

無人載具技術與應用

徐瑋隆

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評分標準

- 出席 30%
- 作業 40%
- 上機考30%

機器人視覺定位&導航

- 機器人移動平台
- 機器人定位
- vSLAM模組 應用

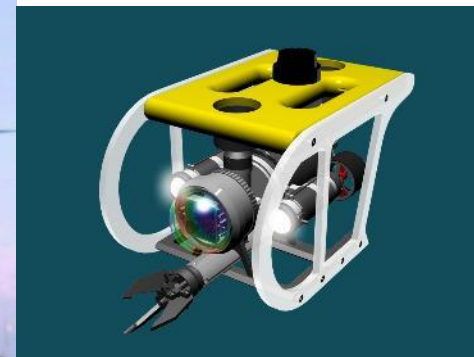
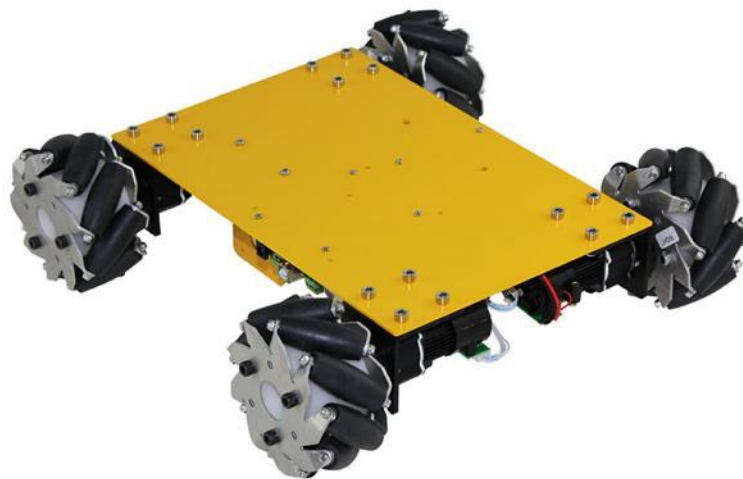
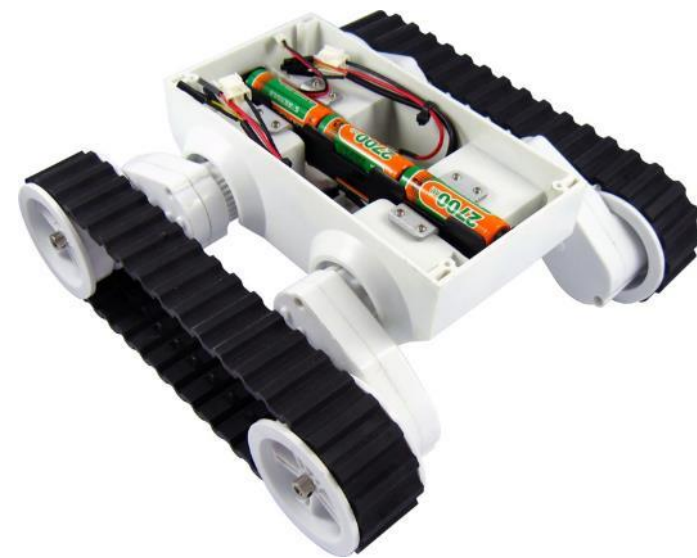




