TABLE OF CONTENTS

			Page
ABSTF	RACT (I	ENGLISH)	
ABSTF	RACT (THAI)	
ACKN	OWLE	OGEMENT	V
TABLE	OF C	ONTENTS	VI
LIST (OF TAE	BLES	VIII
LIST (OF FIGI	JRES	IX
LIST (OF ABB	BREVIATIONS	X
CHAP	TER		
1	INTF	RODUCTION	1
	1.1	The significance of the research question	1
	1.2	The research objective:	
	1.3	Contribute of the research	2
	1.4	Justifications for conducting research in this population	2
2	PREI	DICTIVE ANALYSIS OF A HIGHWAY ROAD ACCIDENT IN THAILAND:	
	USIN	USING MACHINE LEARNING APPROACH	
	2.1	Abstract	4
	2.2	Introduction	5
	2.3	Data Description and Methodology	15
	2.4	Descriptive Statistics and Result	21
	2.5	Conclusion and Discussion	32
	2.6	Study limitation and future study	34
	2.7	Reference	34
3	USIN	IG A DECISION TREE TO COMPARE RURAL VERSUS HIGHWAY	
	МОТ	TORCYCLE FATALITIES	44
	3.1	Abstract	44

TABLE OF CONTENTS (Continued)

			Page
	3.2	Introduction	45
	3.3	Literature Review	47
	3.4	Methodology	50
	3.5	Results	57
	3.6	Conclusion and Discussion	65
	3.7	Limitations and Future Studies	67
	3.8	References	68
4	COM	IPARISON OF MACHINE LEARNING PREDICTABILITY PERFORMANCE	•
	THE	CASE OF MOTORCYCLE ACCIDENT IN THAILAND	74
	4.1	Abstract	74
	4.2	Introduction	75
	4.3	Literature Review	78
	4.4	Methodology and Data	81
	4.5	Results	89
	4.6	Conclusion & Discussion	95
	4.7	Limitations and Future Studies	97
	4.8	Reference	98
5	CON	CLUSION AND RECOMMENDATION	105
APPEN	IDIX A	LIST OF PUBLICATIONS	106
BIOGR	APHY.		120

LIST OF TABLES

Table		Page
2.1	Road accident using data mining and Machine learning	7
2.2	Previous research has identified the factors that determine	
	the severity of driving injuries	11
2.3	the driver who was the caused in those accident divided	
	by highway vs Non highway	16
2.4	Total 34 Attribute with setting description	16
2.5	Focusing Rule with high lift and widely gap between support	
	and confidence	28
3.1	The Machine Learning Models Used in Extant Traffic Accident	
	Studies	50
3.2	The Categorical Variables and Their Descriptive Statistics	52
3.3	The Measurement Categories for the 27 Identified Motorcycle Accident	
	Variables	54
3.4	The Final HW and RR Sets by Rider Speed	63
3.5	The Model Evaluation Results	64
4.1	Comparison of the advantages and disadvantages of ML models	76
4.2	Machine learning models in traffic accident study	78
4.3	Categorical Attribute and descriptive statistics	82
4.4	Total 28 Attributes with setting description	86
4.5	Info. Gain Ranking by model	89
4.6	evaluation result from models	91
4.7	Confusion Metrix for each model	94

LIST OF FIGURES

Figur	ures F	
2.1	Highway accident stacked column chart by year	6
2.2	Data analysis process step	15
2.3	Associate Rules Mining Diagram	19
2.4	Highway accident distribution plot by 24-hour time series w/	
	Kernel density as line chart	22
2.5	Frequency itemset extraction	23
2.6	Associate Rules Mining total 1558 rules	24
2.7	and 2.8 Support and Confidence distribution from 1,558 rules discovered	25
2.8	1,558 discovered rules with scatter plot Support VS Confidence	26
2.9	Dendrogram for 1,558 rules discovered on Antecedent	27
2.10	Confidence and support chart gap trend chart by interesting rules	31
3.1	Total number of vehicles and motorcycles registered	
	in Thailand from 2015 to 2020	45
3.2	The steps in the process for the study	51
3.3	Diagram of the confusion matrix	57
3.4	HW and RR fatality probabilities at different times of the day	58
3.5	The HW tree model	59
3.6	The RR tree model	60
3.7	The confusion matrix actual and predicted results for HWs	65
3.8	The confusion matrix actual and predicted results for RRs	65
3.9	Key accident factors: HWs versus RRs	66
4.1	Machine learning Process flow	81
4.2	Confusion matrix diagram	88
4.3	Performance Measurement models	92
11	Model-specific ROC plot for predicting pon-fatality	03

LIST OF ABBREVIATIONS

LHS = Left hand Side

RHS = Right Hand Side

HW = Highway

RR = Rural Road

TP = True Positive

FP = False Positive

TN = True Negative

FN = False Negative

DT = Decision Tree

SVM = Support Vector Machine

RF = Random Forest

kNN = K-Nearest-Neighbors

NN = Neural Network

LR = Logistic Regression

GB = Gradient Boosting

AUC = Area Under Curve

CA = Classification Accuracy