

Risk Sensitive Surveillance with Optimal Sensor Quality for Distributed Robotic Systems

Goals

- To provide high quality sensory information of a given region
- To minimize the risk of capture or damage to an acquiring agent
- To allow for a dynamic number of agents without significant algorithmic modification

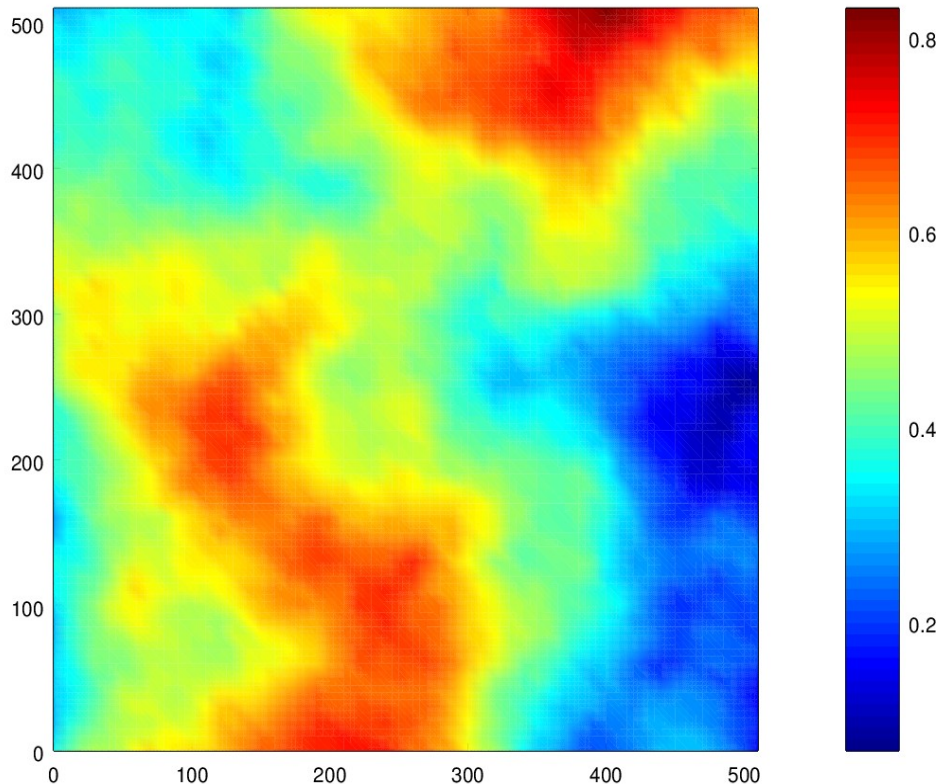


Figure showing the risk of a given area



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- Method

- Move to regions of the map that have a combination of the largest uncertainty and lowest risk
- Determine the altitude by maximizing the sensor quality whilst minimizing the risk