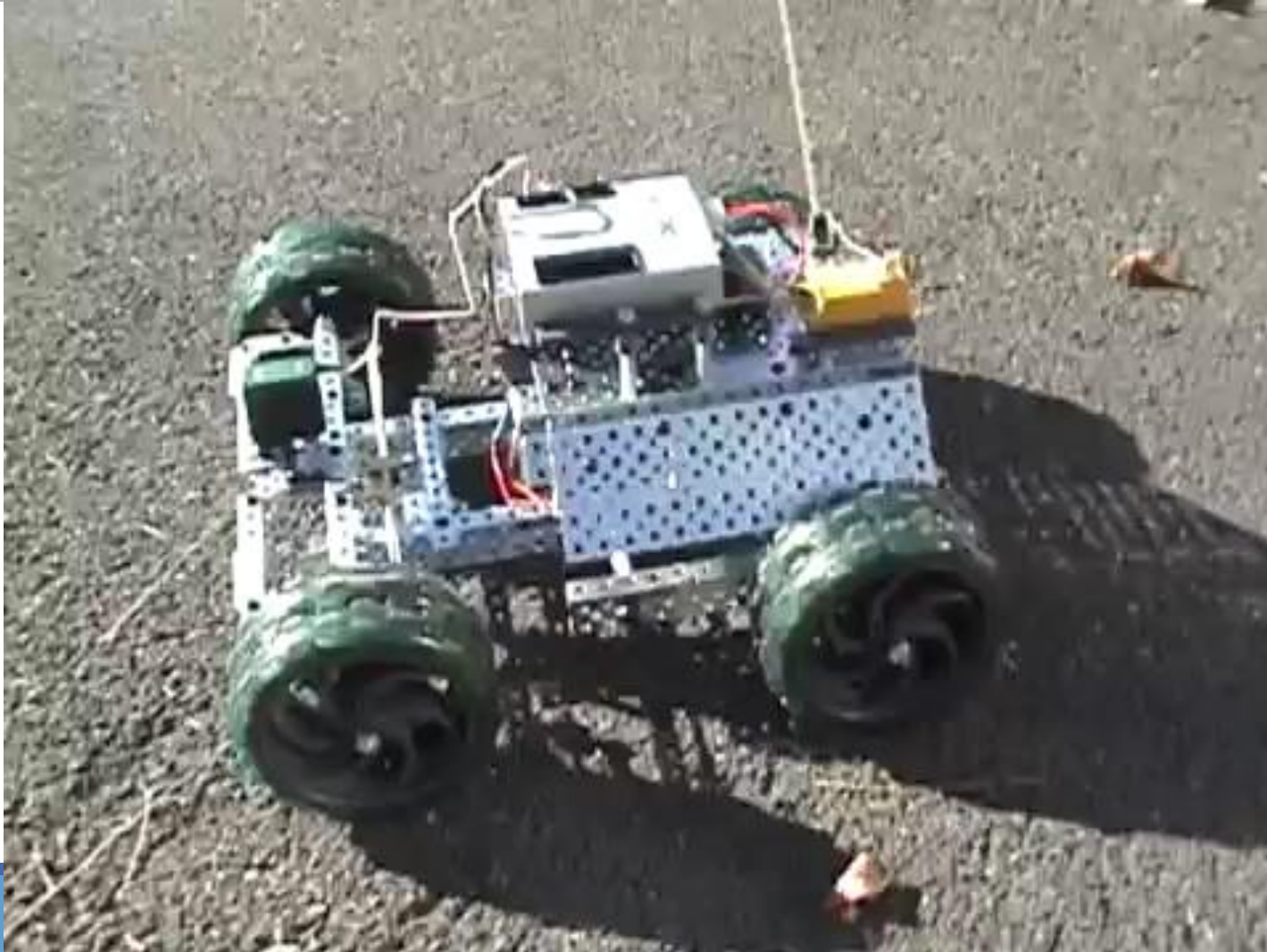
機器人移動平台

機器人移動平台

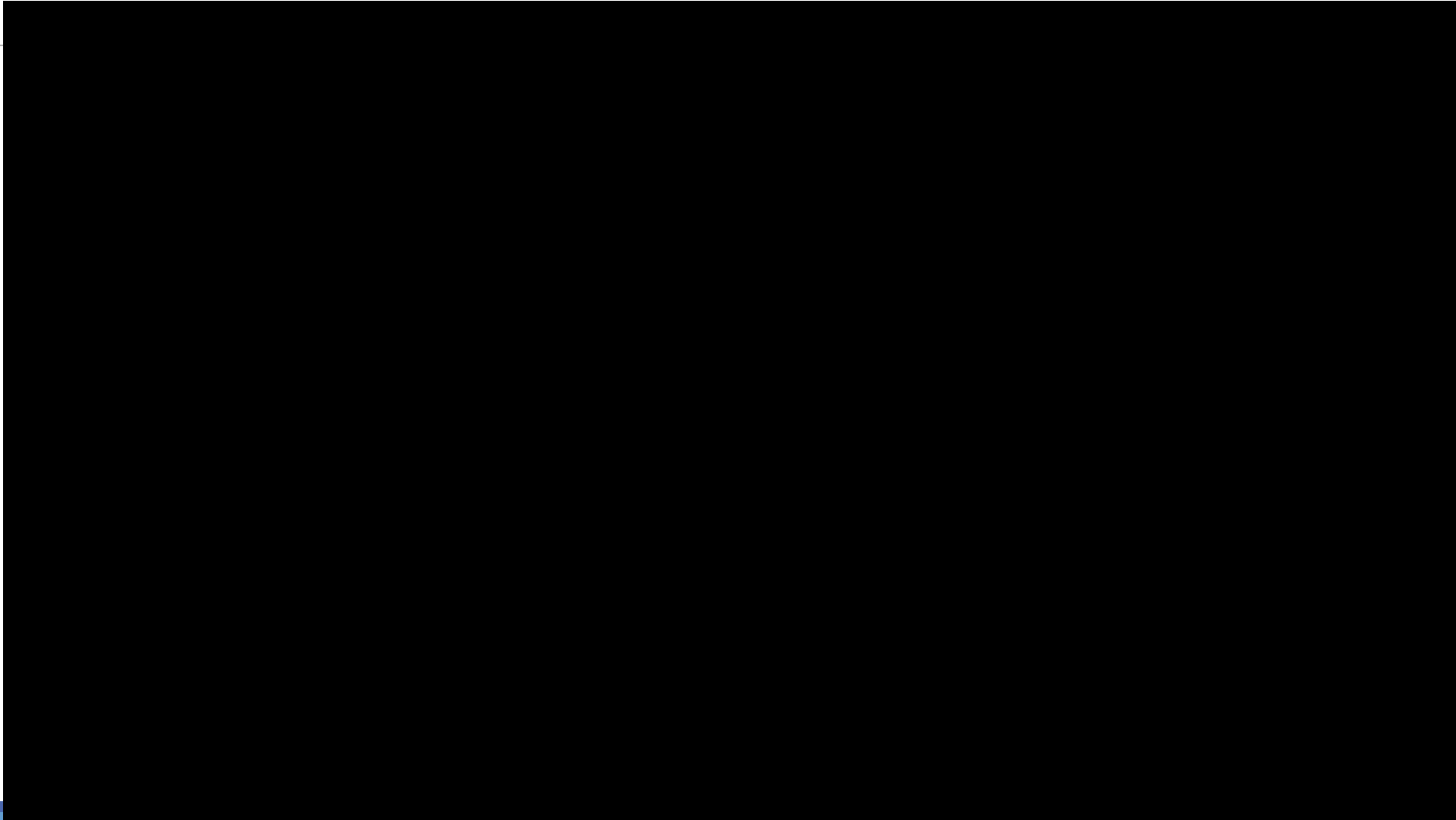
- 舵輪控制
- 兩輪差速
- 全向輪



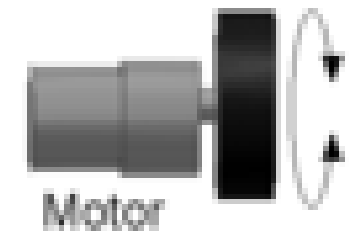
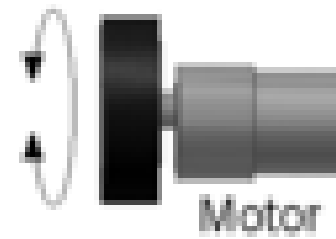
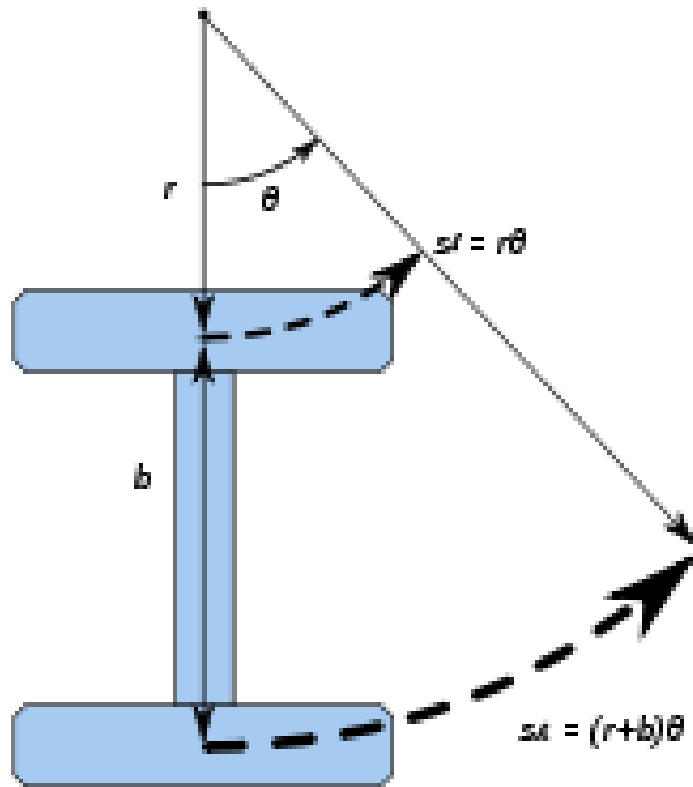
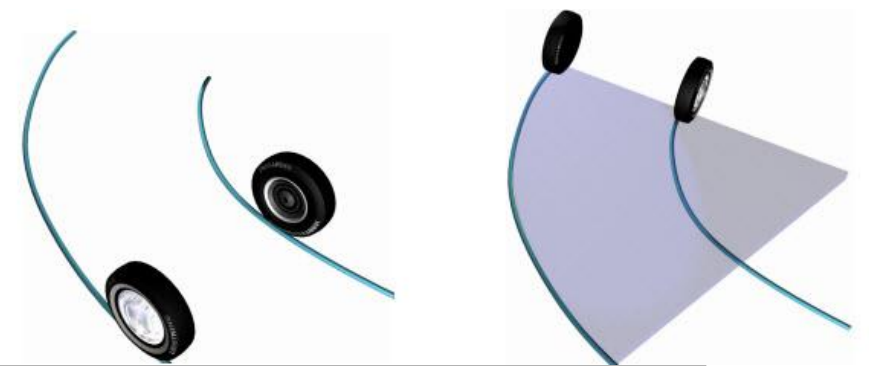
舵輪控制



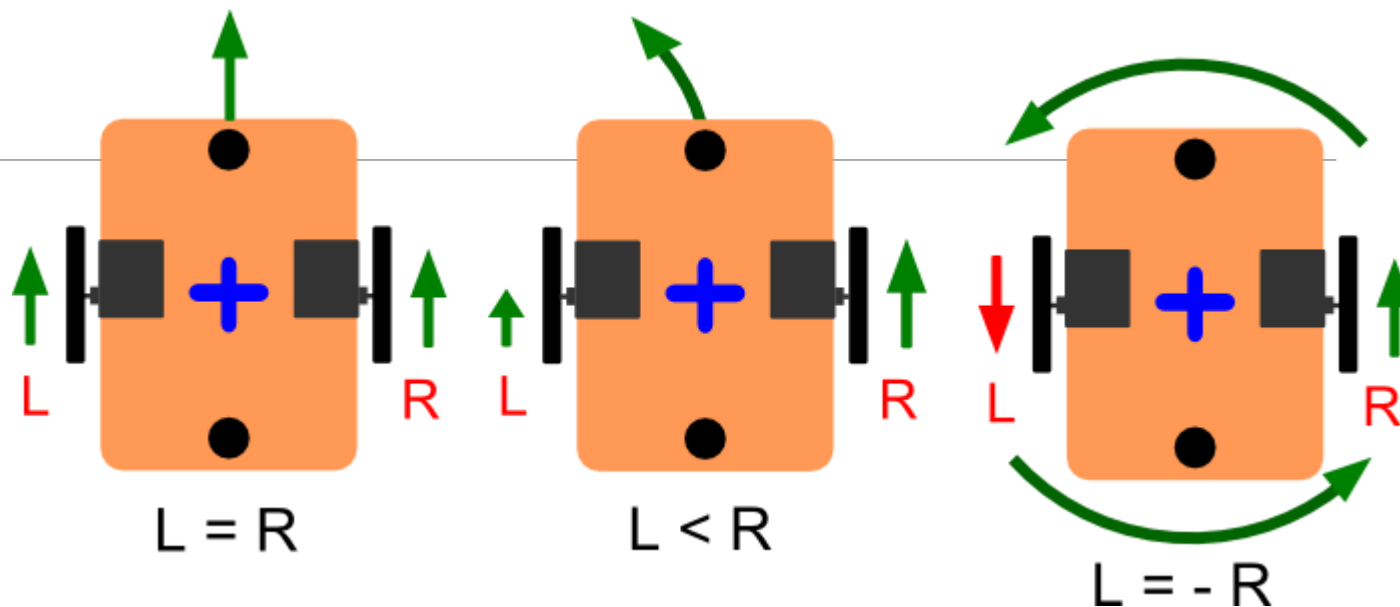
舵輪控制



兩輪差速(1/3)



兩輪差速(2/3)



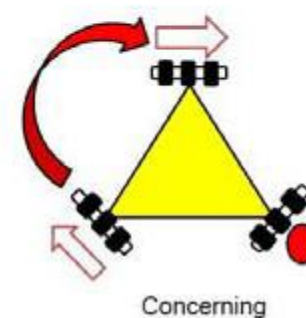
