

# Swarm Painting Atelier

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**Abstract.** The design of coordination mechanisms is considered as a vital component for the successful deployment of multi-agent systems in general. The same happens in artificial collective creativity and in particular in artificial collective paintings where the coordination model has direct effects in agent's behavior and in the collective pattern formation process. Coordination, that is, the way agents interact with each other and how their interactions can be controlled, plays an important role in the "aesthetic value" of the resulting paintings, in spite of its subjective nature. Direct or indirect communication, centralized or decentralized control, local versus global information are important issues regarding coordination. We have created a swarm painting tool to explore the territory of collective pattern formation, looking for aesthetically valuable behaviors and interactions forms. We adopted the bottom-up methodology for producing collective behavior, as it is more kin to fragmentation, surprise, and non-predictability—as if it was an unconscious collaboration of collective artists—something similar to a swarm "cadavre exquis", but where we have a much more numerous group of participants, which drop paint while they move. They do not know anything about pattern or style, they have just to decide where to move and which color to drop. We are going to show the artistic pieces made by a swarm painting tool made collections of decentralized painting agents using just local information, which are coordinated through the mediation of the environment (stigmergy). We will also describe other types of agent coordination based on imitation where some consensual attributes, like color or orientation, or position, will emerge, creating some order on a potential collective chaos. This consensus can die out, randomly or by interaction factors, and new consensual attributes can win resulting in heterogeneous paintings with interesting patterns, which would be difficult to achieve if made by human hands. We think that our main contribution, besides the creative exploration of new artistic spaces with swarm-art, will be in the sense of showing the possibilities of generating unpredictable and surprising patterns from the interaction of individual behaviors controlled by very simple rules. This interaction between the micro and macro levels in the artistic realm can be the source of new artistic patterns and also can foster imagination and creativity. The Atelier can be reached at: <http://www.di.fc.ul.pt/~pub/swarm-atelier>.