

Industrial Applications of Human-Robot Collaboration

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Editorial

Human-Robot Collaboration is the study of collaborative processes in human and robot agents work together to achieve shared goals. Many new applications for robots require them to work alongside people as capable members of human-robot teams. These include robots for homes, hospitals, and offices, space exploration and manufacturing. Human-Robot Collaboration (HRC) is an interdisciplinary research area comprising classical robotics, human-computer interaction, artificial intelligence, design, cognitive sciences and psychology [1].

Industrial applications of human-robot collaboration involve Collaborative Robots, or cobots, that physically interact with humans in a shared workspace to complete tasks such as collaborative manipulation or object handovers [2].

Collaboration is defined as a special type of coordinated activity, one in which two or more agents work jointly with each other, together performing a task or carrying out the activities needed to satisfy a shared goal. The process typically involves shared plans, shared norms and mutually beneficial interactions. Although collaboration and cooperation are often used interchangeably, collaboration differs from cooperation as it involves a shared goal and joint action where the success of both parties depends on each other [3].

For effective human-robot collaboration, it is imperative that the robot is capable of understanding and interpreting several communication mechanisms similar to the mechanisms involved in human-human interaction. The robot must also communicate its own set of intents and goals to establish and maintain a set of shared beliefs and to coordinate its actions to execute the shared plan. In addition, all team members demonstrate commitment to doing their own part, to the others doing theirs, and to the success of the overall task. Human-human collaborative activities are studied in depth in order to identify the characteristics that enable humans to successfully work together

[4]. These activity models usually aim to understand how people work together in teams, how they form intentions and achieve a joint goal. Theories on collaboration inform human-robot collaboration research to develop efficient and fluent collaborative agents. The belief-desire-intention (BDI) model is a model of human practical reasoning. The approach is used in intelligent agent's research to describe and model intelligent agents. The BDI model is characterized by the implementation of an agent's beliefs (the knowledge of the world, state of the world), desires (the objective to accomplish, desired end state) and intentions (the course of actions currently under execution to achieve the desire of the agent) in order to deliberate their decision-making processes. BDI agents are able to deliberate about plans, select plans and execute plans [5].

Conflict of Interest

None.

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