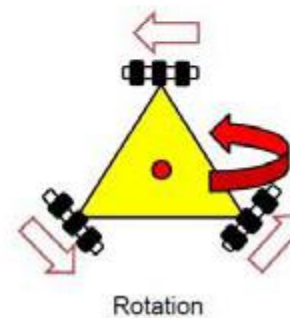
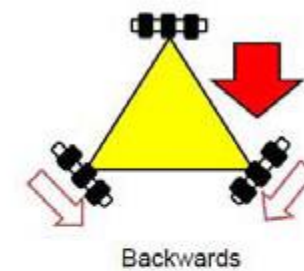
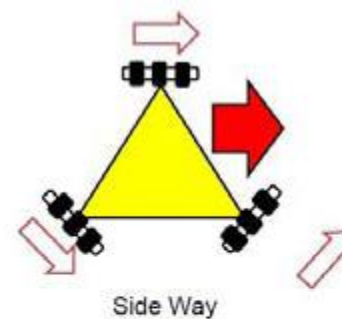
$$\begin{bmatrix} \dot{x} \\ \dot{y} \\ \dot{\theta} \end{bmatrix} = \begin{bmatrix} v_x \\ v_y \\ \omega \end{bmatrix} = \begin{bmatrix} \cos \theta & 0 \\ \sin \theta & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} v_R \\ \omega_R \end{bmatrix}$$

兩輪差速(3/3)



