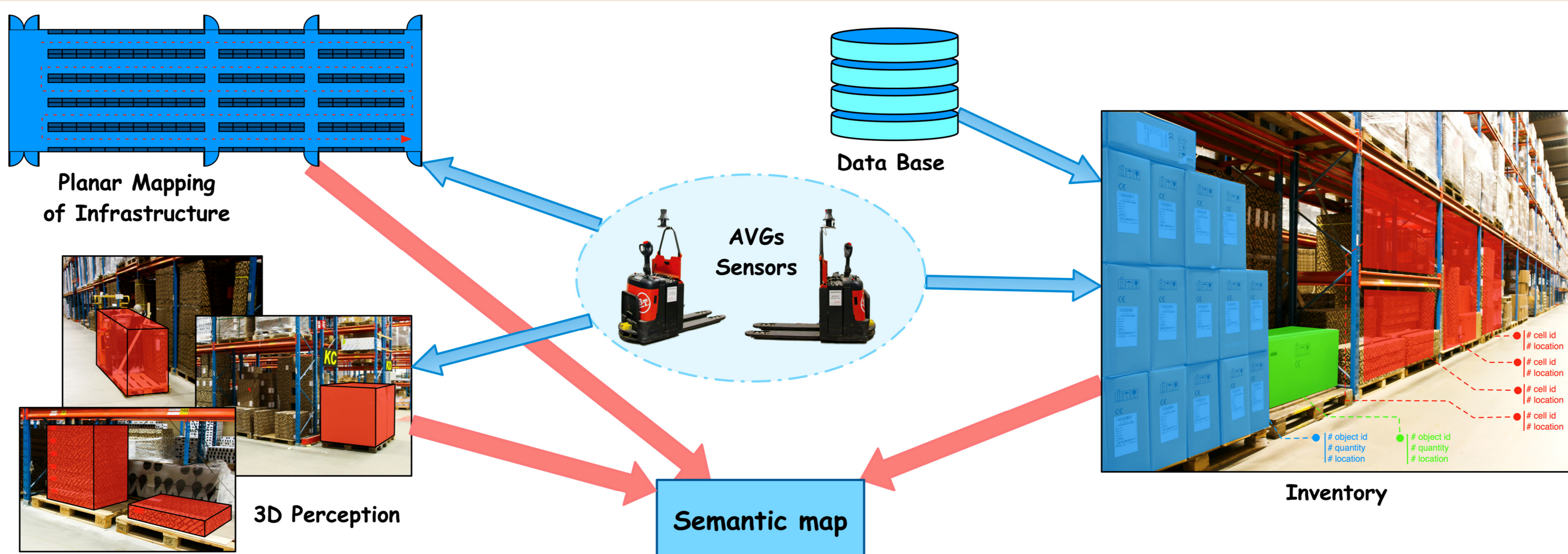


Automatic Inventory and Mapping of Stock - AIMS

in Cooperation with Kollmorgen, Optronic and Toyota Material Handling Europe

CAISR Centre for Applied Intelligent Systems Research

Knowledge Foundation <>



AIMS – Overall goal

An intelligent warehouse environment that autonomously builds a map of articles in a warehouse and relates article identity from the warehouse database with the article's position (metric) and visual appearance in the warehouse.

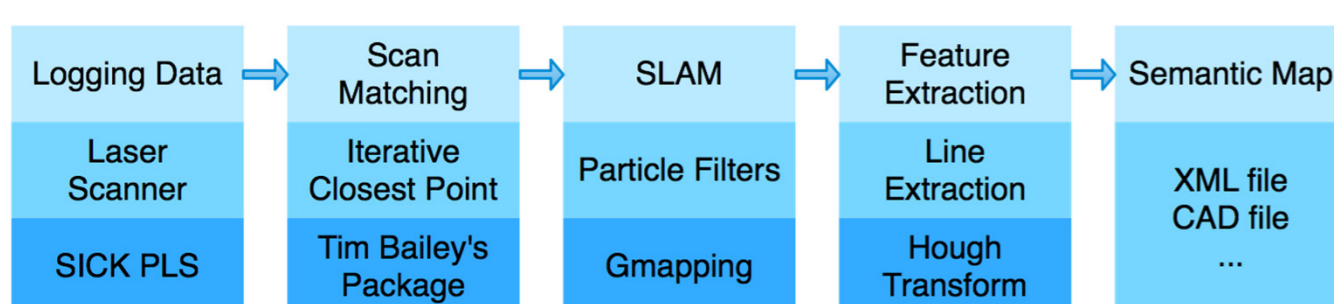
Motivation

An important skill for future robots and automated guided vehicles (AGV:s) are:

- The ability to recognize and describe objects that the robot shall handle and the environment in which the robot operates (*situation awareness*).
- The ability to structure and sort information provided by sensors (*flexibility and adaptability*).

