EGCI 491 Computer Engineering Seminar
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Week #4 LaTeX II

Assignment#3 (10 points)

Instruction:

1) Please answer and combine all of your answers to each question in a single *.doc or *.pdf file.
2) You can place your results (screen captures) and your code in text under or along with each result in your document file.
3) You can also submit .tex file along with .doc/.pdf as needed.

Note*: This is an individual assignment, please do not work as a group yet.

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1. Create a LaTeX document to show quadratic formula as shown below on the "01 LaTeX Assignment 2 - Math Equations.tex" file. Report your results and LaTeX code. **(5 points in total)**

1.1. An inline equation (EQ1,EQ3 - ***1 point***)

1.2. A new-line equation (EQ2,EQ4 - ***2 points***)

1.3. Multiple-line equations with numbering and alignment (EQ5 - ***2 points***)

Expected Results:

1 Quadratic Formula

A quadratic equation is a second degree polynomial written as $ax^2 + bx + c = 0$. The generic function of the quadratic equation can be determined as:

$$f(x) = ax^2 + bx + c \tag{1}$$

whose discriminant $b^2 - 4ac$ is positive, with x representing an unknown, with a, b and c representing constants, and with $a \neq 0$, the quadratic formula is:

$$x = -b \pm \frac{\sqrt{b^2 - 4ac}}{2a} \tag{2}$$

where the plus–minus symbol $\pm$ indicates that the quadratic equation has two solutions. When written separately, they become:

$$\begin{aligned} x_1 &= -b + \frac{\sqrt{b^2 - 4ac}}{2a} \quad and \\ x_2 &= -b - \frac{\sqrt{b^2 - 4ac}}{2a} \end{aligned} \tag{3}$$

Hint:

1) Use "**amsmath**" package to insert math equations. *(See P.7-8)*
2) Use "**^**" for **superscript** (e.g., x^2 -> x^2) and "**_**" for **subscript** (e.g., x_2 -> x_2)
3) Use the command **\begin{align} … &= … \end{align}** to insert an equation with numbering and alignment (&=). *(See P.10)*
4) Use **\begin{align} … \end{align}** to insert equation(s) with number(s). *(See P.11)*
5) Use the command "**\frac{…X…}{…Y…}**" to insert a fraction of {…X…} over {…Y…}.
6) Use the command "**\sqrt{…}**" to insert a square root of {…}.
7) Use the command **"\hspace{…}**" to insert horizontal space, where {…} indicates the size of the blank space (e.g., 1em, 2pt, 3cm).

Results (Screen Captures):
Your Code:

2. Edit the timeline table in “02 LaTeX Assignment 2 - Timeline.tex” to be the timeline of your own project seminar. Report your results and LaTeX code. (**2 points**)

Results (Screen Captures):
Your Code:

3. Edit "08 Bibliography.tex" and "References.bib" to cite and add details of **at least two published papers** related to your senior project as part of Chapter 2 – Literature Review similar to the example shown below. Report your results and LaTeX codes. **(3 points in total)**

3.1. Find two published papers related to your senior project on IEEE Explore, Scient Direct, or others. (***1 point***)

3.1.1. Go to **Mahidol e-Database**: https://www.li.mahidol.ac.th/e-databases/#I

3.1.2. Select e-Database that you like to look for related published papers such as IEEE Explore

3.1.3. Enter some keywords for searching related papers and then briefly read the abstract and conclusion or the introduction if needed to filter out and select only the papers that you like to review.

3.2. Add details (e.g., title, authors, journal/conference name, volume, date, page) of the selected two papers on "**References.bib**". (***1 point***)

3.3. Edit **"08 Bibliography.tex"** to cite all of the selected papers from 3.2 as part of Chapter 2- Literature Review, similar to the example show below (***1 point***)