Differential Drive Simulator

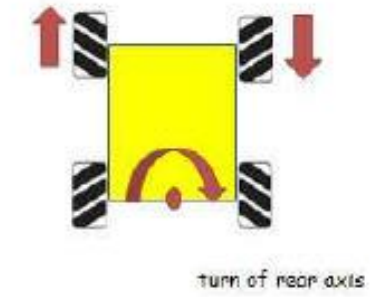
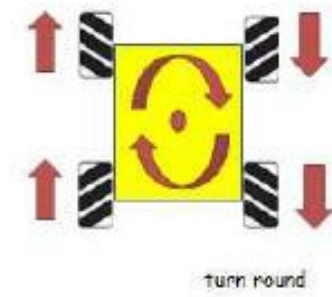
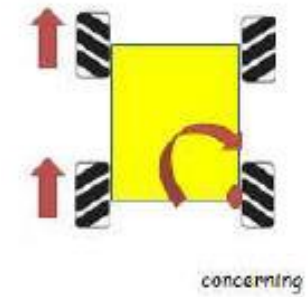
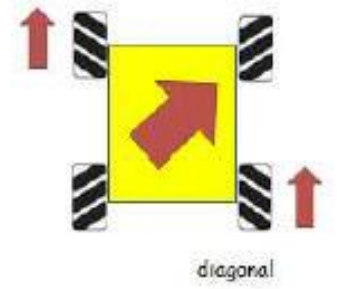
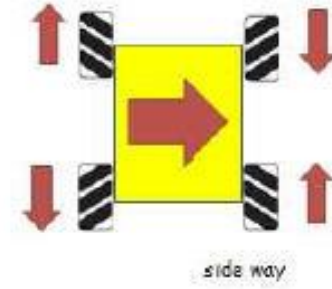
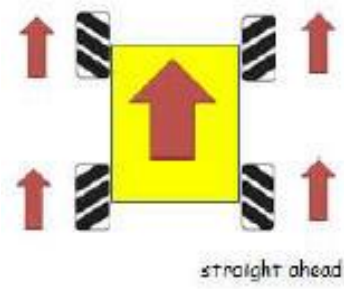
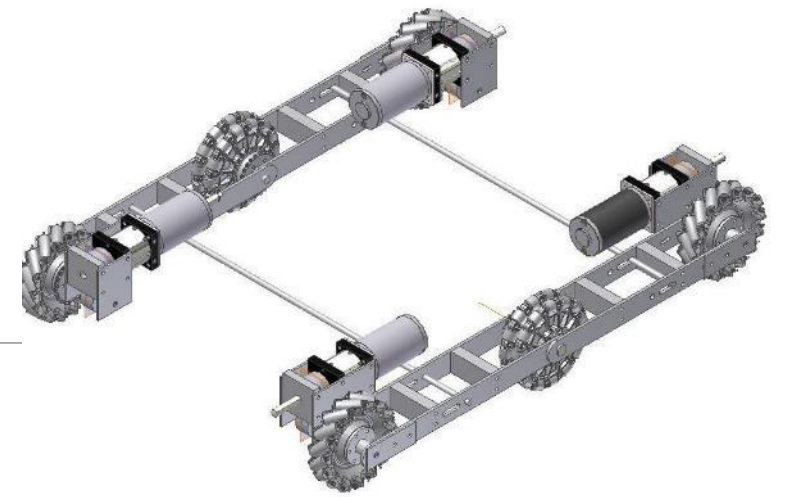
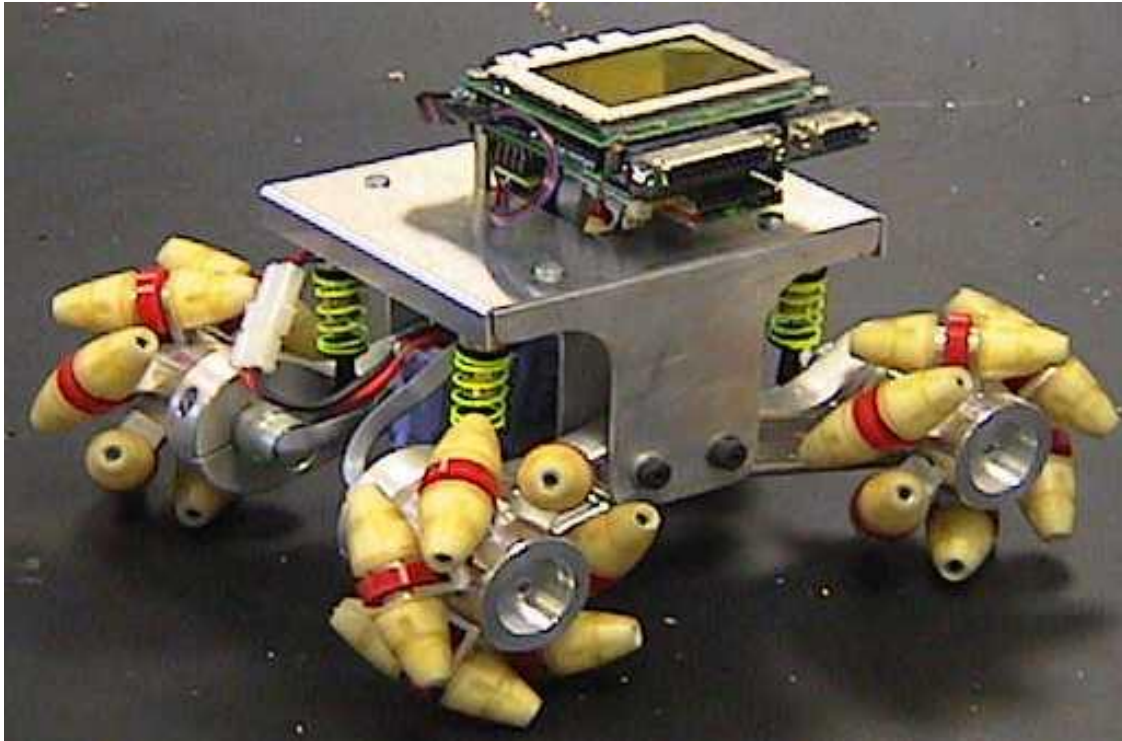
全向輪(1/4)



