



Abstract

- The research will predict what type of P.Q. disturbances are introduced during power production in a stand-alone Hybrid Renewable Energy System (H.R.E.S.).
- The energy system data was collected and used to produce a Fuzzy Logic (F.L.) used to control the hardware to mitigate the disturbance
- The hardware used in the system consists of a Multiplexer (MUX) and different types of filters. The output of the multiplexer chooses the filters.
- The algorithm will improve the system's efficiency and help the designers improve the system's design capabilities
- The monitoring system will help predict what type of P.Q. disturbances are produced when different energy sources are used to produce power
- The proposed system monitors these P.Q. disturbances and classifies them according to their severity

Methodology

- The proposed system is based on live data analysis and deciding what type of mitigation equipment would be used
- The collected data was used to create FL shown in Figure 1
- The data was simplified using Artificial Neural Network, using Sigmoid function to initialize algorithm Figure 2
- The software data Flow is shown in figure 3
- Figure 4 Shows the AI algorithm used for the process
- Simulation Results are presented in Table 1

Conclusion

- The data collected from different nodes will help the designers to identify the problematic areas and improve mitigation techniques
- The system will help the designers see how different types of loads that are used in the grid can impact the PQ of the electrical grid
- The system could be used as a predictive tool to avoid major problems in the grid

Types of Event	Number of Occurrences	Values	Types of filter	Accuracy
THD (Voltage)	700	Low	IIR	98%
THD (Current)	900	Low	IIIR	97%
THD (Voltage)	800	High	FACT	94%
THD (Current)	1200	High	FACT	94%
Unidentified	2500	Mixed	HYBRID	96%

Table 1

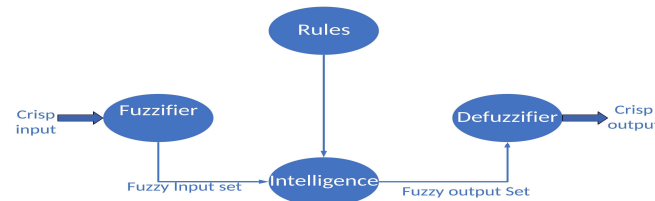


Figure 1

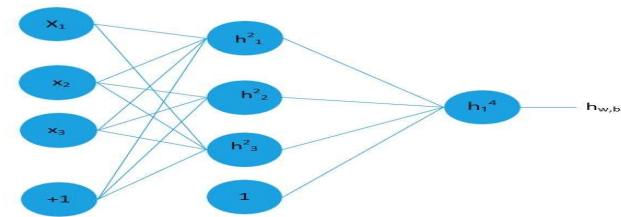


Figure 2

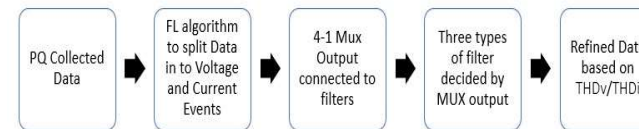


Figure 3

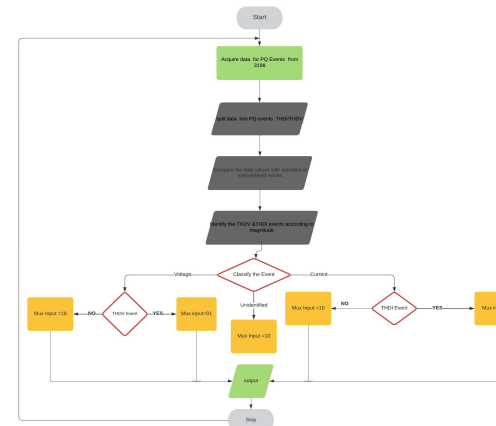


Figure 4