Power quality Enhancement in Microgrid by using IOT

This write up presents an optimal power control strategy for an autonomous microgrid operation based on a real-time self-tuning method. The purpose of this work is to improve the quality of power supply of the microgrid where some Distributed Generation (DG) units are connected to the grid. Voltage and frequency regulation, and power sharing are the main performance parameters which are considered in this work.

The most desirable characteristics of today's power system with distributed energy resources (DER) forming the microgrid is the reliability of the power supply and immunity to various power quality (PQ) issues. It is important to examine PQ issues arising from the introduction of DER and behavior of Microgrid with penetration of various loads.
microgrid that has some special characteristics that would improve the overall efficiency of system to make it environment friendly, gain more functionality by increasing energy intensity, increasing the overall use and values of existing productions and transmission capacity, integrate greater levels of renewable energy sources (RESs), improve power quality to correspond to new digital demands, become more reliable, resilient, flexible, and sustainable.
The key characteristics needed for these changes are listed as follows:

- Intelligence (learning ability)
- Two-way communication
- Self-healing
- Advanced metering infrastructure (AMI)

The major Challenges in micro grid power quality are Power electronic devices, Renewable energy sources integration and Plug-in hybrid electrical vehicles integration. Hence the micro grids technology will bring new tools as well as new challenges that are inevitable.
These tools are Advanced metering infrastructure, Information and communication technology, Smart appliances, Storage devices, Computational intelligence, Advanced control methods, Active demand-side management and demand response, Multiagent technology and Internet of things.
These tools could be divided into several categories such as technologies, concepts, and novel control methods. A smarter grid requires the participation of the tools, which can deliver technology solutions to overcome the challenges in power quality issues , assist utilities and engage consumers.

In the research, I am planning to enhance the power quality in Microgrid through power quality improvement devices, power electronic converters and power electronic controllers by using internet of things..