

**APPLICABILITY OF ARTIFICIAL INTELLIGENCE
TECHNIQUES FOR EFFECTIVE COMMUNICATION
IN GREEN CONSTRUCTION**

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Thesis submitted in partial fulfilment of the requirements for the
Degree Master of Science (Major Component of Research)

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Sri Lanka

August 2022

DECLARATION

I affirm that this is my effort, and this dissertation does not contain any material previously published or written by another person except where the acknowledgement is made in the text to the best of my knowledge and belief.

Further, I here admit the intellectual assistance of my research supervisor Dr. Menaha Thayaparan for the successful fulfilment of this MSc by Research thesis. I affirm that I will not make any publication from this research without the name(s) of my research supervisor(s) as contributing author(s) unless otherwise, I have obtained written consent from my research supervisor(s).

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ABSTRACT

Applicability of Artificial Intelligence Techniques for Effective Communication in Green Construction

Green construction is the flagship in the construction industry as a guide to tackle environmental tragedy. With the rapid development, Sri Lanka also has concentrated on applying green concept in construction industry. Nevertheless, poor communication impedes adoption and corporative environment for implementing green construction. Understanding and then overcoming the barriers to effective communication is decisive for a successful construction project delivery. While prevailing environmental tragedy lead the concentration of green concept, there is a remarkable awareness of AI application in construction industry. Therefore, this study aims at to investigate the application of Artificial Intelligent (AI) techniques in addressing the barriers related to effective communication to successfully deliver green construction in Sri Lanka.

This research adopts a pragmatism philosophy and pace through mixed research approach to draft an abductive conclusion. Under survey strategy, key informant interview (KII) and questionnaire survey were utilised as the data collection techniques. The qualitative findings from KII were analysed through manual content analysis and quantitative findings from questionnaire survey were analysed through analytical hierarchical process (AHP).

Framework to enhance the effectiveness of communication using AI techniques for successful delivery of green construction in Sri Lanka is developed based on the combination of both inductive and deductive interpretation of findings from KII and questionnaire survey. The developed framework has been validated through a questionnaire survey. The framework embedded with eighteen communication barriers and fourteen applicable AI techniques. Each communication barriers are assigned with the applicable AI to overcome for effective communication in green construction with the rank and performance score gained through AHP. Accordingly, this study gives a guidance for identifying communication barriers in green construction, applicable AI techniques in Sri Lankan construction industry and possible AI techniques to overcome communication barriers in green construction project.

Keywords: Artificial Intelligence Techniques, Communication, Green construction

DEDICATION

To my beloved parents, brother and Haritha

ACKNOWLEDGEMENT

This research would not be a success without numerous of people. First and foremost, I am enormously indebted to my supervisor Dr. Menaha Thayaparan for the given interest, inducement, gentle guidance and invaluable assistance delivered throughout this study. I would also like to extend my sincere gratitude to Prof. Ananda Karunaratne, University of Moratuwa for his continuous support as an advisor throughout my study. Further, I am thankful to Dr. Kaushal Keraminiyage, University of Salford, UK for his constructive advice and suggestions given to further improve this study. I further declare my gratefulness to Dr. Sachie Gunathilake for her continuous support as the post graduate research coordinator in Department of Building Economics, University of Moratuwa.

Very special thanks go to Prof. Yasangika Sandanayake, acting Head of the Department and Ch. QS. Suranga Jayasena, former Head of the Department, all other academic and non-academic staff of Department of Building Economics, University of Moratuwa, who have contributed immensely to my academic journey as a MSc by Research Student. I cannot forget the massive support and continuous encouragement received from my fellow researchers in the Department of Building Economics throughout the study.

I express my indebtedness to all the participants in the expert survey and questionnaire survey of this dissertation for their contribution, values and ideas, invaluable support and the invaluable time they spent to make this study successful.

I hereby express my deepest gratefulness for my parents, brother, husband and well-wishers for giving me an exceptional corporation to make this journey successful. The completion of this dissertation could not have been possible without the participation of all aforementioned personnel.

Ridmika K.I.

August 2022

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ABBREVIATIONS

ABC	- Artificial Bee Colony
ACO	- Ant Colony Optimization
AHP	- Analytical Hierarchical Process
AI	- Artificial Intelligence
AIT	- Artificial Intelligence Techniques
AR	- Augmented Reality
BI	- Business Intelligence
CI	- Consistency Index
CR	- Consistency Ratio
CRI	- Copenhagen Resource Institute
DE	- Differential Evolution
FA	- Firefly Algorithm
GA	- Genetic Algorithm
PSO	- Particle Swarm Optimisation
RI	- Random Consistency Index
SA	- Simulated Annealing
SFLA	- Shuffled Frog-Leaping Algorithm
VR	- Virtual Reality