosing a methodology for developing, the size, requirements, time and budget should be considered.

For client base project, continually revisited requirements are required throughout the lifecycle of developing the software while gathering requirements at the same time.

Along with continuous communication through emails and phone calls, a detailed record of requirements was documented and after considering the nature of the task, size of the project, time and costs, agile would be the suitable method for the application developing process.

### 2.3.2 Applying agile management to the development

#### 1.Decompose the story into smaller tasks then Break down each task into many very small tasks so that can avoid backlog and standstill. []

During the developing process, the project is breaking into three main parts and some sub tasks in each parts.

Original data and report comprehension

Understand the data source including the logistics term and relation to other data sets.

Understand the template of Yusen’s report including structure of the report and how and where to retrieve the data from original files.

Data manipulation and graph generation

Using open source python libraries to process original data. For instance, calculate the total number of some data sets and re organize the data.

Filter out the data that are needed to be plotted and adjust the features of those generated graphs including the size, colour, axis and legends ensuring the graphs are readable.

Interface design

building the basic page templates and styles including input pages, result page and final report template.

showing function to the static pages by using wireframe.

#### 2.Ensure a minimum amount of communication with your customer with regular and short iterations.

Communicating the client on weekly basis mainly via emails and phone calls to get the feedbacks so that ensuring the right approach to the solution and meet requirements. With more communication with the company, application developing progress and

#### 3.Plan interface design.

During this project development, the focus is on code for KPI data processing. Interface design and prototyping is deprioritized. And it indeed causes impacts on the application running through front end.[] For instance, part of the back end codes cannot be executed through the front end which is the interface that clients to manipulate.

It is import to acknowledge that discovery and design cannot be scaled down below a certain minimum effort.

## 2.4 Project management

Project Management is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholders needs and expectations from a project. []

In order to achieve the developing goals on time, applying project management theory and methods will be helpful to track the progress in each stage.

One of the first benefits doing project management is that the project will be more predictable. Also with a plan to manage the project will help to communicate and manage expectations with customers, team members and stakeholders more effectively.

### 2.4.1 Project management tool

During the developing stage, Gantt chart will be used to manage the development process including document and schedule the project for it is good at showing timing and progress clearly which helps project tracking.

#### 2.4.1.1 Gantt chart

A Gantt chart, commonly used in project management, is one of the most popular and useful ways of showing activities (tasks or events) displayed against time. []

A Gantt chart is a type of bar chart, devised by Henry Gantt in the 1910s, that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements comprise the work breakdown structure of the project. Modern Gantt charts also show the dependency (i.e., precedence network) relationships between activities. []

The Gantt chart below shows key activities including communication with Yusen, gathering the requirements, application design, coding, testing the application and generate a manual for users.

Also the chart marked the actual duration and completion time of each activity lasts by different colours. See fig No.

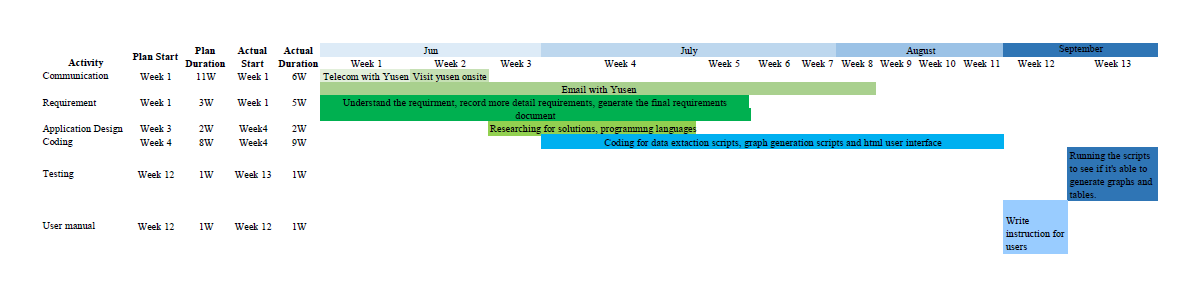


fig No. KPI dashboard project Gantt Chartt

#### 2.4.1.2 GitHub and online notebook

Along with more developing issues shown up, recording the problems raised during the developing process and possible solutions to the issues by using GitHub and notebook. Backup and document the changes of codes and the scripts on GitHub for version control. Using online jupyter notebook keep more details logs about progress, problems and solutions to each part of the codes for later review and update.

