A GENETIC ALGORITHM FOR SAFE AND RAPID TRANSMISSION OF MILITARY VEHICLES IN A MINEFIELD

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Abstract— **Often, military vehicles need to pass through mines. In such circumstances, ensuring the safety and rapid transmission of a vehicle in a minefield is a serious task. Hitting a mine might cause a great damage on the vehicle and the worst of all, can cause death of soldiers. To prevent a possible damage, a safe and short path to a destination can be determined in advance provided that the locations of mines are known. In this paper, we proposed a Genetic Algorithm (GA) to find the shortest secure path from the given source to the destination through a minefield. In the proposed method, first, the shortest path between source and destination is constructed ignoring the mines. Then, the path is improved step by step by creating sub paths eliminating mines on the path. To walk around a mine on the path, the GA creates a number of different sub-paths excluding the location of that mine. Once all the locations of the mines are removed from the path, this path is said to be a safe path. Using this procedure, a population of safe paths from the source to the destination is generated. In order to produce shorter paths among the safe path population, we apply crossover and mutation operators accordingly. At the end of the GA, the shortest path found is selected as the path between the source and the destination. The proposed GA has been experimented with different parameters, and the results have proven that the proposed method is successful in finding safe and shorter paths effectively.**

Keywords—Minefield; Genetic Algorithm;mine; shortest path.