Universidade de Pernambuco
Programa de Pós-Graduação em Engenharia da Computação (PPGEC)

Proposta de Dissertação de Mestrado

Área: Computação Inteligente

Título: State Representation Learning Using Event-Based Visual Sensor Data

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Description – Reinforcement learning (RL) [1] is a machine learning paradigm where cognitive agents solve an action decision-making problem through interaction with its environment. An open challenge is the time required or the number of samples needed to achieve an optimal policy to choose an action. Additionally, the learning process becomes more complex when the observation presents a high dimensionality. Therefore, feature acquisition to learn what is present in the observation through deep learning (DL) [2] becomes essential to estimate state- and action-value scores better.

Representation learning (RepL) [3] is a DL branch that intends to learn semantic image understanding from the input data. Some RepL works present a self-supervised learning method which not require annotated data for training. RepL with RL focuses on learned features that evolve through time and are influenced by an agent's actions. Works addressed that state representation learning [4] allows predicting the future observation or reward, therefore, improving the action-outcome in long-terms.

Event-based vision [5] is a new visual sensor inspired by a biological vision to overcome some traditional camera limitations. This new sensor transmit brightness changes asynchronously called events. Its main advantages are the fast response, high dynamic range, low power consumption, and few storage data. This new form of representation for visual input can be used with StRL to improve the latent space information [6].

It is expected to propose a suitable architecture to process event-based visual data under an StRL method for the RL framework as an efficient approach, reducing the learning time and improving the action selection policy in a robot control problem.

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