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Distribution automation application functions in smart grid

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Power is universally acknowledged as critically important infrastructure for economic development. Transmission and distribution losses are very high in developing countries. Distribution loss is 60-80% of the total loss. Smart grid technology is a necessary condition for very large amounts of renewable electricity on the grid for this reason. Smart grids are advantageous because of their reliability, flexibility in network topology to handle possible bidirectional energy flows, efficient demand-side management, load adjustment, peak curtailment and systematic communication between suppliers and consumers. Computer aided monitoring, control and management of electric power distribution networks is "Distribution Automation (DA)". Distribution systems are not developing according to a planned program in developing countries, resulting in uneconomical utilization of fund and poor service to customers. The disadvantages are over-loaded feeders, lengthy feeders and poor power factor of load, inefficiency of billing system, poor voltage profile, higher power and energy loss, reduced per capita consumption and loss of revenue. Distribution load flow algorithm developed for distribution proved to be efficient, robust & guarantees convergence. It can handle single phase, three phase, balanced and unbalanced loads. It was found suitable for multi-conductor and multi-feeder with high r/x ratio. The proposed algorithm can be applied to reactive power compensation and network reconfiguration. State estimator, network observability and bad data processor along with fault detector algorithm were robust. It was helpful for optimal ordering of nodes, analyzes system in real-time, estimate current operating state, process measurement data and determines fault type and location.

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Towards hand gesture based assistive writing support system for blind/visually impaired people

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After formulation of Braille, no other technology has enabled blind and visually impaired people to communicate effectively with the digital technology. So, they feel disconnected with today's cyber-world. Data published by World Health Organization reveals that about 285 million people are visually impaired round the globe. Out of this, about 19 million children (below age 15) are estimated to be visually impaired. Braille displays, scanner or reader, etc., are the output devices which blind people use to get connected with computers. But, there are limitations while blind people have to enter data in a computer. Entire QWERTY keyboard like functionality is not feasible with 6- or 8- dot Braille. Human-computer interaction techniques can be applied to solve such issues. We are developing a simple, cost effective, portable and easy to use writing support system to address these issues. While developing this system, we have proposed a new dactylology with which blinds can interact with the computers. A new feature extraction technique called as reduced shape signature (RSS) is introduced. This method reduces number of feature sets and it is invariant to rotation, translation as well as scaling. To discriminate intra-class gestures differential angle and polygonal area is computed along with RSS. Prototype model of the proposed writing support system is developed and algorithm for gesture recognition is implemented on the same. Real time experiments are performed and it is observed that the symbols recognition rate of the proposed system is 97.53%. At this stage, blind users can edit contents in Microsoft words using this experimental setup. Efforts are going on to add dynamic gesture functionality in future.

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