

## Misel Brezak defended his PhD thesis

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Misel Brezak defended his PhD thesis on the localization, motion planning and control of mobile robots in intelligent spaces. The thesis investigates application of mobile robots in environments provided with ambient intelligence to form the so-called Intelligent Spaces (iSpaces). The purpose of the iSpace is providing various services to its users, where mobile robots provide numerous possibilities, such as load delivery, visitor guidance etc. Thus the focus of the thesis is set to developing the capability of the space to fully utilize mobile robots. In this way a method for fast and precise mobile robot localization using distributed cameras is developed. The developed algorithm enables high framerates and at the same time high measurement precision and accuracy as it works in subpixel precision. The algorithm was tested in multiple experiments and performed with very good results. Second, a fast and flexible robot mobile robot motion planning method appropriate for application in iSpaces is developed. The developed motion planner is decoupled and consists of four stages: path planning, path smoothing, trajectory planning and trajectory tracking. The method can replan the path in real time, which enables planning in dynamic environments.

All algorithms are very flexible and allow use in various scenarios, and one of the intended applications is also robot soccer. While global vision based localization is already used in our robot soccer application, use of developed motion planner is planned in the future after some multi-robot issues are solved. The motion planner should be capable e.g. to kick the ball at the right moment and with preferred orientation and velocity of the robot, thus enabling very precise ball handling.

The dissertation defense committee:

1. Professor Sven Loncaric (Head)
2. Professor Ivan Petrovic (Supervisor)
3. Professor Josko Deur
4. Professor Nedjeljko Peric
5. Professor Vesna Zupanovic