Evaluation of fish shoal inspired movement in collaborative robotic environments

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ABSTRACT

In this paper we consider the evaluation of fish shoal inspired movement in collaborative robotic environments. Based on two new metrics, the polarization and the cohesion, a navigation and obstacle avoidance environment composed of LEGO Mindstorm NXT robots has been implemented and evaluated. A set of experiments have been conducted using the LEGO robotic set, targeting specific emergent behavior patterns such as flash expansion and fountain effect (which are typical fish shoal evasive maneuvers). These experimental results prove the quality of the metrics when used for the evaluation and validation of fish shoal inspired models for navigation and obstacle avoidance in complex movement applications which demand collaborative intelligence.

INDEX TERMS

- **Author Keywords**
  behavior-based systems , fish shoal inspired movement , obstacle avoidance , robotic collectives , robotic navigation