

Advanced fault detection in dc microgrid system using reinforcement learning

ABSTRACT

As technologies are expanding, the demand for power supply also increases. This causes the demand for power is difficult to be fulfilled as non-renewable sources are reducing. Therefore, the microgrid concept is introduced, where it is constructed with renewable energy sources, energy storage devices and loads. There are two types of microgrid, which are alternating current (AC) microgrid and direct current (DC) microgrid. Various research show that DC microgrid has more advantages over AC microgrid. However, DC microgrid is not widely used due to the lack of studies on it compared to AC microgrid. Besides, DC microgrid has one significant problem not fixed, which is the fault in the DC microgrid. Whenever a fault occurs, the whole DC microgrid will be affected rapidly. Therefore, this project aims to design a fault detector based on artificial intelligence to detect the fault and isolate the fault effectively. A fault detector based artificial intelligence should be implemented into the DC microgrid system to protect it. Two techniques in Artificial Immune System are being compared. The results showed that the improved Negative Selection Algorithm with variable sized detector has better performance than the general Negative Selection Algorithm with constant sized radius in detecting fault in DC microgrid system.