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Modeling multi-robot coordination using crocodile dominance hierarchy

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Crocodiles are considered as magnificent creatures with high intelligence. They possess complex behaviors such as advanced parental care, complex communication, cooperative hunting and uses various tools for hunting. Crocodiles are classic opportunistic predators, having complex hunting behavior and excellent teamwork. In cooperatively hunting, the hunts are usually described as opportunistic, simultaneous individual hunts in which each crocodile tries to maximize the probability of catching the prey for itself. The cognitive model of crocodile's predatory behavior has much similarity with the model of cognition of human being. The major difference existing between the cognitive models of human beings and crocodiles is as follows: human beings perform many tasks where collaboration is not needed whereas crocodile's predatory behavior depends mainly on coordination, collaboration and conflict resolution. In order to achieve complex goals, multi-agent collaboration and conflict resolution is essential along with coordination. However, the model of cognition reported by Patnaik in his book does not reflect these states. Multi agent systems (MAS) are essential solutions for large-scale, complex problems as single agents are having limited capabilities and computing resources, where a group of individual agents usually work together to achieve a common goal. In real-time problems, the agents have to take dynamic decisions during run-time and coordinate their actions accordingly. In such scenarios, conflicts between agents may arise while coordinating and collaborating dynamic action among them to achieve the goal and even after achieving the goal. To resolve such issues and conflicts in coordination and collaboration, crocodile dominance logic is being used. This model exhibits multi-level coordination in multi agent systems using the dominance logic of crocodiles for resolving conflicts in coordination and collaboration. This modeled can be applied to real-time systems.

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Page 51