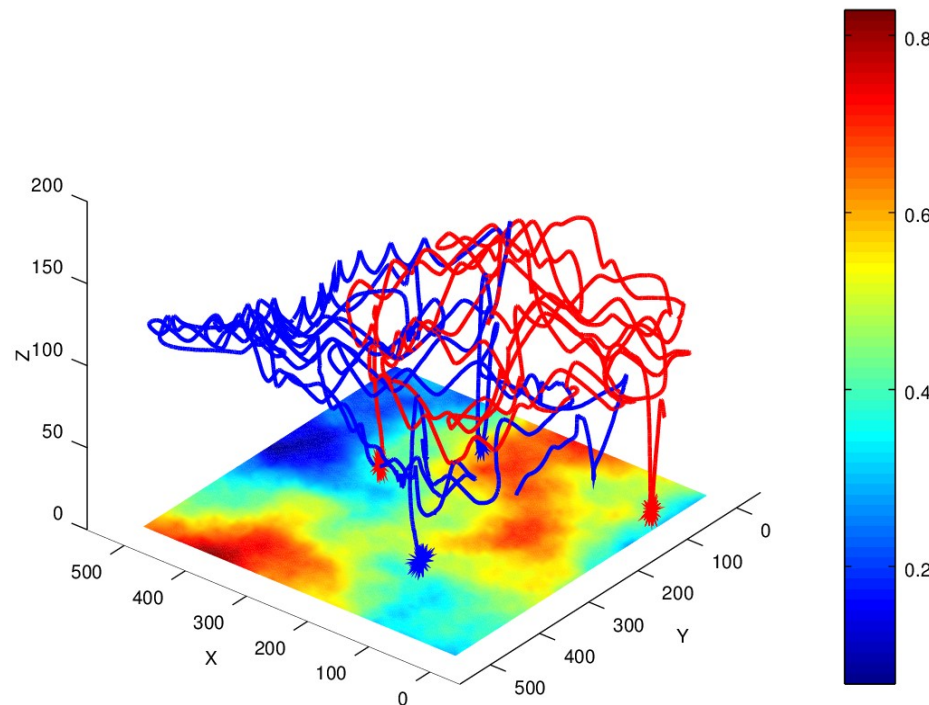


Figure showing the trajectories of quadrotors during a practical experiment



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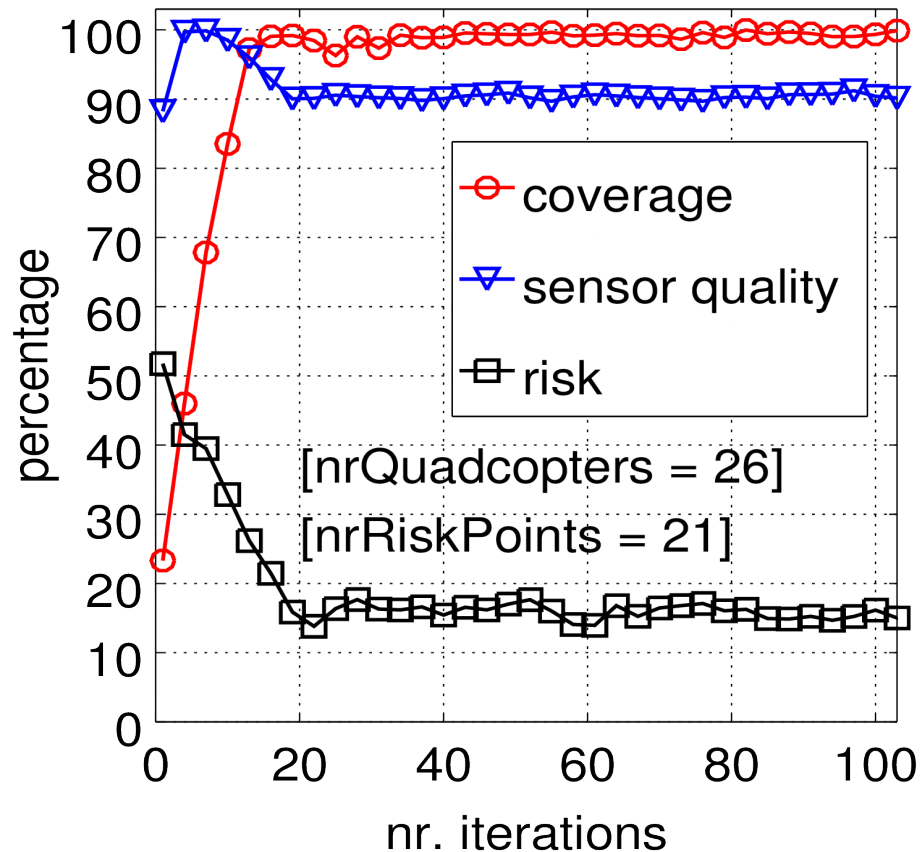


Figure showing the risk, sensor quality, and total coverage as a function of time (in iterations)

• Results

- The algorithm very quickly converges to total area coverage
- Measured risk and sensor quality are respectively minimized and maximized
- The algorithm scales linearly with the number of quadrotors