## 2.5 Application Development planning

### Stage one: June – July

Understanding the clients, looking into multiple solutions and programming language and tools for developing the application. Learning to use libraries, pandas, matplotlib and reading their documentations.

Communicating with clients frequently insure that requirements are fully understood. And offering a projection about its functionalities that can be applied by the end of the project.

understand the data sets including the source customer requirement and do research for proper programming tool and learn to use necessary libraries to assist in developing the application.

After doing research about tools for data extraction, manipulation and analysis online, I found out that python library Pandas is one of the most useful tools for fast data analysis and manipulation*.* Pandaswith powerful built in functions that enabling users to carry out the entire data analysis workflow in Python. In this application development process, Pandas would be the main tool to process KPI data easily and automatically.

### Stage two: July -August

data manipulation, plot graph and final report generation

The strength of Pandas seems to be in the data manipulation side, but it comes with very handy and easy to use tools for data analysis, providing wrappers around standard statistical methods in [stats models](http://statsmodels.sourceforge.net/).

It is also handy to use read\_csv or read\_excel function from python Pandas library to pull out the required data from excel files. And then applying graphing methods of [matplotlib](http://matplotlib.org/) to the plot the charts clients required.

At this stage, based on the report requirements including writing time periods, KPI calculation formulas and total number of each performance that carried out by different hauliers or overall perforce of them all, certain built in functions are applied to filter, do simple calculation and separate or group the data sets.

### Stage three: August

Integrate the user interface

Creating relative html static pages to get and store user’s selection or input data

### Stage four: September

#### Application testing

#### Application deliver to client

Demonstration

Creating user manual

Training and installation

# 3. Application design

When start to design the KPI dashboard generating application, it is important to specify the functionalities clients want to achieve. Using Unified Modelling Language will help to show the requirements clearly and a successful user and developer communication so that ensuring the success of development.

3.1 Unified Modelling Language (UML)

The Unified Modelling Language (UML) is a modelling language used by software developers can be used to develop diagrams and provide users with ready-to-use, expressive modelling examples and is intended to provide a standard way to visualize the design of the requirements of application. [] UML gives a standard way to write a system model, covering conceptual ideas. With an understanding of modelling, the use and application of UML can make the software development process more efficient. []

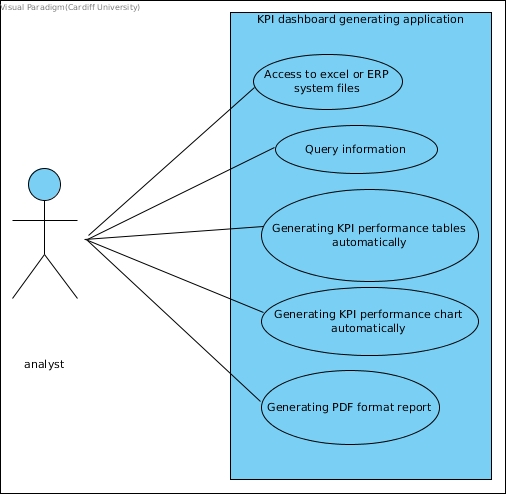
UML has a lot of types of diagrams for developers to apply to the application design. For example, class diagram, communication diagram, component diagram, deployment diagram, object diagram, package diagram, sequence diagram state diagram and use case diagram.

In KPI dashboard generating application, use case diagram is applied to demonstrate the functionalities that the company want. Also sequence diagram is used to show how and what users need to do for generating a report.

## 3.2 Use case diagram

Use case diagram is one the models of Unified Modelling Language. It is a useful technique for requirements gathering and specification.

