



## TABLE OF CONTENTS

ADDING SYNONYMS TO CONCEPTS IN AN ONTOLOGY TO SOLVE THE PROBLEM OF SEMANTIC HETEROGENEITY .....	i
ADDING SYNONYMS TO CONCEPTS IN AN ONTOLOGY TO SOLVE THE PROBLEM OF SEMANTIC HETEROGENEITY .....	ii
CERTIFICATE OF APPROVAL .....	iii
DECLARATION BY CANDIDATE .....	iv
ACKNOWLEDGEMENTS .....	v
ABSTRACT .....	vi
TABLE OF CONTENTS .....	viii
LIST OF FIGURES .....	xii
LIST OF TABLES .....	xx
LIST OF ABBREVIATIONS .....	xxii
I. INTRODUCTION .....	1
1.1 Background .....	1
1.2 Problem Definition .....	5
1.3 Research Questions .....	12
1.4 Research Purposes .....	12
1.5 Dissertation Organizations .....	13
II. LITERATURE REVIEW AND FUNDAMENTAL THEORY .....	14
2.1 Previous Works Related to Knowledge Integration, Ontology Similarity and Ontology Synonyms .....	14
2.2 Ontology Integration .....	17
2.2.1 Ontology Combination .....	17
2.2.2 Ontology Merging .....	18
2.2.3 Ontology Alignment .....	18
2.2.4 Ontology Matching .....	19
2.2.5 Ontology Mapping .....	20
2.3 Interoperability in Information System Environment .....	23



2.4	Definitions of Ontology .....	24
2.4.1	Components of Ontology .....	27
2.4.2	Types of Ontologies .....	28
2.4.3	Design Principle of Ontologies .....	31
2.4.4	Ontology Based Integrations Approach.....	32
2.4.5	Ontology Development Tools.....	36
2.4.6	Ontology Languages .....	41
2.5	Dublin Core Metadata Element Set .....	49
2.6	Introduction to Several Methodologies to Build Ontology.....	51
III.	PROPOSED MODEL.....	56
3.1	Modelling Different Perception .....	57
3.2	An Architecture System.....	60
IV.	DESIGN of ONTOLOGY MAPPING IN DIFFERENT CASE STUDY .....	68
4.1	Background : Poverty Case Study .....	68
4.1.1	Ontology Design : Poverty Case Study .....	77
4.2	Background : Library Case Study.....	92
4.2.1	Ontology Design : Library Case Study.....	92
V.	IMPLEMENTATION of ONTOLOGY MAPPING IN DIFFERENT CASE STUDY .....	96
5.1	Implementation : Poverty Case Study.....	96
5.1.1	Classes in Ontology UV1, Ontology UV2 and Ontology CO in Poverty Case Study.....	96
5.1.2	Properties in Ontology UV1, Ontology UV2, and Ontology CO : Poverty Case Study .....	101
5.1.3	Individuals in Ontology UV1, Ontology UV2, and Ontology CO : Poverty Case Study .....	108
5.1.4	GraphViz in Ontology UV1, Ontology UV2, and Ontology CO : Poverty Case Study .....	109
5.1.5	RDF and SPARQL Between Ontology UV1, Ontology UV2, and Ontology CO: Poverty Case Study .....	116
5.1.6	RDF and SPARQL Between Ontology UV1, Ontology UV2 and Ontology CO : Poverty Case Study .....	129
5.1.7	RDF Validator and Converter : Poverty Case Study .....	132



5.2	Case Study II: Library.....	142
5.2.1	Classes in Ontology Library 1 and Ontology Library 2 : Library Case Study .....	142
5.2.2	Properties in Ontology Library 1 and Ontology Library 2 : Library Case Study .....	143
5.2.3	Individuals in Ontology Library 1 and Ontology Library 2 : Library Case Study .....	145
5.2.4	GraphViz in Ontology Library 1 and Ontology Library 2 in : Library Case Study .....	146
5.2.5	RDF and SPARQL Between Ontology Library 1 and Ontology Library 2: Library Case Study .....	150
5.2.6	RDF and SPARQL Between Ontology Library 1, Ontology Library 2 and Ontology Libray CO : Library Case Study .....	152
5.2.7	RDF Validator and Converter – Testing RDF for Library Case Study .....	154
5.3	Query Validation in Ontology CO.....	162
5.3.1	Testing Equivalency between Class People in Ontology CO and Class Person in Ontology UV1 and Ontology UV2.....	162
5.3.2	Testing Equivalency between Individual in Class People (Ontology CO) and Individual in Class Person (Ontology UV1 and Ontology UV2).....	166
5.3.3	Testing Equivalency between DataProperties In Class Person (Ontology UV1) and DataProperties in Class People (Ontology CO) .....	169
5.3.4	Testing Equivalency between Class BirthControl (Ontology CO), Class Contraceptive (Ontology UV1) and Class BirthControlMethod (Ontology UV2) .....	171
5.3.5	Testing Equivalency between Class Job (Ontology CO), Class JobArea (Ontology UV1) and Class Work (Ontology UV2) 174	
5.3.6	Testing Equivalency between Individual in Class Job (Ontology CO), Class JobArea (Ontology UV1) and Class Work (Ontology UV2).....	177
5.3.7	Testing Equivalency between Properties Job in Class Job (Ontology CO), Properties JobName in Class JobArea (Ontology UV1) and Properties JobaArea in Class Work (Ontology UV2).....	181



5.3.8	Testing Equivalency between Individual in Class Welfare (Ontology CO), Class GovernmentAid (Ontology UV1) and Class GovHelp (Ontology UV2).....	186
5.3.9	Testing Equivalency between Individual in Class Location (Ontology CO), Class Area (Ontology UV1) and Class GeographicArea (Ontology UV2).....	190
5.3.10	Testing Equivalency between Individual in Class Location (Ontology CO), Class Area (Ontology UV1) and Class GeographicArea (Ontology UV2).....	194
5.3.11	Testing Equivalency between Class Property (Ontology CO), Class Assets (Ontology UV1) and Class Asset (Ontology UV2) .....	199
5.3.12	Testing Equivalency between Individual Television (Ontology CO), Individual tv (Ontology UV1) and Individual television (Ontology UV2).....	202
5.4	The Dublin Core Metadata Element Set in library and Common Ontology in Library Case Study .....	209
5.4.1	Testing Equivalency between Class Writer (Ontology Library 2 and Ontology Library CO), and Class Author (Ontology Library 1) .....	215
5.4.2	Testing Equivalency between Individual herlina jayadianti (Ontology Library CO), Individual Herlina Jayadianti (Ontology Library 1) and Individual herlinajayadianti (Ontology Library 2).....	218
VI.	CONCLUTIONS AND FUTURE WORKS.....	237
	REFERENCES .....	239