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Adopting Flocks of Birds Approach to Predator for Anomalies Detection on Industrial Control Systems

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Abstract : Industrial Control Systems (ICS) such as Supervisory Control And Data Acquisition (SCADA) can be seen in many different critical infrastructures, from nuclear management to utility, medical equipment, power, waste and engine management on ships and planes. The role SCADA plays in critical infrastructure has resulted in a call to secure them. Many lives depend on it for daily activities and the attack vectors are becoming more sophisticated. Hence, the security of ICS is vital as malfunction of it might result in huge risk. This paper describes how the application of Prey Predator (PP) approach in flocks of birds could enhance the detection of malicious activities on ICS. The PP approach explains how these animals in groups or flocks detect predators by following some simple rules. They are not necessarily very intelligent animals but their approach in solving complex issues such as detection through corporation, coordination and communication worth emulating. This paper will emulate flocking behavior seen in birds in detecting predators. The PP approach will adopt six nearest bird approach in detecting any predator. Their local and global bests are based on the individual detection as well as group detection. The PP algorithm was designed following MapReduce methodology that follows a Split Detection Convergence (SDC) approach.

Keywords : artificial life, industrial control system (ICS), IDS, prey predator (PP), SCADA, SDC
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