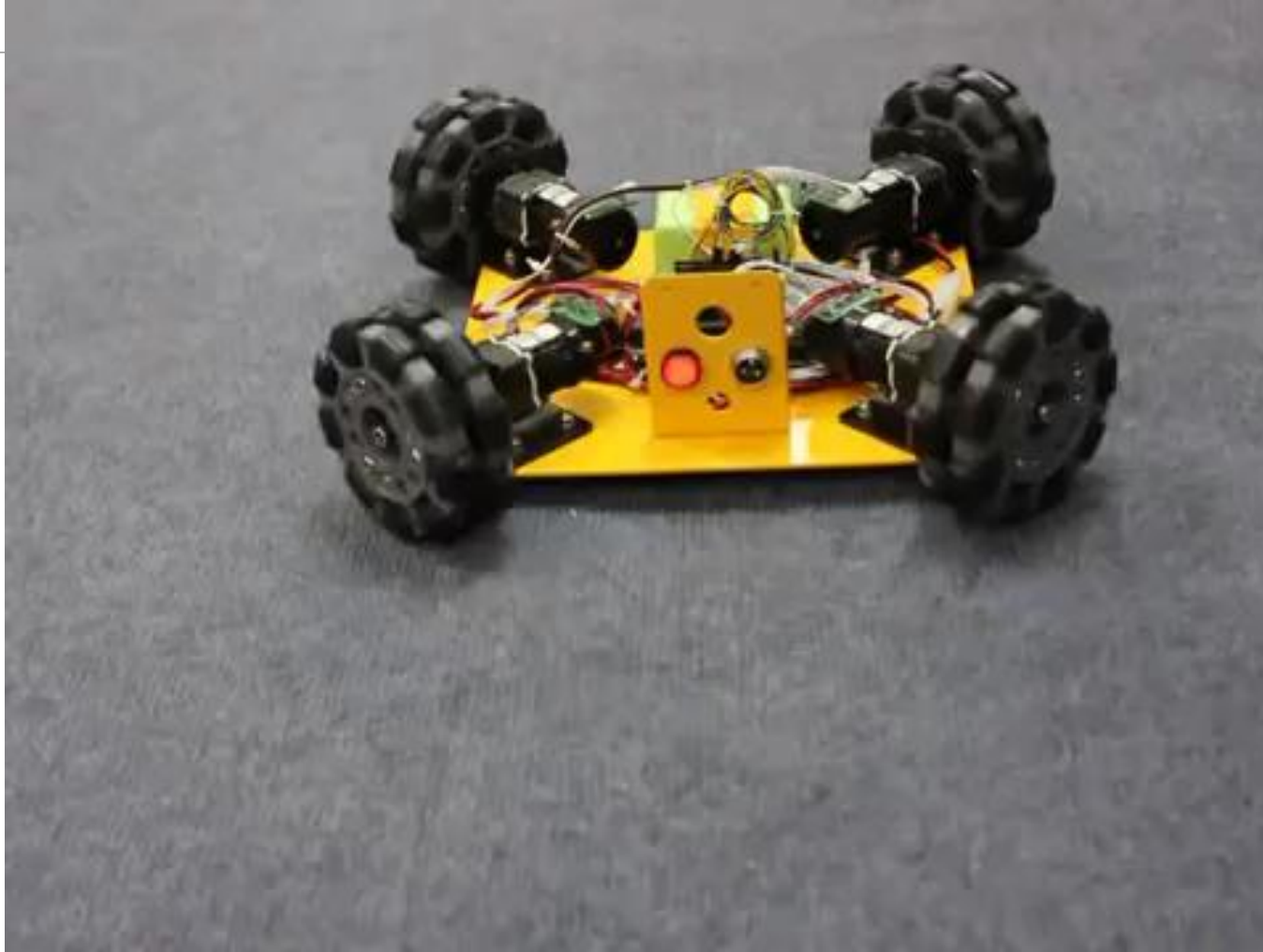
全向輪(2/4)



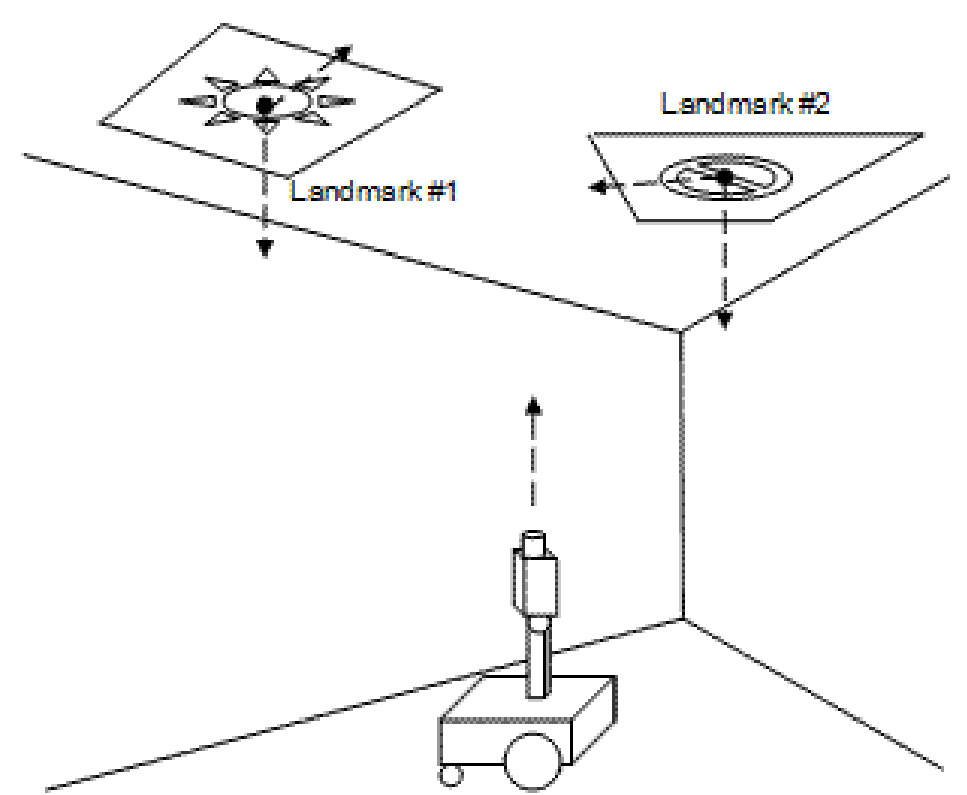
全向輪(3/4)



全向輪(4/4)

