

Implementing Demand Forecasting System to Enhance Inventory Management Efficiency for SMEs



UNDERGRADUATE THESIS
Submitted as one of the requirements to obtain
Sarjana Komputer (S. Kom)

By:
Kevin Marchanda Marthakusuma
001202200091

FACULTY OF COMPUTER
SCIENCE STUDY PROGRAM
CIKARANG
August, 2025

Copyright by
Kevin Marchanda Marthakusuma

SIMILARITY INDEX REPORT

Implementing Demand Forecasting System to Enhance
Inventory Management Efficiency for SMEs.docx

ORIGINALITY REPORT

8%	6%	0%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to President University Student Paper	3%
2	Submitted to University of Sunderland Student Paper	1%
3	repository.president.ac.id Internet Source	1%
4	myfik.unisza.edu.my Internet Source	<1%
5	Submitted to University of Portsmouth Student Paper	<1%
6	psasir.upm.edu.my Internet Source	<1%
7	a-research.upi.edu Internet Source	<1%
8	m.mu.edu.sa Internet Source	<1%
9	Submitted to Universiti Malaysia Sabah Student Paper	<1%

10	Submitted to Segi University College Student Paper	<1 %
11	Submitted to Adventist University of Central Africa Student Paper	<1 %
12	Submitted to University of Adelaide Student Paper	<1 %
13	Submitted to universititeknologimara Student Paper	<1 %
14	www.prepbytes.com Internet Source	<1 %
15	dspace.daffodilvarsity.edu.bd:8080 Internet Source	<1 %
16	healthdocbox.com Internet Source	<1 %
17	Thangaprakash Sengodan, Sanjay Misra, M Murugappan. "Advances in Electrical and Computer Technologies", CRC Press, 2025 Publication	<1 %
18	repository.uib.ac.id Internet Source	<1 %
19	etheses.lib.ntust.edu.tw Internet Source	<1 %
20	journals.orclever.com Internet Source	

		<1 %
21	president.ac.id Internet Source	<1 %
22	www.jatit.org Internet Source	<1 %
23	eprints.dinus.ac.id Internet Source	<1 %
24	scholar.unand.ac.id Internet Source	<1 %

GPT ZERO


GPTZero
Version 2025-06-02-base

Combine Form 1-5.pdf - 7/21/2025

AI Report

We predict this text is

Human Generated

<div>AI Probability</div> <div>11%</div> <div>This number is the probability that the document is AI generated, not a percentage of AI text in the document.</div>	<div>Plagiarism</div> <div>?</div> <div>The plagiarism scan was not run for this document. Go to gptzero.me to check for plagiarism.</div>
--	---

ABSTRACT

We would like to introduce a web-based warehouse management application designed to assist small and medium-sized enterprises (SMEs), particularly those in the electro-deposition paint (EDP) sector. The purpose of this system is to simplify the stock management process and minimize human error in raw material recording.

The primary focus of this project is the implementation of a Demand Forecasting feature designed to predict future raw material needs based on historical data from the past three months. The Demand Forecasting feature we will develop will use linear regression methods and monthly data processing to estimate the amount of material needed for that month, thereby preventing stock shortages or surpluses. Additionally, this web application includes a notification feature aimed at alerting users if any raw material falls below the minimum threshold.

In addition to the main features mentioned above, this project includes features specific to each role. The author has developed features for the admin head and master roles, both of which have control over access authorization and all data input. The web application's UI will be developed using Bootstrap v5.3, jQuery, DataTables, and SweetAlert, with MySQL used for data storage. All development for this project was carried out using Visual Studio Code (VSCode), with a local server using XAMPP.

Testing results show that the prediction feature operates as intended, with a low error rate and reliable results in assisting users with the raw material procurement planning process. This system effectively assists in the planning and availability of raw materials for these SMEs.

TABLE OF CONTENT

	Page
Abstract	i
Dedication	ii
Acknowledgment	iii
Table of Content.....	iv
List of Figures	vi
List of Tables	vi
CHAPTER I: INTRODUCTION.....	1
1.1 Background	1
1.2 Problem Statement	1
1.3 Objectives.....	2
1.4 Scope and Limitation	2
1.5 Significance of the Study	3
1.6 Project Methodology.....	3
1.7 Man Month Allocation.....	4
1.8 Project Timeline	5
1.9 Organization of the Report.....	6
CHAPTER II: LITERATURE REVIEW	7
2.1 Theoretical Framework.....	7
2.2 Related Research.....	8
2.3 Technology Used	10
2.4 Summary	10
CHAPTER III: SYSTEM DESIGN AND ANALYSIS	11
3.1 Existing Business Process	11
3.2 Proposed Business Process	13
3.3 Requirement Analysis	15
3.4 Use Case Diagram.....	17
3.5 Data Flow Diagram (DFD)	21
3.6 ERD / Database Design.....	23
3.7 Functional Design per Role (Admin Head, Master)	31
CHAPTER IV: SYSTEM IMPLEMENTATION	33

4.1 Technology Stack Used	33
4.2 System Architecture	34
4.3 Implementation of Demand Forecasting.....	35
4.4 Implementation of Role-based Features	36
4.5 Interface Overview.....	37
4.6 Testing and Evaluation.....	42
4.7 Discussion	43
CHAPTER V: CONCLUSION AND SUGGESTION	43
5.1 Conclusion	43
5.2 Suggestions for Future Development.....	44
REFERENCES	46
APPENDICES	48
Appendices A: Forecasting Result Screenshot	48
Appendices B: UI Screenshot per Role	48
Appendices C: Gantt Chart	51
Appendices D: Man Month.....	52

LIST OF TABLES

Table 1.1 Man Month Allocation.....	5
Table 1.2 Project Timeline (Gantt Chart)	6
Table 2.3 Tech Stack.....	10
Table 3.4.1 Use Case Scenario.....	17
Table 3.6.1 Data Dictionary	24

LIST OF FIGURES

Figure 1.6 Waterfall Methodology.....	4
Figure 3.1 Existing Business Process	12
Figure 3.2 Proposed Business Process	14
Figure 3.4 Use Case Diagram	17
Figure 3.5.1 Data Flow Diagram Level 0	21
Figure 3.5.2 Data Flow Diagram Level 1	22
Figure 3.6 Entity Relationship Diagram	23