

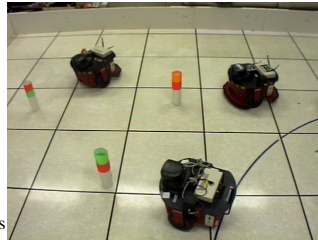
Localization

Chairs: George Bekey, Gamini Dissanayake

Collective Localization: A distributed Kalman filter approach to localization of groups of mobile robots

S. I. Roumeliotis and G. A. Bekey
University of Southern California

- Improved localization accuracy for teams of mobile robots
- Distributed multi-robot sensor fusion schema - Kalman filtering
- Reduced position uncertainty for the case of 3 mobile robots
- Shared group knowledge appears as position estimates inter-dependencies

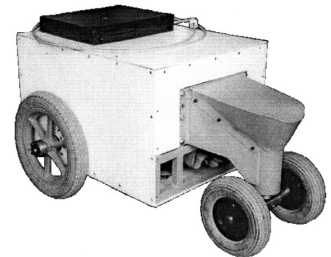


Algorithms and Architectures for Acoustic Localization based on Microphone Array in Service Robotics

E. Mumolo¹, M. Nolic¹ and G. Vercelli²

¹University of Trieste and ²University of Genoa

- Surveillance and transportation tasks in indoor environments
- Cross-correlation and Neural Networks approaches using a 4 element Linear Microphone Array
- Real-time operation with a distributed architecture
- Absolute localization error with a true speaker is below 50cm



Extracting Topology-Based Maps from Gridmaps

E. Fabrizi¹ and A. Saffiotti²

¹Universit di Roma Tre and ²Orebro University

- New type of maps
- Represent the topology induced by the shape of the free space
- Extracted by image processing from fuzzy occupancy grids
- Extraction is fast and robust

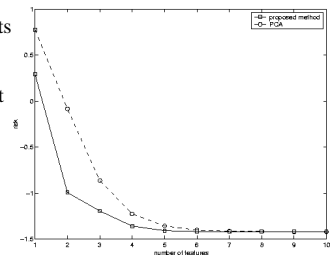


Supervised Linear Feature Extraction for Mobile Robot Localization

N. Vlassis¹, Y. Motomura² and B. Krose¹

¹University of Amsterdam and ²Electrotechnical Laboratory

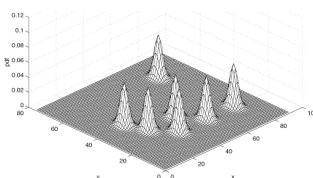
- WHAT? Extract 'task-relevant' features from sensor measurements
- WHY? Because PCA and related methods are task-irrelevant
- HOW? By Supervised Projection Pursuit optimizing Mutual Information
- RESULT? Improved average robot localization performance



Bayesian estimation and Kalman filtering: A unified framework for Mobile Robot Localization

S. I. Roumeliotis and G. A. Bekey
University of Southern California

- Filter out odometric error & reduce landmark related uncertainty
- Bayesian decision making & Kalman filter estimation
- Global localization in an office environment
- Optimal fusion of proprioceptive and exteroceptive measurements



Computing the Sensory Uncertainty Field of a Vision-based Localization Sensor

A. Adam, E. Rivlin and I. Shimshoni
Technion - Israel Institute of Technology

- Sensor accuracy varies with place
- Goal: obtain a performance map
- Method of prediction
- Statistical validation

