

Paper Review - Effective and General Evaluation for Instruction Conditioned Navigation using Dynamic Time Warping

The paper introduces a new metric to evaluate and guide trajectories of navigation agents at the task of instruction conditioned navigation. The proposed metrics are based on Dynamic Time Warping, a well known method used for measuring similarity between two time series, trajectories in this case. Proposed metrics, normalized Dynamic Time Warping (nDTW), SDTW (nDTW constrained to only successful paths) are sensitive to the order of the nodes and softly penalize deviations from the reference path, which help in making sure that the predicted path is also similar to the reference trajectory rather than evaluating just based on Success or distance of last node from the goal location, disregarding actual total path taken, these have been the shortcomings of previously used metrics for evaluation of this task and the proposed approach in the paper has been shown to improve performance of reinforcement learning navigating agents when used as a reward signal on Room-to-Room (R2R) and Room-for-Room(R4R) datasets, experiments have also been conducted to show paths generated via nDTW metric guidance show similarity with human judgements.

Main contributions of the paper are its proposal of the Dynamic Time Warping based metric for measuring and evaluating path following success rather than just using SPL or other related metrics. Which does makes sense that this would be a better metric as it takes into consideration the similarity of the overall trajectory and does take into account the ordering of the nodes traversed.