Middle East Technical University

Department of Computer Engineering

CENG300
SUMMER PRACTICE REPORT

JotForm Yazilim A.Ş.

Hacettepe Teknokent Safir Bloklar C Blok Kat:6

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Instructor:
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Student's Signature

Organization Approval

Contents

1 Introduction

I have completed my internship at JotForm Yazılım A.Ş., R&D office, at Hacettepe Teknokent, Ankara.
My internship was about Time Series Analysis (TSA), and an implementation of a prediction system, using metrics provided by JotForm. The metrics are numerical, and represents the state (mainly, financial state) of the company. Using SARIMAX modelling, I have made a system which makes predictions about the future, and, when in need, can be exported as a graph, and be further evaluated by the Data Science team of JotForm. This will be further explained in further sections of this document.

2 About JotForm Inc.

JotForm is an international company, having offices in San Francisco, Izmir, and Ankara. Managerial staff is primarily located in Ankara office, which is also the home for the main R&D hub for the company.

Figure 1: A View From JotForm's Ankara Offices

2.1 Structure of the company

In JotForm, employees are operating in teams, named by themselves, such as Amplify, Hermes and so on. The main responsibility of a team is not divided between different products of the company. This way, they can keep their focus, and work more reliably as a team. A team, for example, may work on Form Builder for a certain amount of time, and not in other products such as PDF Editor.
On fridays, all teams from Izmir and Ankara offices of JotForm come together for a meet, called the Demo Day. This facilitates for the presentations of the work done in the week for each team. This day is also the day for us interns to perform their presentations about their projects.

2.2 Products offered by JotForm

2.2.1 Form Builder

Form Builder tool is the main product of the company. Offering a drag-and-drop interface for creating forms, analyzing data easily and making the analysis of the results from the form easier (using JotForm Sheets) is the main focus of the company. Since 2006, the founding of the company, they operate a Form Builder interface, which is active to this day. Main differences from competitors such as Google Sheets is the ease of use, and options for payment such as PayPal, Stripe etc. , which makes the product a standalone candidate for e-commerce websites, handling payments and billing information all by itself.

2.2.2 PDF Editor

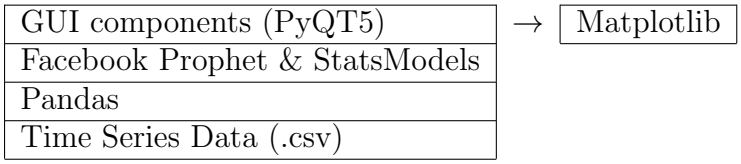
In the last year, JotForm offices in Ankara started a project on PDF documents. Since the main focus of the company is on the forms, and customers repeatedly reporting that they need to convert their PDF forms to some online form, a team in Ankara office has built a tool for the purpose. In PDF editor, users can upload their fill-able PDF forms, and automatically transform them into an online form, hosted on JotForm. This feature also works in the other way around, as in, a user can take an existing online form in JotForm, and turn it into a fill-able PDF file format.

2.2.3 JotForm Sheets

Primarily to relieve their customers from needing to resort to Google's services, mainly, Google Sheets, the company developed a tool to deal with Spreadsheet files. This is integrated into their form builder environment, so that the customers can perform aggregate functions similar to Microsoft Excel™, analyze large amount of responses to their forms, and export to useful file formats, such as .csv files.[**?**]

3 Project

The project I have completed is called JFM Overseer. Overseer is an application written in Python 3.7, and is capable of predicting time series. The overall structure of the application is as in the following diagram:



The components and how to set them up are as follows:

3.1 Time Series Data Specifications

Overseer is a tool to analyze Time Series data, which must be given to the program as .csv files, with the following structure:

$$\begin{array}{|c|c|} \hline t & y \\ t_0 & y_0 \\ \vdots & \vdots \\ \hline \end{array}$$

In this representation, t must correspond to a date-time value, mainly, parse-able by Matplotlib and other software used. The values for y must be integers.
This lets us create a function $F(t) = y$, which is useful in upcoming definitions. My goal was mainly to produce a prediction, namely, we have to

define values m_t, n_t such that for any $t > t_{end}$, where the last observed point of the function F is at time $t_0 + end$, the equation

$$P(m_t < F(t) < n_t) = 0.95 \tag{1}$$

must hold. This corresponds to creating a 95% probability interval for the possible observed values of the function F in the future, and means that we have made a prediction. The values m_t and n_t can be averaged to yield a possible future value of F. The process for doing this was explained in (Box and Wilkins CITE). However, before getting to that, we must first process the data.

4 Methodology

This section should be dedicated to explaining the 'theoretical know-how' or 'steps to run your code' or 'algorithms used'.

The following are guidelines. Use your judgment appropriately

1. Explain your approach to solving this homework assignment (theoretical know-how)
2. Which concepts from the class did you apply in this homework? How did you apply them? State the assumptions made, including the reason for assumptions.
3. Are there any special steps that should be followed to run/simulate your program/files on other computer, with necessary software (MATLAB/MULTISIM)?
4. Explain the main parts of your algorithm with the help of a flowchart, if appropriate. What does each section of it do?

