ABSTRACT

In this thesis, Islanding and Power Quality(PQ) Issues in Hybrid Distributed Generation (DG) System consists of Photovoltaic(PV) system and Wind Power Plant connected to grid through a Point of Common Coupling(PCC), are detected and classified, using Wavelet Transform and Artificial Neural Networks. Wavelet Transform indices are extracted from the Negative Sequence component of the voltage signal at PCC to detect the disturbances. A feature vector is modeled with WT indices and loading of DG system to train Artificial Neural Network. . The proposed method is compared with a conventional method. The results demonstrate the advantages of Wavelet over conventional method in detection and classification of disturbances in the system and robustness in application of Machine Learning (ML) Classifier. The trained ANN is deployed as a Web Service using Microsoft Azure Machine Learning Studio. It enhances the implementation feasibility of proposed method.

ACKNOWLEDGEMENT

I express my sincere thanks to P.R. Subadhra, Assistant Professor, Department of Electrical and Electronics Engineering for her valuable guidance from conceptualization to finalization of my project.

I am very grateful to Dr. M. Nandakumar, Head of the Electrical and Electronics Engineering Department for providing the necessary support and environment to complete this project.

In particular, I express my heartfelt gratitude to Dr.Reji P, Prof. Rathi K, Dr. M V Jayan and Prof. Bindumol.E.K for their moral support and guidance to complete my project on time.

I also acknowledge my deep sense of gratitude to all the faculty members of Electrical and Electronics Engineering Department who have helped me directly or indirectly to complete this work.

I take this opportunity to thank all my friends who helped me throughout this project and for their suggestions and discussions.

It gives me great pleasure to thank my parents and family for their blessings and suitable help.

Last but not the least I give all thanks and praise to GOD Almighty for His abundant blessings without which this venture would not have been successful.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

DG	Distributed Generation
WT	Wavelet Transform
ANN	Artificial Neural Network
SD	Standard Deviation
MPPT	Maximum power point tracking
VSI	Voltage source inverter
PCC	Point of common coupling
HPF	High pass filter
LPF	Low pass filter
THD	Total harmonic distortion
SD3	Standard Deviation of Wavelet Details at Level 3
SD4	Standard Deviation of Wavelet Details at Level 4
E3	Energy of Wavelet details at Level 3
E4	Energy of Wavelet details at Level 4