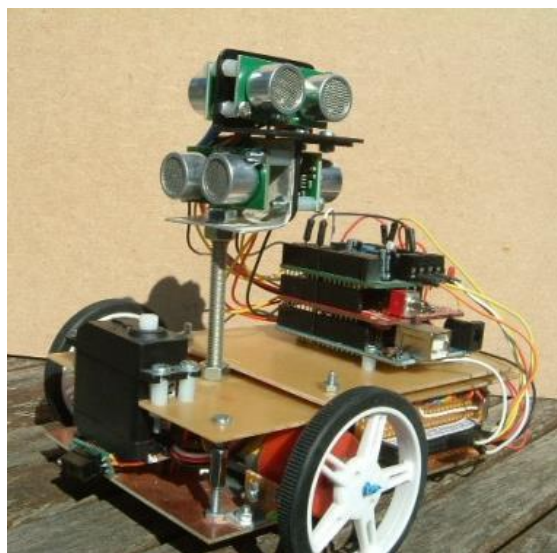


機器人定位

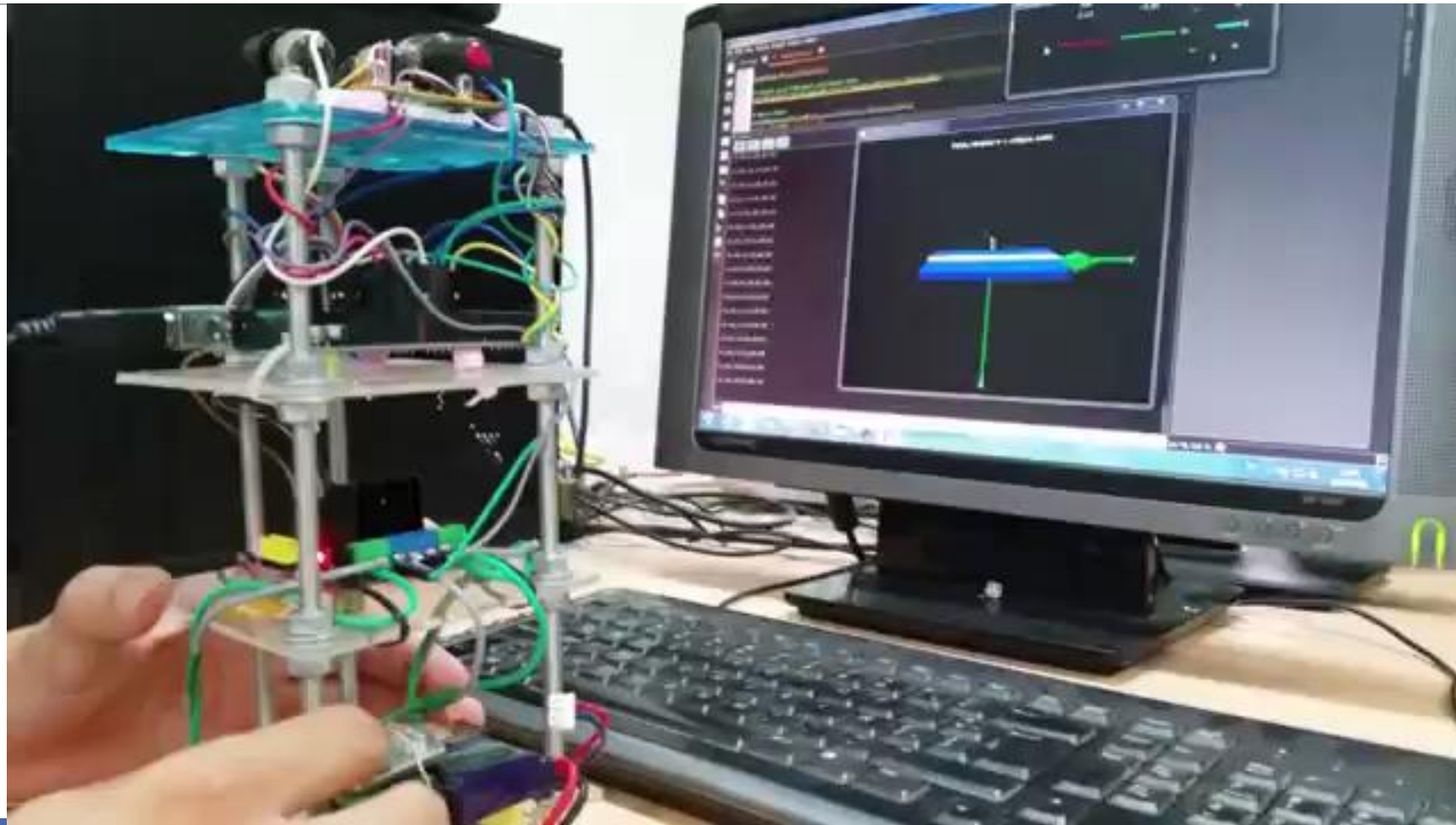


機器人定位

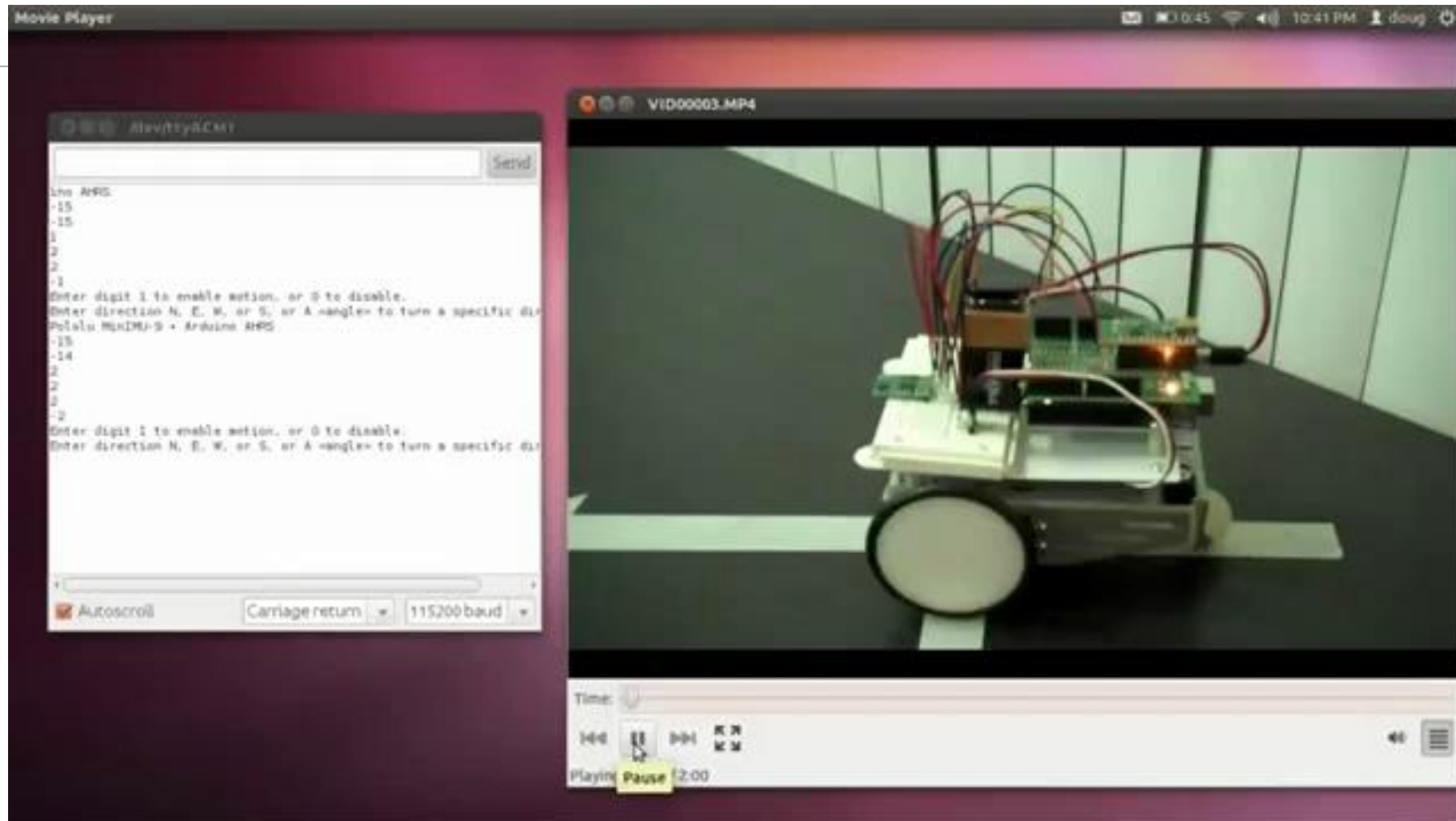
- 慣性定位
- 雷射定位