Use Cases define the behaviour performed by system. it shows how system behaves from the users’ point of view, captures the users’ functional requirements of a system. Use cases are developed according to users’ needs. []



## 3.3 Sequence diagram

A Sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. []

UML sequence diagrams model the flow of logic within your system in a visual manner, enabling you both to document and validate your logic, and are commonly used for both analysis and design purposes. Sequence diagrams are the most popular UML artefact for dynamic modelling, which focuses on identifying the behaviour within your system. Sequence diagrams, along with class diagrams and physical data models are in my opinion the most important design-level models for modern business application development. []

## In the user activity sequence diagram, it shows what users need to do in order to load in certain input page, what required information should be submitted for later report generation. Also it shows the sequences of interaction between users and the interface.

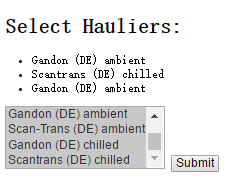
fig.no User activity sequence diagram

## 3.4 User interface design Add screenshot

The user interface is written in html language. The interface has 3 main parts including input and selection page, result and confirmation page and final report page.

### 3.4.1 Input and selection page +screenshot

Input form allows users to type in evaluation dates and names of business performers. Or choose start date, end date hauliers’ and in market carriers’ name from drop down menus.

Submit button for ‘post’ and create a local file to store the user’s inputs.

### 3.3.2 Result page

Text would show confirmation message if the submission succeeds.

### 3.3.3 Template page +screenshot

Compose the template page according to company’s specification.

In first section of report, comparing actual overall performance with planned overall performance, actual used vehicles and planned vehicles.

Describing punctuation performance of each line hauls

Showing the average usage of pallets and average number of LFF.

In second part of the report, in market carriers will be evaluated separately in their performances of delivery, punctuation, spending and special costs.

## 3.5 Back end code design

### The application runs in linear work flow and eventually generate KPI tables and charts by following steps.

### 3.4.1 Import the raw data from csv files

### Read data from csv file by using read\_csv

### 3.4.2 Locate the data

### Match the user inputs with the data from original file by using iloc or using read\_csv parameters usecols to narrow down the information scope.

### 3.4.3 Reform the data

### Turn csv strings into Pandas data frame by using to\_pickle or pd.DataFrame.

### 3.4.4 Read the data

### Read from data frame by read\_pickle or read\_csv

### 3.4.5 Manipulate

### Turn selected data into tables and charts by using to\_html and pd.plot.

# 4. Implementation

This section details the major methods used to manipulate the data. Methods and functions that applied to processed the data will be explained in four main parts which are reading data, storing data, reforming data and manipulating data.

Complete source code is included as an attachment.

## 4.1 Main functions

### 4.1.1 Reading KPI data

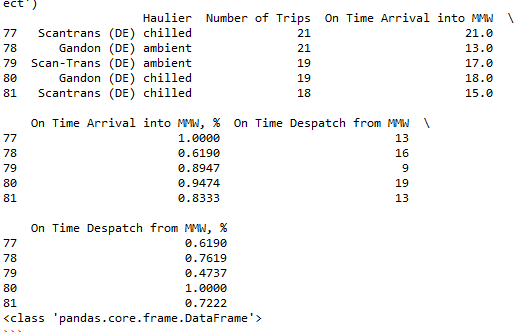
Before starting to manipulate the raw data, application needs the read\_csv code to import original data. From the template from Yusen, it is not necessary some time to import all the data from csv file. In order to narrow down the scope of contents, once add parameter usecols, only those chosen data will be read into Pandas’ dataframe.



Read all the column out.



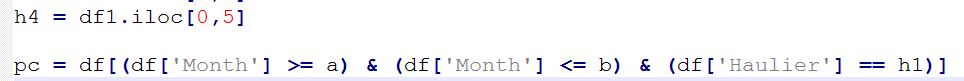
Read only chosen columns.



Apart from reading directly from raw data, the application needs to read user input from html page as well. Since user inputs are output and stored as csv file, read\_csv() file can be applied.

### 4.1.2 locating KPI data

In this section, Pandas’ iloc function along with Pandas’ condition selection are applied to matching user inputs and raw data so that filtering related data of user inputs.



