

Priority-Based Decision Support System (PBDSS) by Genetic Algorithm as a Tool for Network Problem

The dynamic problem in activities of Industrial Projects Networks (IPN) is a key challenge in implementing the projects that large scale network, and has attracted of a lot of researchers attention in recent years by using Genetic Algorithm (GA) as a tool for Decision Support System. Where in GA each chromosome represents a one critical path therefore the core of problem IPN represented in three points; first, some generated chromosomes do not match with any path of network pathways or incorrect paths (chromosomes) because the operations of mutation or crossover. Second, difficulty to representing the critical paths because the paths have different lengths (different number of nodes). Third is the dynamic problem, the project scheduling is sensitive to unplanned disturbances and events (dynamic changes) such as creating, deleting, changing or slowing down an activity. This requires to redesign of the network problem and resolving. That wastes more time and effort to resolve those complex calculations. Researchers proposed methodology PBDSS based on three modern methods; Priority Based Encoding Method (PBEM) and Variable Length Encoding (VLE) by GA. A critical path can be uniquely determined by PBDSS. In addition, proposed Net-Data File (NDF) used to represent a network problem with the least possible storage space. The results of study have shown the practical viability of the proposed method to effectively solve the dynamic network problems. The PBDSS is more flexible with regard to the structure and solve of the networks. Thus, the structure of network problem by the scheduling set in NDF is more efficient and easy than the matrix (traditional methods) in representation of properties of encodings to building an effective genetic search. The study concludes with a discussion of future work.