Multi robot systems

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Introduction

- Motivation?
  - Automization
  - Make robots do complex tasks by themselves

Research results

Collaborative Multi-Robot Exploration

- Minimizes time

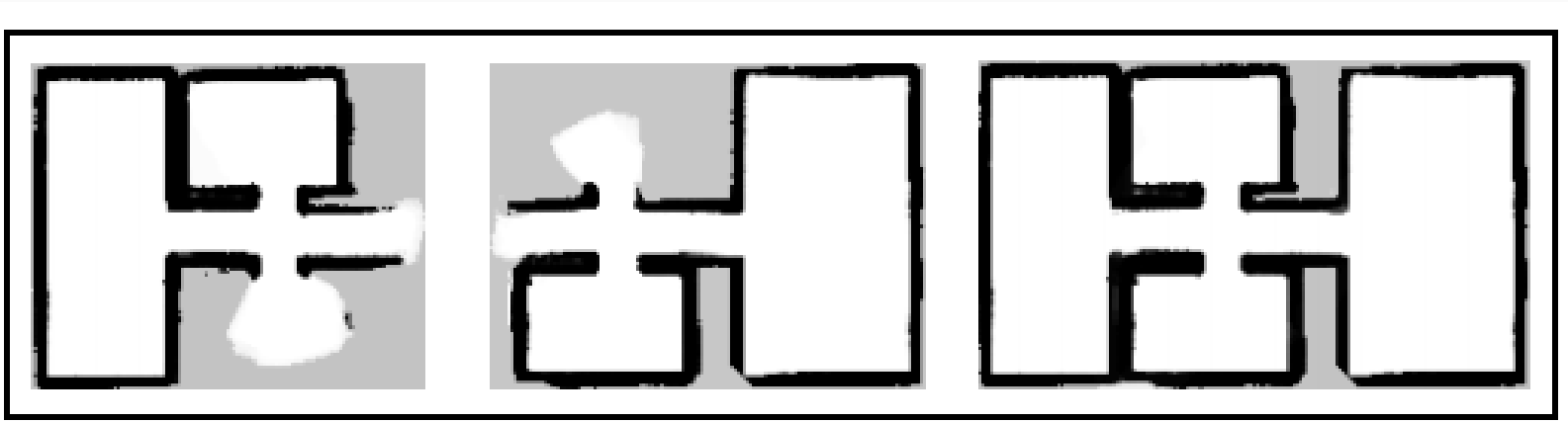
- Constructs a map about the environment

Collaborative multi-robot exploration

Process

- send each agent to the closest *frontier* cell
- decrease the utility value of a point if a robot is nearby
- construct the map if there are no unknown points