### 4.1.3 Reforming KPI data

After obtain the matching data, in order to generate graphs and table later, those data need to be read to dataframe format by *to\_pickle*() function. later those pickle format data can be read out again by read\_pickle with dataframe format.

### 4.1.4 Manipulating KPI data

Apart from to\_html and plot function that are used to manipulate the data, other functions such as drop\_duplicate, head and tail can filter out duplicate data or show the first n data or last n data from the file.

## 4.2 Codes implementation

### 4.2.1-line haul

In processing line haul data section, MMW.py, a flask script, MMWChart.py, a python native code, MMW and MMWend html pages are coded for generating MMW OT Arrival Trend Germany, %, MMW OT Despatch Trend Germany, % and 1st Hub OT Arrival Trend Germany, % trending charts and tables

The scripts will run in this order: MMW.py - MMW.html – MMWend.html MMWChart.py

Creating a form for users to input start and end and haulier’s name in a static html page. Bonding the http GET method with the submit button to store the inputs from users to a local csv file. In html script, using form tag, input tag, p tag and label tag to structure the input area. And applying CSS script to style the user input page and align the input to left.

Execute MMW.py in virtual environment first. Enter <http://127.0.0.1:5000/> in the web browser to get to the input page. Users can type in up to 4 hauliers in any preference order at the same time and customize time span in star date and end date form. After click the submit button, if the submission was successful, users will be lead to an ok page that confirms the success of collecting data from the input form. All the inputs from users will be stored in a csv file called MMW.csv in the same folder with MMW.py script.

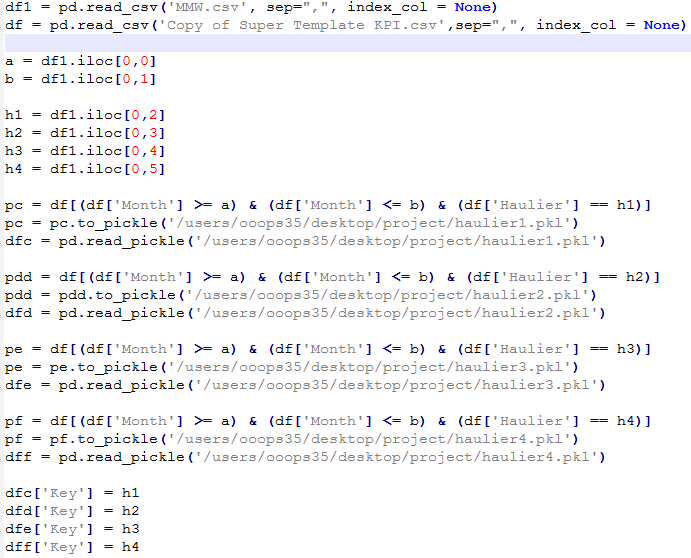
Users’ inputs are processed by http method ‘GET’ and writer function from csv module in the python script. CSV writerow helps to write the inputs to MMW.csv in one row and using iloc function could easily locate the inputs for later data manipulation.



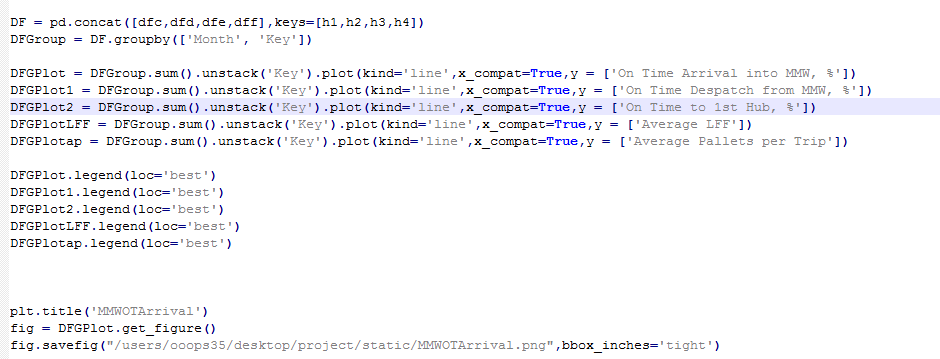
Executing the MMWChart.py script to access the MMW.csv file to get the hauliers and the time period they want to show and then to generate trending charts for each hauliers.



