THESIS TITLE

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by

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Under the supervision

of

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This is to certify that the thesis entitled ****, submitted by **Rajdeep Chatterjee (Roll No.: **** and Reg. No.: ****)** S/o, Mrs. **** and Mr. **** to the School of Computer Engineering, Kalinga Institute of Industrial Technology Deemed University, Bhubaneswar, Odisha, India for the award of the degree of **Doctor of Philosophy (Ph.D.)** in Computer Science and Engineering, is a bonafide record of the research work done by him under my supervision. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

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ABSTRACT

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KEYWORDS: ****; ****; ****; ****.

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Abbreviations

Acronym	What (it) Stands For
BCI	**B**rain-**C**omputer **I**nterface
EEG	**E**lectro **E**ncephalogram
MI	**M**otor **I**magery
DM	**D**iscernibility **M**atrix
PCA	**P**rincipal **C**omponents **A**nalysis
FDM	**F**uzzy **D**iscernibility **M**atrix
AAR	**A**daptive **A**uto **R**egressive
BP	**B**andpower
EngEnt	**E**nergy and **E**ntropy
KLD	**K**ullback **L**eibler **D**ivergence
FSM	**F**uzzy **S**imilarity **M**easures
NB	**N**aïve **B**ayes
KNN	**K** **N**earest **N**eighbor
SVM	**S**upport **V**ector **M**achine
ENS	**E**nsemble
Adaboost	**A**daptive **B**oosting
Logitboost	**L**ogit **B**oosting
Mix-Bag	**M**ixture **B**agging

Symbols

Symbol	Description
η	Feature-set obtained from different feature extraction strategies (reference: sliding windows of chapter 5)
υ	Value in the input dataset
υ'	Discrete value after discretization
μ	Mean value of an attribute
σ	Standard deviation of an attribute
m	Number of instances in the dataset
n	Number of columns in the dataset
N	Number of decision classes in the dataset
$\vec{X}$	Represents a vector
$\mu_X(.)$	Gaussian (fuzzy) membership value
$DissM$	Dissimilarity Measures
$classNum$	Number of decision classes
$actualFeatureNum$	Number of features
$Std.$	Standard deviation
$Ao5$	Average of 5 independent runs
$Bo5$	Best of 5 independent runs
MRS	Mean reduct size

Dedicated to Lord Kashiswara and my family. . .

Chapter 1

Introduction

BCI is a hybrid domain involving the subjects of neuroscience, digital signal processing, and machine learning [1, 2, 3].

Chapter 2

Survey

Chapter 3

Problem Definitions and Objectives

3.1 Background

3.2 Problem Statements

3.3 Roadmap of the Thesis

Chapter 4

Experimental Setup

This chapter lays out the experimental setup that is used for the experiments reported in the succeeding chapters.

Chapter 5

Contribution-1

Chapter 6

Contribution-2

Chapter 7

Contribution-3

Chapter 8

Conclusions and Future Work

In this thesis, we have studied motor-imagery EEG signals and their classification.

8.1 Summary of Results

8.2 Future Research Directions

Research is a continuous process.

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