The objective of this paper is to discuss and introduce an efficient and reliable power quality (PQ) monitoring strategy that uses the advances in signal processing and pattern recognition to improve power quality monitoring practices. The proposed monitoring strategy is capable of detecting, tracking, and classifying any power quality violation by the use of on-line measurements. Methodologies which can be utilized for identifying the source of PQ problems based on the recognized phenomena will be discussed. Various simulation results are introduced to validate the use of the proposed monitoring strategy.