Navigation to a human in motion by using points of interest

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Abstract :

Navigating to a human target is underexposed in the current literature. However, there are cases where it is necessary to get to the moving target as fast as possible. This work supports navigation of a person to another person in motion that they lost or need. In this way, children, elderly, family, co-workers and friends could be found more quickly. This research proposes the Semantically Enriched A * (SEA*) method to use semantics, in the form of points of interest, to determine the prediction of the target and uses this prediction to approach the target.

Overall the SEA* method uses the positive components of the iterative A* algorithm, semantics and the direction of the target to predict where the target is going to, to successfully reach the target. Points of interest, landmarks, are critical points to check where a person is moving towards. These static locations are promising for navigating to a person in motion. Estimating the predicting location of the target is recommended by first limiting down the points of interest by the approaching points of interest by the target and then using the point of interest that is the closest to the target. This process gives a good prediction of the target in both implementations. The proposed SEA* method is tested both in an indoor environment, as in an outdoor environment.

The SEA* method shows promising results in both the simulated indoor environment, represented by a 2D square regular grid, as in the outdoor environment, represented by a road network, using real GPS data. In this work the SEA* method is compared to the iterative A* approach and shows promising improvements. This work provides a framework that could be implemented to always find a person in motion or find them faster by using shortcuts to get to this person. A variety of different spatial models could implement the SEA* algorithm as long as the spatial model supports the A* algorithm, is able to translate the positions of the user and the target to the spatial model and supports adding points of interest to the model.

Finally this research discusses further implementations of this method. Future research must provide answers to the questions if this method also works in a real-time case or if it works using a 3D spatial model to support 3D indoor navigation.

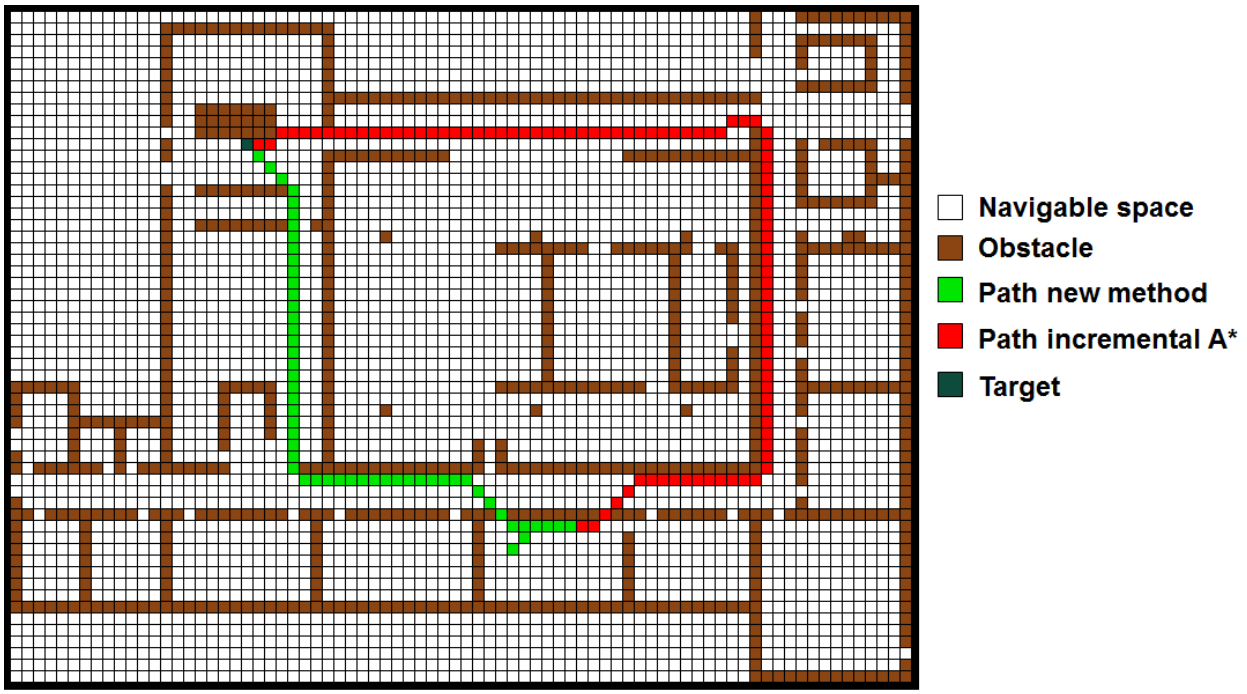

Figure 1: Test scenario showing the difference between the classic A* method and the one improved by considering points of interest.