Collaborative multi-robot exploration



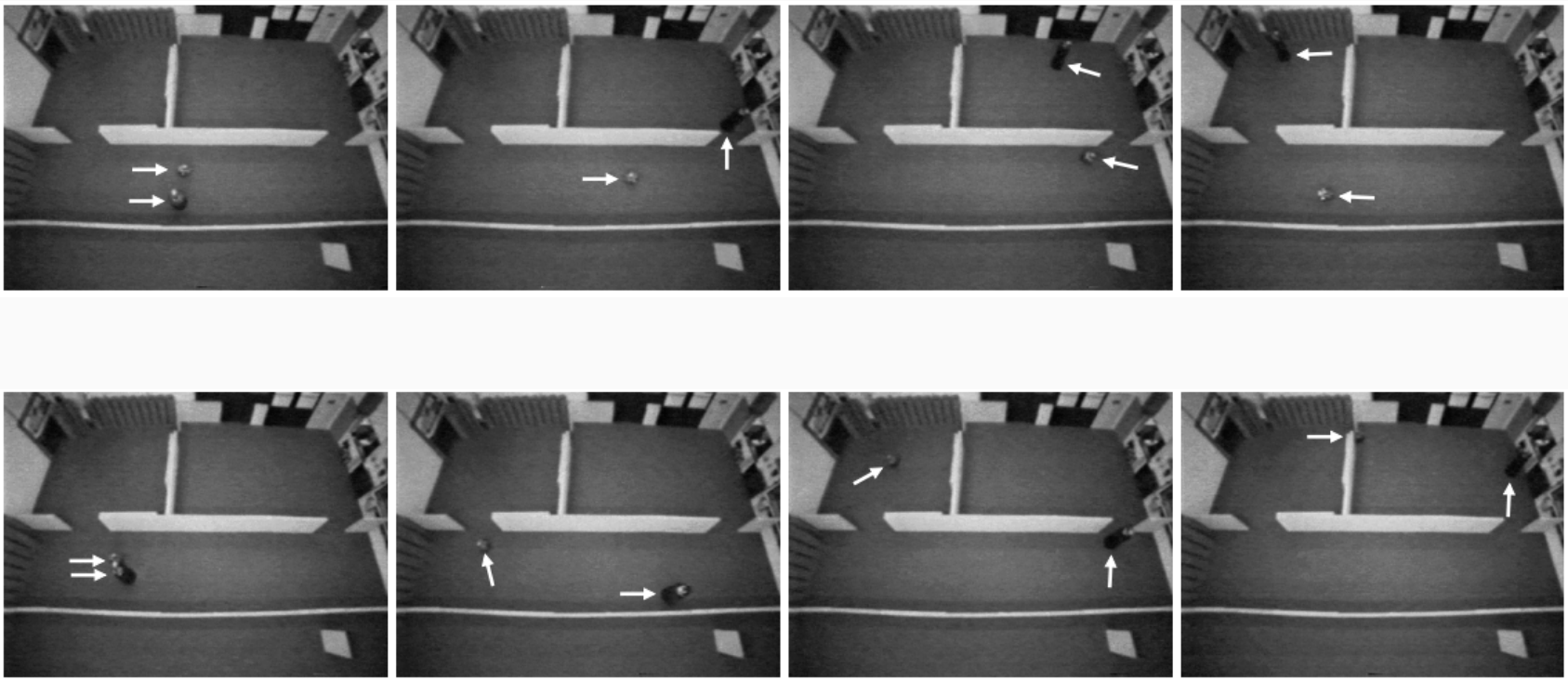
- with the use of realtive position

Collaborative multi-robot exploration

Experiments:

- randomly placed robots
- 2, 3, 4 robots
- increasing the map size with the nr. of robots
- faster with 100s, 200, 300s then the non-optimized

Collaborative multi-robot exploration



- Results with the 2 robots

Recent research results

Multi-Robot System for Artistic Pattern Formation

- make robots form a pattern
- make the transition between pattern smooth and efficient

Multi-robot system for artistic pattern formation

Use case of pattern formation

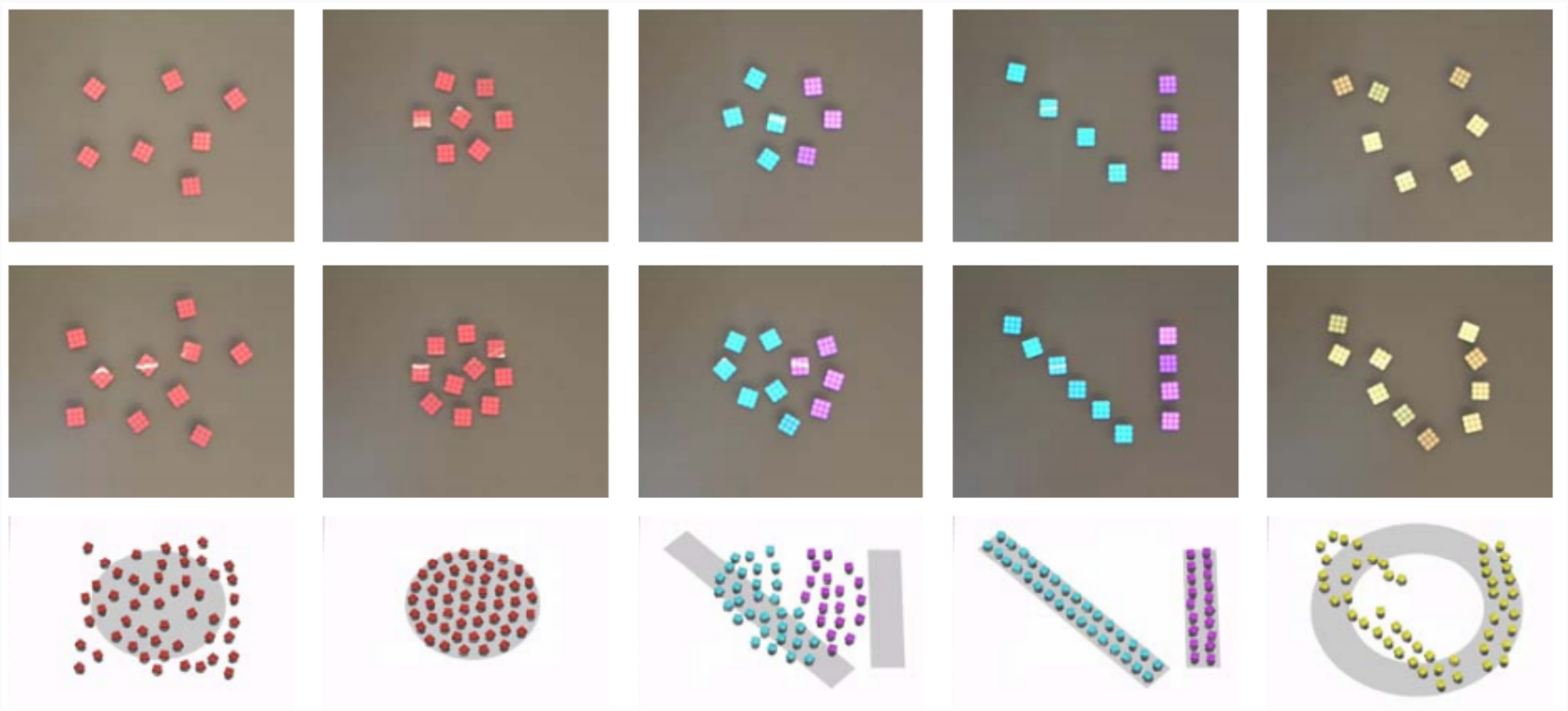
- exploration
- alignment of aerial vehicles
- cooperative control over a mobile network
- escorting and rescue mission

