Minimizing Power Failure from Weather Disruptions

Framework which improves resilience of electrical power during severe weather

Inventors at Georgia Tech have developed a novel framework that minimizes the impact of failure of the electrical power generation and transportation gird or network when a severe weather event or other calamity occurs. This invention improves the resilience of the power grid through the use of topological network structures and spatial temporal frameworks to determine dynamic failure-and-recovery points within the grid. It analyzes and determines spots that are the most or least resilient as well as time durations between failure and recovery when a severe weather-related event occurs. The advantage offered by this invention is employing spatial-temporal scales to measure resilience and taking into account aggregate component failures and recoveries based on topological network structures. The above factors tailor the model's capability to utilize global and local parameters in the analysis and determination of where failures may occur.

Summary Bullets

- **Efficient –** Allows power grid resilience for a community to be determined in the best possible manner by the electric utility while minimizing the impact of weather-related events
- **Analytical –** Capable of analyzing and determining spots most or least resilient as well as time durations between failure and recovery
- **Customizable –** Ability to tailor the model's overall framework to include global and local parameters in the analysis and determination of performance issues

Solution Advantages

- **Efficient –** Allows power grid resilience for a community to be determined in the best possible manner by the electric utility while minimizing the impact of weather-related events
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Potential Commercial Applications

- Electric utility companies

Background and More Information

Models and methods that enable reliable and assured power supply under disruption scenarios, such as storms, hurricanes, floods or other catastrophic events are needed to speed-up large complex power system failure-and-recovery efforts by quickly determining the location of faults and recovery time at the disruption points. Data from these models can assist electric utility companies to plan, stage resources and respond to power loss situations. The overall goal is to ensure reliable power supply to consumers and other users while minimizing relocation or other hardships faced by users during weather related power outages. The data generated can also be leveraged to enhance the resilience capability of other large, complex, distributed systems and mitigate the impact of failures due to natural events.

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Publications

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