- 超音波定位
- RF定位



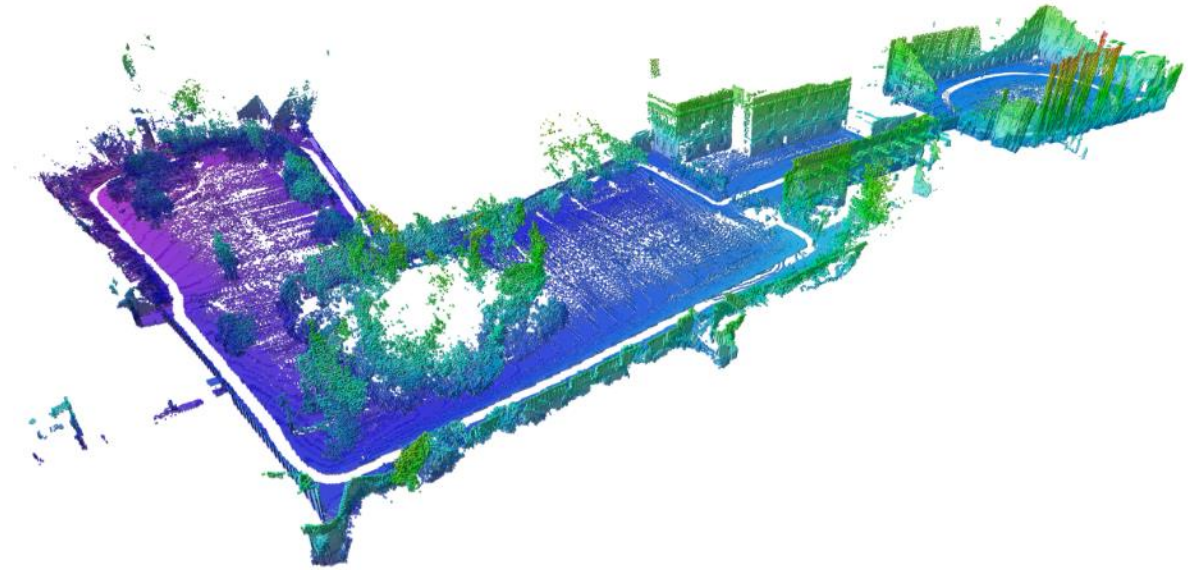
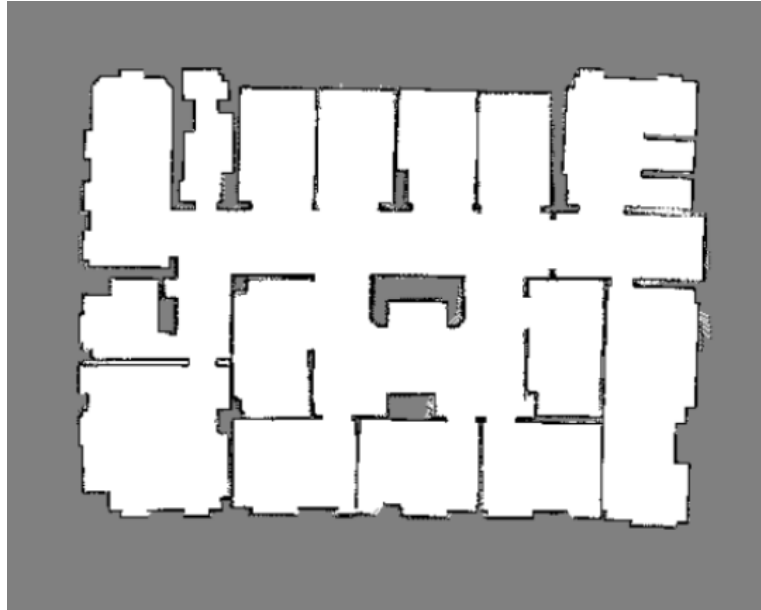
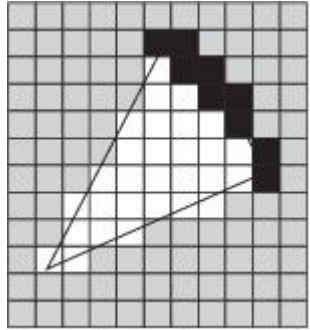
慣性定位(1/2)



