

CONTENTS

| | |
|---|------|
| APPROVAL | ii |
| SELF DECLARATION AGAINST PLAGIARISM | iii |
| ABSTRACT | iv |
| ABSTRAK | v |
| DEDICATION | vi |
| ACKNOWLEDGMENTS | vii |
| PREFACE | viii |
| CONTENTS | ix |
| LIST OF TABLES | xii |
| LIST OF FIGURES | xiii |
| LIST OF TERMS | xiv |
| LIST OF NOTATIONS | xv |
| 1 INTRODUCTION | 1 |
| 1.1 Statement of the problems | 3 |
| 1.2 Conceptual Framework/Paradigm | 3 |
| 1.3 Research Problem | 4 |
| 1.4 Objective and Hypotheses | 4 |
| 1.4.1 Objectives | 4 |
| 1.4.2 Hypotheses | 4 |
| 1.5 Assumption | 5 |
| 1.6 Scope and Delimitation | 5 |
| 1.7 Significance of the Study | 6 |
| 1.8 Main Academic Contributions | 6 |
| 2 REVIEW OF LITERATURE AND STUDIES | 8 |
| 2.1 Related Literatures | 8 |
| 2.2 Related Studies | 13 |
| 2.2.1 Natural Language Processing | 13 |
| 2.2.2 Natural Language Generation | 13 |

| | | |
|----------|--|-----------|
| 2.2.3 | Multiple Choice Question | 13 |
| 2.2.4 | Pre-Trained language model | 13 |
| 2.2.5 | Transformer | 14 |
| 2.2.6 | Chi-Square Test | 16 |
| 2.2.7 | Encoder-based Architecture | 17 |
| 2.2.8 | Decoder-based Architecture | 17 |
| 2.2.9 | Encoder-Decoder Architecture | 17 |
| 2.2.10 | Justification to use Encoder-Decoder type of model | 18 |
| 2.2.11 | Justification to use T5 model | 18 |
| 2.2.12 | T5 | 18 |
| 3 | RESEARCH METHODOLOGY | 20 |
| 3.1 | Research Design | 20 |
| 3.2 | Datasets Processing | 21 |
| 3.3 | Models Training | 24 |
| 3.3.1 | Multiple Choice Question Generation Design | 26 |
| 3.3.2 | Generate Question Answer Pairs | 27 |
| 3.3.3 | Generate Distractors | 31 |
| 3.3.4 | Distractor Scoring | 35 |
| 3.4 | Evaluation and Error Analysis | 35 |
| 3.4.1 | Automatic metrics Evaluation | 36 |
| 3.4.2 | Error Analysis | 37 |
| 3.5 | Experimentation | 39 |
| 3.5.1 | MCQ Survey Experiment | 39 |
| 3.5.2 | MCQs Configuration | 40 |
| 3.5.3 | MCQ Survey | 40 |
| 3.5.4 | Survey Analysis | 41 |
| 4 | PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA | 43 |
| 4.1 | Experimental Results | 43 |
| 4.2 | QG and QAG Error Analysis Results | 47 |
| 4.2.1 | QG Error Analysis | 47 |
| 4.2.2 | QAG Error Analysis | 52 |
| 4.2.3 | Comparison of QG and QAG results | 56 |
| 4.3 | DG and DAG Error Analysis Results | 60 |
| 4.3.1 | DG Error Analysis | 60 |
| 4.3.2 | DAG Error Analysis | 67 |
| 4.3.3 | Comparison of DG and DAG results | 72 |
| 4.4 | MCQ Survey Results | 76 |
| 4.5 | Summary of Findings | 85 |

| | |
|---|-----------|
| 5 CONCLUSION AND RECOMMENDATIONS | 88 |
| 5.1 Conclusions | 88 |
| 5.2 Recommendations | 88 |
| BIBLIOGRAPHY | 90 |
| Appendices | 93 |
| A Curriculum Vitae | 96 |