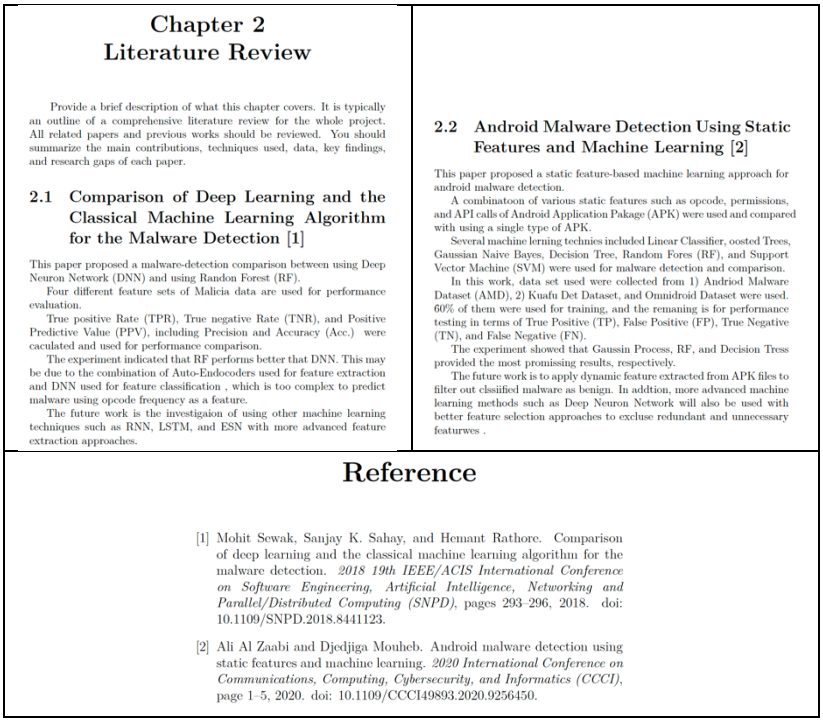
3.3.1. Use **\section**{… XXX …} to add a tittle of a selected paper.

3.3.2. See slide P.17 and P.19 for the commands and examples of how to cite the papers in LaTeX (e.g., **\citet{}, \cite{}, \citep{}**).

3.3.3. Add some brief details such as the contribution of the paper.

3.3.4. Repeat step 3.3.1 - 3.3.3 to cite and add details of the second paper. After that, report your results (capture screen) and LaTeX code below.

Example:



Chapter 2
Literature Review

Provide a brief description of what this chapter covers. It is typically an outline of a comprehensive literature review for the whole project. All related papers and previous works should be reviewed. You should summarize the main contributions, techniques used, data, key findings, and research gaps of each paper.

2.1 Comparison of Deep Learning and the Classical Machine Learning Algorithm for the Malware Detection [1]

This paper proposed a malware-detection comparison between using Deep Neuron Network (DNN) and using Randon Forest (RF).

Four different feature sets of Malicia data are used for performance evaluation.

True positive Rate (TPR), True negative Rate (TNR), and Positive Predictive Value (PPV), including Precision and Accuracy (Acc.) were caculated and used for performance comparison.

The experiment indicated that RF performs better that DNN. This may be due to the combination of Auto-Endocoders used for feature extraction and DNN used for feature classification , which is too complex to predict malware using opcode frequency as a feature.

The future work is the investigaion of using other machine learning techniques such as RNN, LSTM, and ESN with more advanced feature extraction approaches.

2.2 Android Malware Detection Using Static Features and Machine Learning [2]

This paper proposed a static feature-based machine learning approach for android malware detection.

A combinatoon of various static features such as opcode, permissions, and API calls of Android Application Pakage (APK) were used and compared with using a single type of APK.

Several machine lerning technics included Linear Classifier, oosted Trees, Gaussian Naive Bayes, Decision Tree, Random Fores (RF), and Support Vector Machine (SVM) were used for malware detection and comparison.

In this work, data set used were collected from 1) Andriod Malware Dataset (AMD), 2) Kuafu Det Dataset, and Omnidroid Dataset were used. 60% of them were used for training, and the remaning is for performance testing in terms of True Positive (TP), False Positive (FP), True Negative (TN), and False Negative (FN).

The experiment showed that Gaussin Process, RF, and Decision Tress provided the most promissing results, respectively.

The future work is to apply dynamic feature extracted from APK files to filter out clssiified malware as benign. In addtion, more advanced machine learning methods such as Deep Neuron Network will also be used with better feature selection approaches to excluse redundant and unnecessary featurwes .

Reference

[1] Mohit Sewak, Sanjay K. Sahay, and Hemant Rathore. Comparison of deep learning and the classical machine learning algorithm for the malware detection. *2018 19th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD)*, pages 293–296, 2018. doi: 10.1109/SNPD.2018.8441123.

[2] Ali Al Zaabi and Djedjiga Mouheb. Android malware detection using static features and machine learning. *2020 International Conference on Communications, Computing, Cybersecurity, and Informatics (CCCI)*, page 1–5, 2020. doi: 10.1109/CCCI49893.2020.9256450.

Results (Screen Captures):
Your Code:

Bonus Question (***2 points***)

From question 3, add at least **3 more related published papers/works** (only its title and citation) that you plan to review/present as a part of your Chapter 2 - literature review. Report your codes and result.

Results (Screen Captures):
Your Code: