

TABLE OF CONTENTS

Cover Page	i
Candidate's Declaration	iii
Acknowledgement	iv
Certificate of Examiner	v
Plagiarism Verification Certificate	vi
Abstract	vii
Table of Contents	viii
List of Figures	xi
List of Tables	xiii
List of Abbreviations	xv
List of Appendices	
Addendum	
CHAPTER 1	
INTRODUCTION	
1.1 Introduction	1
1.2 Introduction to academics and student performance	2
1.3 Education Research	3
1.3.1 Quantitative Research	3
1.3.2 Qualitative Research	3
1.4 Education System in India	4
1.4.1 Levels of school education in Rajasthan	4
1.4.2 Factors that influence Student Performance	5
1.4.2.1 Demographic Attributes	6
1.4.2.2 Socio-economic Attributes	6
1.4.2.3 Academic Attributes	6
1.5 Motivation for study	7
1.5.1 Survey Results	7
1.6 Problem Statement	8
1.7 Objectives of the Study	9
1.8 Research Design	9
1.9 Organization of Thesis	11

CHAPTER 2

INTRODUCTION TO MACHINE LEARNING TECHNIQUES

2.1	Introduction	13
2.2	Machine Learning	13
2.3	Classification Techniques	15
	2.3.1 Logistics Regression	15
	2.3.2 Support Vector Machine	17
	2.3.3 K-Nearest Neighbor	18
	2.3.4 Naïve Bayes	19
	2.3.5 Decision Tree	20
	2.3.6 Random Forest	21
	2.3.7 Stochastic Gradient Boosting	22
	2.3.8 AdaBoost	23
	2.3.9 Bagged Decision Tree	24
2.4	Chapter Summary	25

CHAPTER 3

LITERATURE REVIEW

3.1	Introduction	26
3.2	Literature Review highlighting attributes	26
3.3	Literature Review using Machine Learning Techniques in Academics	30
3.4	Summary of Literature Review	42
3.5	Research Gaps identified	43
3.6	Chapter Summary	43

CHAPTER 4

FRAMEWORK FOR RESEARCH

4.1	Introduction	44
4.2	CRISP-DM for Education	44
4.3	Methodology	46
	4.3.1 Data Collection	49
	4.3.2 Data Preparation	55
	4.3.3 Exploratory Data Analysis	56
	4.3.4 Feature selection	59

4.3.5 Jupyter Notebook (ML Tool)	66
4.3.6 Applying various classifiers	67
4.3.7 Evaluation of best classifier	68
4.4 Chapter Summary	70
CHAPTER 5	
PREDICTION OF STUDENT POTENTIAL IN TECHNICAL PROGRAMS	
5.1 Introduction	71
5.2 Applying ML techniques to analyze student potential	72
5.3 Evaluation of classifier results	80
5.4 Finding the optimal feature subset from the student dataset	82
5.5 Evaluation of students based on Education Boards	90
5.5.1 Evaluation using Machine Learning Techniques	93
5.5.2 Evaluation using Ensemble Methods	94
5.6 Chapter Summary	96
CHAPTER 6	
PREDICTION OF STUDENT PERFORMANCE	
6.1 Introduction	97
6.2 Categorization of Data	97
6.3 Finding best classifier model to analyze student performance	99
6.4 Overall Evaluation of student performance prediction models	102
6.4.1 Performance for the two-label class	103
6.4.2 Performance for the two-label class	103
6.4.3 Performance for the two-label class	104
6.5 Chapter Summary	
CHAPTER 7	
CONCLUSION AND SUGGESTIONS FOR FURTHER WORK	
7.1 Introduction	106
7.2 Summary and Contributions of the work done	106
7.3 Contributions of the research work	109
7.4 Suggestions for further work	110
References	111