In the first part of MMWChart.py, using Pandas library to read user inputs csv file MMW.csv and copy of super template kpi.csv file. By using df. iloc function to locate the certain dates and names of hauliers in original file and them into Pandas pkl format by for later plotting.



In order to plot multiple hauliers in one chart, *concat()* and *groupby()* are used to group the data together. For keeping the charts clear, legend is added to present each hauliers by different colours and the legend is set to automatically adjust its position wherever it suits the best. In the end, plotting the data by using *plot()* function and using *savefig()* function to save them to statics folder for later use.



The second approach allows users to do the multiple selection from a list of hauliers rather than make them to do the type in. once user done the selection, click the submit button to store the selection to a list. Then export the selections to a local file then run the MMWChart.py to generate graphs of KPI performance.

Using jinja2 template to write a for loop to loop through the list of hauliers’ names. Using JavaScript to bind the select and submit functions to menu and submit button.

### 4.2.2 IMC (in market carriers)

For IMC part of report, in market carriers’ performances will be valued separately by 6 key performance indicators including Number of Outbound Deliveries, Number of Handling Units, Total Weight, Number of Returns, Number of Pallets and Number of Parcels.

Once the user inputs dates and names of IMC, the application would locate the eligible contents from csv files, it could either get the inputs directly running the program at back end or get information from html page then read the csv file that stores user inputs and locate relative data from in market csv file then start to plot. Organized dates and IMC data sets will be used for tables and graphs generation. The fig no. TOF on Full, % shows the 6 months’ punctuation performance of one of the in market carriers.

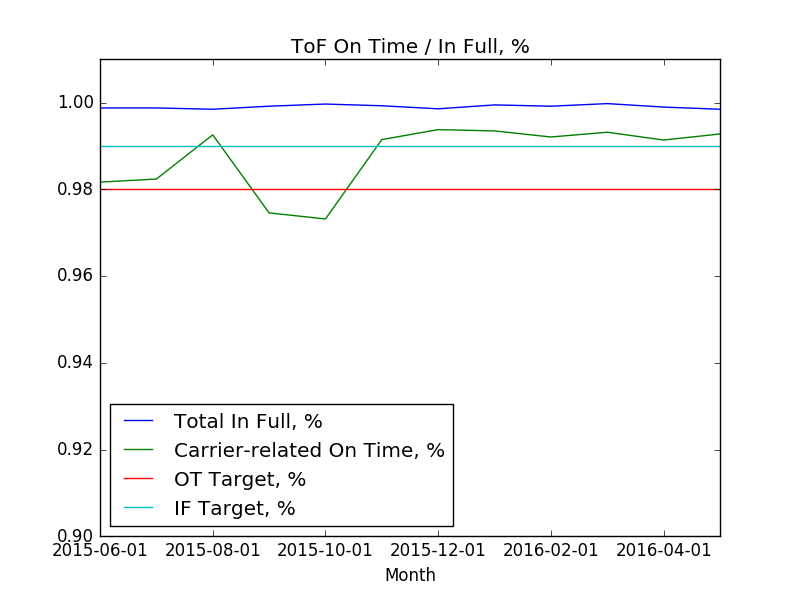
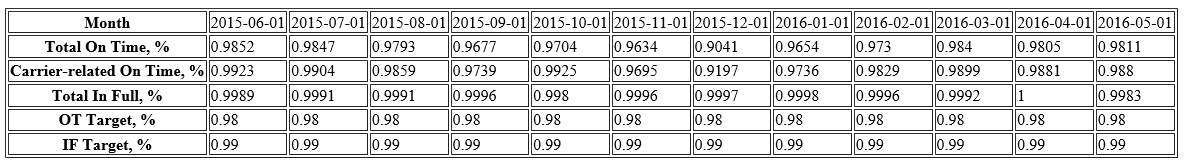


fig no. TOF on Time / In Full, %

And relative table would be created as a html table by to\_html function and render to final report by jinjia2 template. In order to get the same as the company provided in the report template, using *traverse(.T)* to swap the columns and rows then using drop*(.drop())* to delete unwanted column.







