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Artificial Situation Awareness for an Intelligent Agent

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Abstract

A behavioural representation of an intelligent agent (IA) is considered an important part to generate explanations on its behaviours to understand what it is thinking. Previous studies have introduced various behavioural representations, such as decision tree, goal hierarchy, belief-desire-intention (BDI) hierarchy, and physical system network. However, they cannot optimally disclose IA's comprehension on given situations which is needed in certain cases of human-autonomy teaming like collaborative driving. To address this gap, this paper proposes a new behavioural representation based on artificial situational awareness to reveal situations encountered by the IA behind its executed action. The experimental implementation was conducted in collaborative driving context using the Carla

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A behavioural representation of an intelligent agent (IA) is considered an important part to generate explanations on its behaviours to understand what it is thinking. Previous studies have introduced various behavioural representations, such as decision tree, goal hierarchy, belief-desire-intention (BDI) hierarchy, and physical system network. However, they cannot optimally disclose IA's comprehension on given situations which is needed in certain cases of human-autonomy teaming like collaborative driving. To address this gap, this paper proposes a new behavioural representation based on artificial situational awareness to reveal situations encountered by the IA behind its executed action. The experimental implementation was conducted in collaborative driving context using the Carla simulator. The results show that the proposed behavioural representation has better performance in extracting IA's situational awareness compared to the baseline method. This work is significant to enhance human comprehension on IA so their trust in IA can be calibrated.

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Promoting an intelligent agent (IA) to be a human counter-part in human-autonomy teaming (HAT) requires a mechanism to make IA understandable and predictable by explaining its behaviours [1], [2]. Thus, the human counterpart can enhance their situational awareness to monitor the IA adequately and to receive strong cues [Signaling to Enhance Reading](#) expectations on IA [3]. Clarifying the rationale behind an executed action of IA is referred to as goal-driven explanations [4]–[6]. However, generating such explanations is highly dependent on how IA's behavioural representation is developed [7].

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