Integration of LSTM Networks, Reinforcement Learning, and Explainable AI in Smart Farming: Enhancing Crop Yield and Resource Efficiency through Federated Learning

by

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A Thesis Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Engineering in
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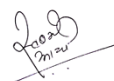School of Engineering and Technology
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May 2022

AUTHOR'S DECLARATION

I, Stabya Acharya, declare that the research work carried out for this thesis was in accordance with the regulations of the Asian Institute of Technology. The work presented in it are my own and has been generated by me as the result of my own original research, and if external sources were used, such sources have been cited. It is original and has not been submitted to any other institution to obtain another degree or qualification. This is a true copy of the thesis including final revisions.

Date: Jan 1, 2024

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Signature:

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ABSTRACT

Enter your abstract here.

CONTENTS

LIST OF TABLES

Tables   **Page**

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Start your paragraph here; justified, no indentation but space between the last paragraph and the next one. Maintain a 1.5 line spacing throughout. This section should consist of 2 pages maximum excluding figures and tables. This is NOT a Literature Review section.

Each paragraph should have at least 4 sentences or 8 lines. Paragraphs of more than 6 sentences (12 lines) should be split into two paragraphs. Follow the appropriate structure of writing a clear paragraph. Consult your adviser about the subsections. Maintain one space between the last line of this section and the next subsection.

1.2 Statement of the Problem

Write approximately three paragraphs only. Each paragraph should have at least 4 sentences. Paragraphs of more than 6 sentences should be split into two paragraphs. Follow the appropriate structure of writing a clear paragraph.

1.3 Objectives

Introduce your main objective first in one sentence, followed by a bulleted list of specific objectives, left aligned. 1. Follow a 0.5-inch Tab setting. 2. Add more here.

1.4 Organization of the Study

Start your paragraph here.

CHAPTER 2
TITLE

Write your introductory paragraph/s to give an overview of the chapter (except for Chapter 1). Limit this section to two paragraphs. Follow the appropriate structure of writing paragraphs. Paragraphs should have at least four sentences (8 lines). Paragraphs with more than 6 sentences (12 lines) must be split into two paragraphs. Maintain one blank line between paragraphs.

2.1 Heading, Level 2

This section presents some guidelines on how to create and format tables and figures following the APA Style with some examples. Every table and figure should serve a purpose. A table or figure can be referred to in the text by its number [e.g., As shown in Table 2.1..., as can be seen in the results of the testing (see Figure 2.1)]. Avoid writing "the table above" or "the figure below" as the position of a figure or table might change during the writing process.

Tables and figures can be generated in different ways using many programs. Table 2.1 presents the format of a table following the APA style. Align all tables and figures with the left margin and place a table or figure after a paragraph where it is first mentioned. Separate the paragraph and the table or figure title by a double-spaced blank line. Titles should be brief, clear, and explanatory.

Repeat the column headings on the second page of the table (see Table 2.1). Separate

Figure 2.1

Doge.

Note. Additional notes goes here.

this paragraph from the table by a double-spaced line. Tables and figures can be placed at the start or end of a page. Fit the table or figure between the margins and in one page.

As there is very little space left for the table on this page, present the table on the next page. You can add more content in this section. The description should be as close to the table or figure as possible. (There should be one blank double-spaced line between the last line of the paragraph and the table or figure number, and between the table / figure number and the title.)

You can cite stuff in references.bib like this (Author, 2024). y is as follows.

$$y = mx + b \tag{2.1}$$

2.2 Heading, Level 2

Add a short introductory sentence/s here.

2.2.1 Heading, Level 3

Start your paragraph here. Table 2.2 presents a sample of a qualitative table with variable descriptions. Separate the paragraph and the table or figure title by a double-spaced blank line. Titles should be brief, clear, and explanatory. Check the Language Center website for more examples.

2.2.2 Heading, Level 3

(1 space between the last line of this section and the next Level 2 heading)

2.3 Heading, Level 2

As for figures, the figure title should also be written in italics below the figure number (in bold) separated by a double-spaced blank line as shown in Figure 2.1. The size and density of the elements in a figure must be considered when deciding on the font size and spacing. Continue with the paragraph here.

Continue with the paragraph here. The table or figure should be as close to the description as possible or when it is first mentioned. Fit the tables and figures between the margins. (There should be one blank double-spaced line between the previous paragraph and the figure number, and between the figure number and the title.)

Table 2.1

An example table in latex.

Methods	Metric
Method A	153.3
Method B	2.4

Note. Add notes here.

CHAPTER 3
METHODOLOGY

CHAPTER 4
EXPERIMENT

CHAPTER 5
CONCLUSION

REFERENCES

Author, F. (2024, Dec). An example citation. *International Conference of Stuff*. Retrieved from `https://www.youtube.com/watch?v=dQw4w9WgXcQ`

APPENDICES

APPENDIX A

TITLE

Figure A1 Doge.

Note. Notice the different styling of figures in the appendix...