Imcs’ spend total and special costs, plotting the total spending or special costs of all in market carriers and show the spending and special costs in different categories. In order to plot the total number, the application need to work out the total number of each month by adding each in market carriers together.

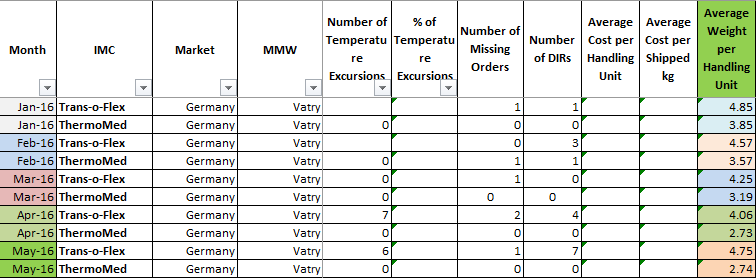


fig no. IMC.csv

In this case, reorganizing the data into different month group by reading the file into several lists then using *concat()* function for final organization eventually creating the total spending and special costs charts.

### 4.2.3 Output the report to PDF

# 5. Testing

Operating environment

Windows 10 laptop

Spyder from anaconda or windows command line

Programming with Python version 3.5 and python library including Pandas, Matplotlib for visualize, web application framework like flask and html template like Jinja2.

method

problem

cannot render more than one html that generated by Pandas in the report page.

While moving toward to next developing part, codes need to be tested and the results needs to be checked.

# 6. Outlook and Improvement for the application

improvement based on current application

create another button allow users to add more hauliers and IMC they need.

In some circumstance, it would be possible that Yusen uses more than four hauliers sometime. Adding more haulier

improving with how the data are stored database, cloud, pull out only the data users needed.

# 7. Learning outcomes-reflection-has developed insight and understanding

Reflection on project

Why python no cost at all, plenty of libraries to support process different formats of files. Easily to access data, erp, sap system.

Small project but each part is different from each other. Reusable code not possible.

Structure the code as soon as possible

Reflection on learning outcomes

Learning new tool for web application developing, consolidate and apply the knowledge learned through the year to practice. Apply theories of soft engineering developing to this application development. Applied knowledge from human centric computing to write an easy understandable user instruction to help user to install and use the application. Based on learnt python programming language Learn to use libraries to help develop the application

Reflection on Instruction for user -hc explain how to write proper instruction for users.

Problems encountered

Fuel surcharge should be filled in the files or it will report error.

Might not render in new pages

Problems with doc and code:

IF and OT target data need to be filled in excel table or the line will not show in the chart.

Axis cannot be auto adjust by different range of data each time periods. Or if using default y axis then the largest figures would be the maximum number of the axis and results in the charts become too full.

Once the time span goes over 12 months, the x axis would not show the months fully rather than show the month of every two months.

## Technical problems with second solution, after rending the input page through flask, the JavaScript code can only add 3 of the selected objects to the array sometimes including unwanted ones.

## MMWChart.py

## Legend needs to relocate. When save the charts figures the legends stay in the middle of the graphs.

## On Time to 1st Hub, % and average LFF indicators cannot be plotted. Has not yet found the reason.

## Cannot plot the second input haulier.

# 8. Conclusion

**Time limitation cannot delivery fully functioned product. The project would go run at the back if the interface cannot be integrated.**

Problems:

Flexibility

Performance

Cost

Code not flexible. Could choose different time span but cannot choose number of hauliers or IMC.

Run at back end cannot run from user interface for now.

Code structure

Simple plain way to structure the codes.

No reusable function

How it works

The application will get HTTP requests which is users’ input in this case, and dispatch code that generates HTML which is rending the customize html template through the flask framework, and creates an HTTP response with that content in this web application is to write the response to a csv file then save it locally. Using to\_pickle and read\_pickle function from pandas to read in the user’ inputs and output them as a data frame data structure for later manipulation.