Current results

- So far in this project an AVG is set up, a data acquisition platform has been developed and tool-chain for 2D metric mapping is proposed.



Tool-chain for metric mapping.

Objective

- **Mapping and localization:** for vehicle navigation and storing the location of articles in environment. Mapping refers to both metric and topological, in 2D and 3D.
- **Recognition and clustering:** for classifying articles in the warehouse, identifying environmental features for localization and topological mapping purpose.
- **3D perception:** for evaluation of the articles' quantity and obstacle avoidance.
- **Dynamic map maintenance:** semantic map includes elements which are varying with respect to time, mainly belong to inventory list or obstacles.
- **Multi agent coordination:** to collect data more frequently and guarantee covering a big environment effectively and faster.

Expected result:

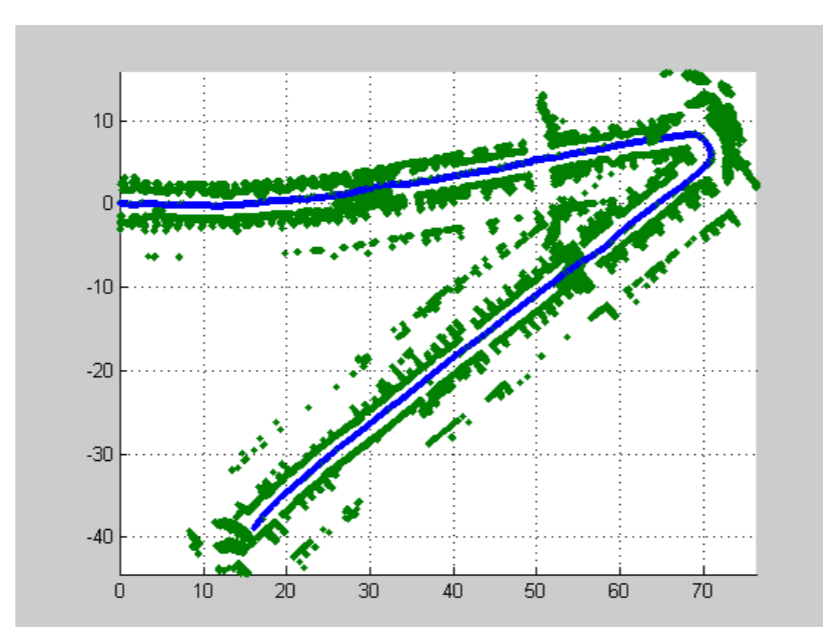
- A method that automatically selects those features in the image that best represent the goods with respect to classification error.
- A method that in a self-organized way learns which goods that exists in the warehouse.
- A system for mapping and making inventory of a warehouse that is:
 - robust to changes in the environment and scalable.
 - able to associate the object database with the warehouse system to receive identity.
 - able to map and take inventory of goods while concurrently creating a map for navigation.
- A sensor system for mapping and making inventory.



AGV



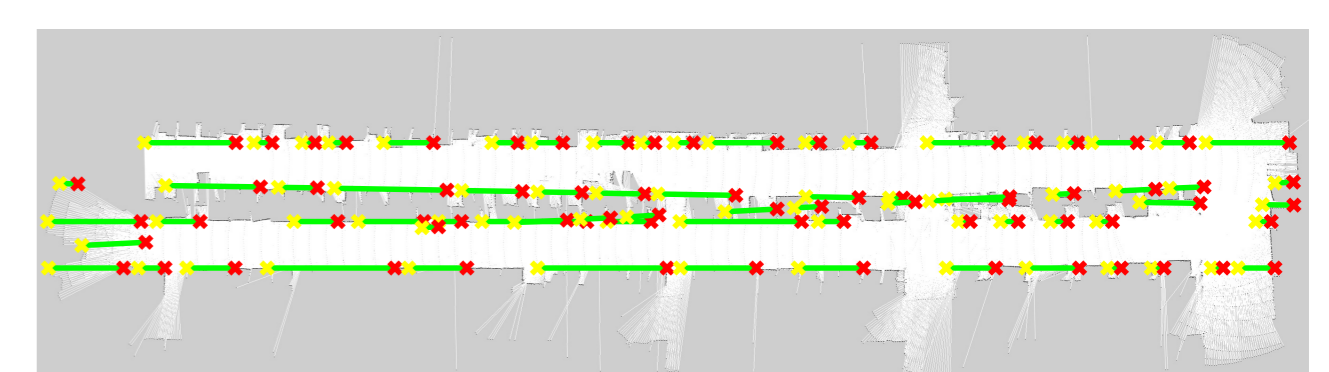
Logging Data



Scan Matching



SLAM



Feature Extraction