RoboCup Rescue 2020 ONLINE
TDP Agent Simulation
Ri-one (JAPAN)

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Abstract

Our conventional clustering was used to divide a whole map into a constant number of clusters. To solve this problem, we implemented a new method, Silhouette analysis. By this method, it became possible to determine the number of clusters suitably depending on the shape of a map so that agents could do rescue activities efficiently. Therefore, we were able to solve the magic number problem.

Our path planning algorithm is based on A* algorithm, adding the cost of unblocking the road. This allowed Agents to choose roads with fewer blockades. However, since agents often passed through burning buildings, the temperature of the building was added to the moving cost as a countermeasure. As a result, it became possible to obtain the path through no buildings on fire.

PF was improved to preferentially remove blockades in areas there are many agents even if agent is not buried. As a result, the number of agents whose paths are blocked by blockades has reduced.To get as many blockades in range as possible, PF was implemented to remove blockades after approaching less than half the range. By this method, PF became able to remove blockade more efficiently.

AT was improved to prioritize victims based on their damage and life periods, and divided into 6 groups.This has made it possible to reduce wasted work and restrain civilian deaths. With this method, basically, civilians with the most damage are given priority in rescue. On the other hand, civilians who have suffered fatal damage and are difficult to help are excluded from rescue.

FB did not consider the damage which was caused by fire spreading to the surrounding buildings when setting a criterion of the priority for fire extinguishing. Therefore, the two factors, the number of surrounding buildings and temperature, were expressed as a single parameter, and the size of the numerical value was used as a reference for the priority of firefighting. This made it possible to extinguish the fire quickly and prevent the damage from spreading. This method

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focuses on preventing the spread of fire rather than completely extinguishing the fire. By combining this method with beforehand extinguish, which was implemented last year based on a similar idea, the range of fire can be suppressed.

References

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