Multi-robot system for artistic pattern formation

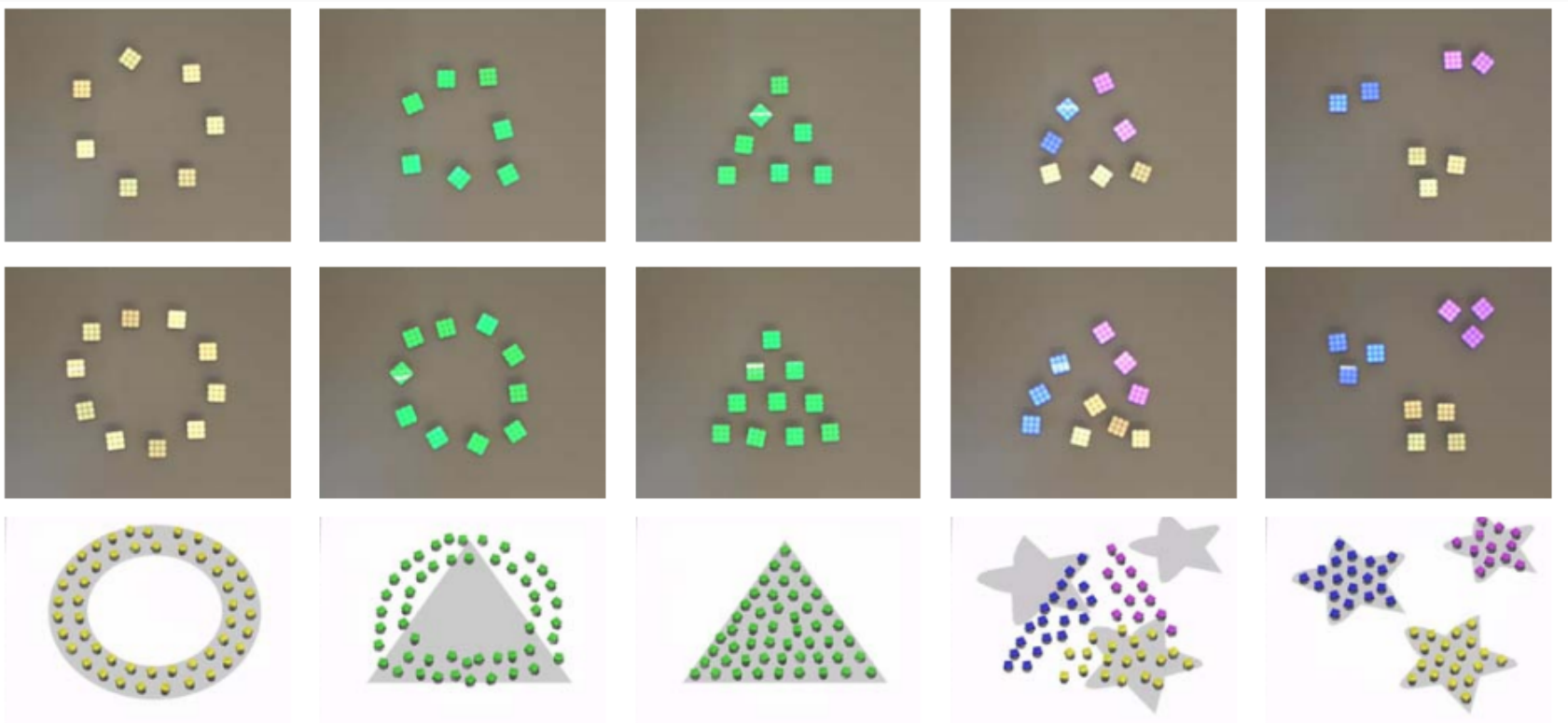
Ideea

- creating goal positions from the input pattern
- multi-robot goal assignment
- (short path and fast convergence)
- avoid collision
- repeat step 2 until finished

Multi-robot system for artistic pattern formation



Multi-robot system for artistic pattern formation



Thanks for watching