# 9. Instruction for users

Installation

In order to run the application, users can download Anaconda python environment from <https://www.continuum.io/downloadsor>. The anaconda has already included both pandas and flask library. Or using windows command line directly then install those libraries via pip in virtual environment. Under this circumstance, users have to install python3 or advance version get the pip.

how to install essential tools

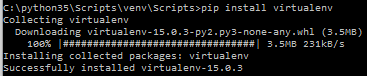
python:

download compatible version of python from <https://www.python.org/downloads/>

click the package to install the python in suggested directory

virtualenv:

for later installation and running of flask, virtual environment needs to be installed through pip. Find your pip python script in the python directory then run *pip install virtualenv* in command line.



install flask:

after installing the virtualenv module, users need to find the activate command script in virtualenv folder to activate the virtual environment. Once users see the (venv) at the front of the directory, flask can now be installed via *pip install Flask.*





install pandas:

Stay with the pip and run pip install pandas.



install matplotlib:

run pip install matplotlib.



how to use the application

if using anaconda as running platform, users only need to open the anaconda then run the essential scripts in order.

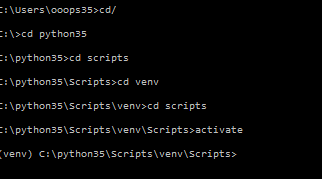
Or if using command line, users could follow the following steps to start the application.

Step one:

open the windows command line, it will be found on windows menu shown as cmd. Then click to start.

Step two:

Change the working directory to where the activate scripts stored then type in activate to start the virtual environment.



Step three:

After the virtual environment has been successfully activated, user could change the working directory back to where the application scripts stored.

Step four:

Running the python scripts in following order.

how the application works

Run the flask script to open the user input page – store and pass the input from users by http get request to local csv file - run the python script to get the stored input then generating relative graphs.

Working directory

Create a main folder in your preferred working directory. In following example, a main folder called project is created on desktop. Users need to put in all the running scripts and excel file that needed for generating report. Under the project folder, two sub folder called templates and static are created. The template folder contains html written report template and input interface pages. Created charts and relative pictures are stored in static folder.

Precautions

Before starting to extract the data, save the sheets of excel file to separate csv files and renames the files to line haul and in market. Or users can read the excel spreadsheets directly by using read\_excel function then save the them to csv files.

In saved csv files, changing the default format of month column from JUN-2015 to 2015-06-01. And change the columns with percentages (99%) to float number (0.99).

It is normal that the anaconda or windows command line start to react slight slower after multiple times of running the several scripts. Users can try to restart the running platform. The processed data and charts will be stored in your working directory.

Refresh the <http://127.0.0.1:5000/>page or clear the browser history if it shows the old page users used before. It would happen to this application from time to time. For example, after users start the report template script and have the address to view the report page. Instead of showing users final report page, input form will be shown.

Failed to generate charts or tables would happen when the scripts cannot read headers of some columns. Users could try to change the name of that particular column in both csv files and related scripts.

Blank cell in the csv files will be processed and shown as NaN in the table. Fill in zeros in the original files will be a solution to avoid the NaN characters.

For Yusen it is very crucial that know the business better. At the same time let your customers see your performance and improvement so that can boost the confidence of your clients and win a stable and long term business relationship. That is called business intelligence.

KPI indicators are essential and important for users and their clients to know the business better. While time spend on generating such report should not take long. Efficient way of Benefit from technology automation let the application helps to do the repetitive work for you.

KPI dash board can offer users an intuitive way to review the business performance and even could help to do an accurate and practical projection for the company.

Dropdown menu to select date, hauliers and imcs

Submit the result

Store into a list

Write the list to csv

Read the csv and original csv

Reform

Read

plot

# 10.Reference

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# 11. Appendix

While following the software development life circle which describes a process for planning, creating, testing, and deploying an information system and this can be used as a basis for breaking down the work into the various tasks that will make up a software development project plan and help to