

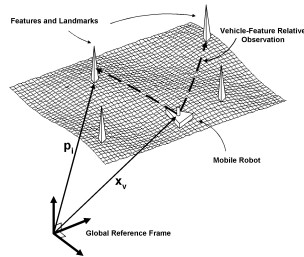
# Mapping and Localization 1

## Chairs: Illah Nourbakhsh, T. Tsubouchi

### A Computationally Efficient Solution to the Simultaneous Localisation and Map Building (SLAM) Problem

Gamini Dissanayake  
University of Sydney

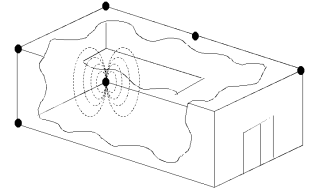
- Robot location without apriori maps
- Efficiency through features with most information
- Experiments on indoor robot with a laser
- Progress towards real-time SLAM



### An Indoor Absolute Positioning System with No Line of Sight Restrictions and Building-Wide coverage

E. Prigge and J. How  
Stanford University

- Provides 'go-anywhere' freedom for mobile robots
- Beacons installed throughout building create magnetic fields
- CDMA techniques applied
- Initial experimental accuracy of 2.5 cm, 2.5 degrees



### Appearance-Based Place Recognition for Topological Localization

Iwan Ulrich and Illah Nourbakhsh  
Carnegie Mellon University

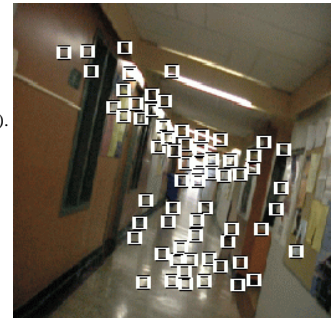
- Topological Localization Indoors and Outdoors
- Histogram Matching of Panoramic Color Images
- Correct Confident Classifications: 87-98
- Incorrect Confident Classifications: 0



### Robust Place Recognition using Local Appearance based Methods

G. Dudek and D. Jugessur  
McGill University

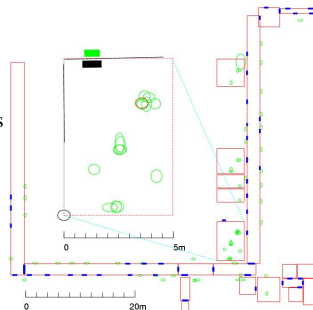
- Making appearance based recognition (using PCA) more robust.
- Recognition is performed in the frequency domain using multiple sub-windows (eigenwindows).
- Scenes and rooms can be recognised with varying backgrounds, irrespective of planar rotations and under occluded conditions.
- Promising results are obtained using the proposed methods. PCA is made more robust.



### Using Multiple Gaussian Hypotheses to Represent Probability Distributions for Mobile Robot Localization

D. Austin and P. Jensfelt  
Royal Institute of Technology

- Multiple gaussian hypotheses are used
- Tree of data association decisions
- Algorithms for tree pruning presented
- Results are given illustrating effectiveness



### Invariant Filtering for Simultaneous Localization and Mapping

Matthew C. Deans and Martial Hebert  
Carnegie Mellon University

- Localization and mapping from landmark bearings and odometry
- Dual location- and relation-based representations
- Computation & memory limited by enforced independence
- Results shown for simulated and real environments