Note:

- In MATLAB, Lines of comment embedded in the program are essential. However, comments cannot be used as a substitute for the algorithm explanations asked for above!
- Remember, these questions are just examples to guide you in explaining your methodology. You may not need to answer all of them in all homework assignments. You may need to add more information in a particular report. Use your judgment appropriately!

5 Results

- The results obtained should be placed here. Attach the screen shots (with description labels) from your simulation to show the schematic circuit, static/transient response, other results, as per the homework/assignment. Also, if something unexpected happened (errors/issues), attach screen shot (with description labels). Use graphs when appropriate to demonstrate results.

6 Discussions and Conclusion

Finally, discuss your results and state your conclusions on the task you were given in this homework.

1. Did you meet the goals of this homework?
2. What was the key elements of theoretical know-how taken into consideration ?
3. If there is any errors/issues, what do you think about this error/issue? How can you do to fix it?
4. If your simulation/calculation works mostly as expected, but fails in some scenarios, what do you think or state the possible reasons, try to propose a solution?
5. What are the limitations of your code/simulation?
6. Make a comment about how this homework affected your knowledge of the subject.

A Appendix

Include your code here!

Note: Also ensure to attach the MATLAB or MULTISIM files with this report.

B Example steps

B.1 Sub Sections

Use section and subsection commands to organize your document. LaTeX handles all the formatting and numbering automatically. Use ref and label commands for cross-references.

B.2 Comments

Comments can be added to the margins of the document using the todo command, as shown in the example on the right. You can also add inline comments too:

This is an inline comment.

Here's a comment in the margin!

B.3 Tables and Figures

Use the table and tabular commands for basic tables — see Table 1, for example. You can upload a figure (JPEG, PNG or PDF) using the files menu. To include it in your document, use the include graphics command as in the code for Figure 2 below.

Item	Quantity
Widgets	42
Gadgets	13

Table 1: An example table.

B.4 Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $\mathrm{E}[X_i] = \mu$ and $\mathrm{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_{i}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

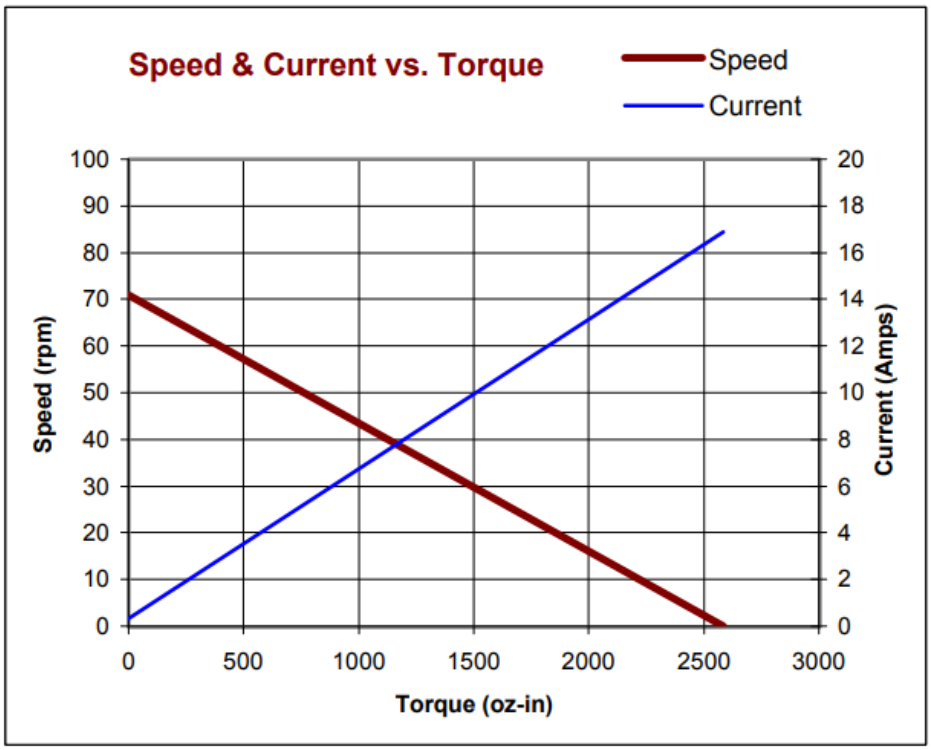


Figure 2: Speed vs. Torque from Pittman motor data sheet

B.5 Lists

You can make lists with automatic numbering ...

1. Like this,
2. and like this.

... or bullet points ...

- Like this,
- and like this.

B.6 Bibliography

- Adding bibliography to document
- Some claim [?].

B.7 Hyperlink to a website

- Hyperlink to a website.

B.8 Learn LaTeX in 30 minutes

- Link to overleaf website.