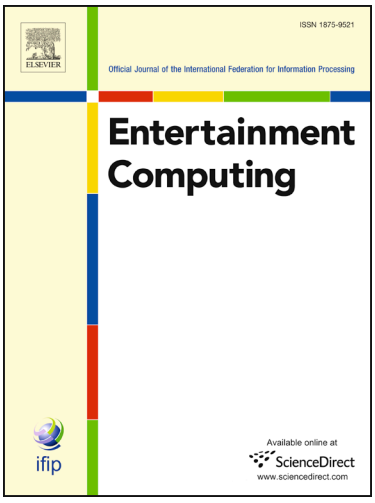

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Reinforcement Learning With Optimized Reward Function for Stealth Applications

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Abstract

Stealth applications are focused in accomplishing a certain objective without being spotted by enemy patrols. Although very diffused in modern applications (security, robotic, military, games), stealthy behaviors has not been extensively studied. Here, we focus on how to obtain good stealthy behaviors by tackling two different problems: (i) how to use a machine learning approach in order to allow the stealthy agent to learn good behaviors for any environment, and (ii) how to use evolutionary computing in order to define specific parameters for our machine learning approach without any prior knowledge of the problem. We use Reinforcement Learning in order to learn good covert behaviors capable of achieving a high success rate in random trials of a purpose built stealth simulator. We also propose an evolutionary approach that is capable of automatically defining a good reward function for our reinforcement learning model. The experiments performed shows that using reinforcement learning with evolved reward function through evolutionary computing achieves a higher performance than using reinforcement learning with the hand-crafted reward function.

Keywords: Machine Learning, Reinforcement Learning, Evolved Reward

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