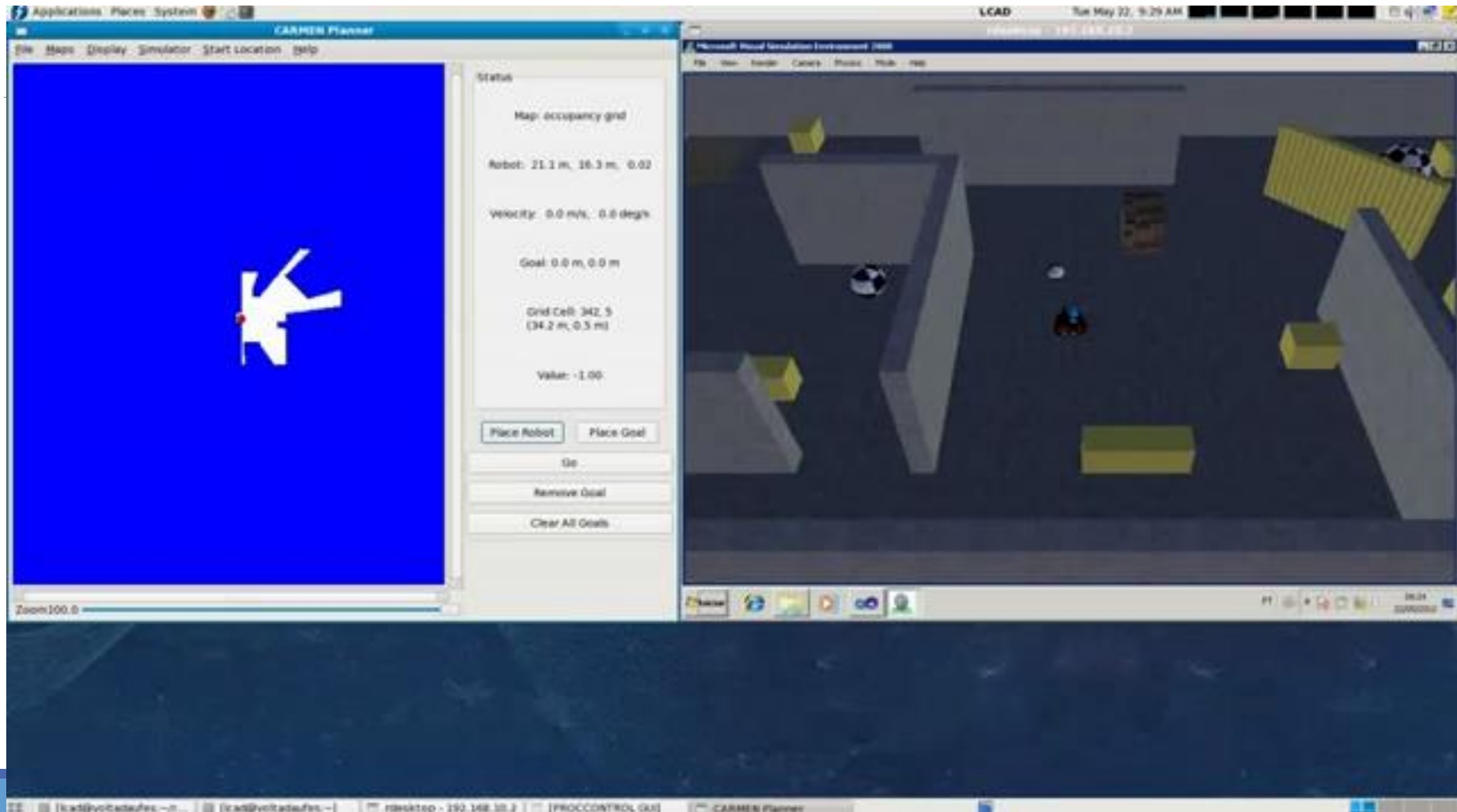
慣性定位(2/2)



雷射定位(1/3)



雷射定位(2/3)



雷射定位(3/3)

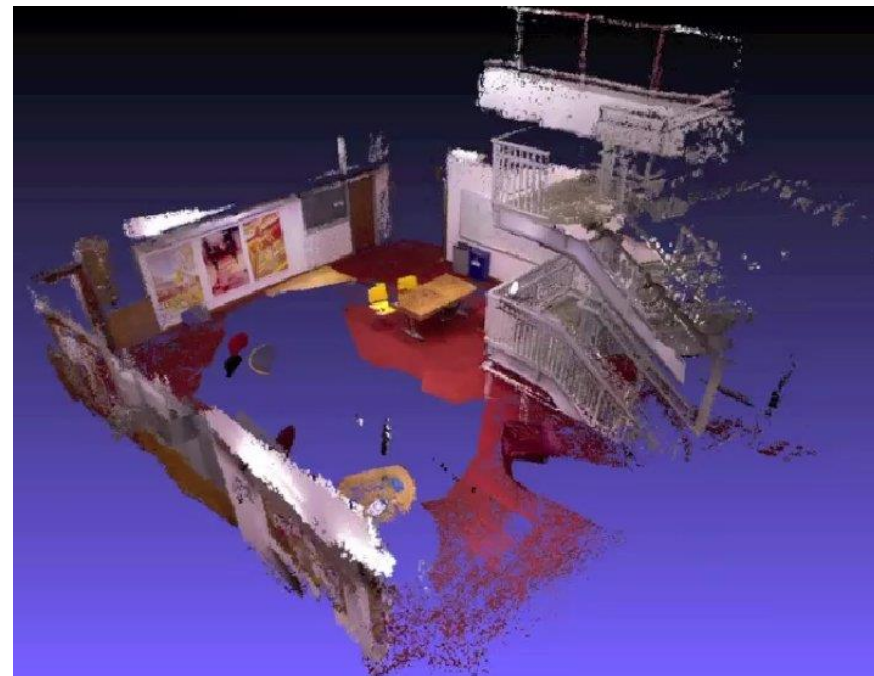
EECS568

Mobile Robotics: Methods & Algorithms

Instructor: Prof. Ryan M. Eustice

Mobile Robot Occupancy Grid Mapping

Algorithm implemented in MATLAB
Footage from ZZ's course homework 4



機器人視覺地圖定位&導航

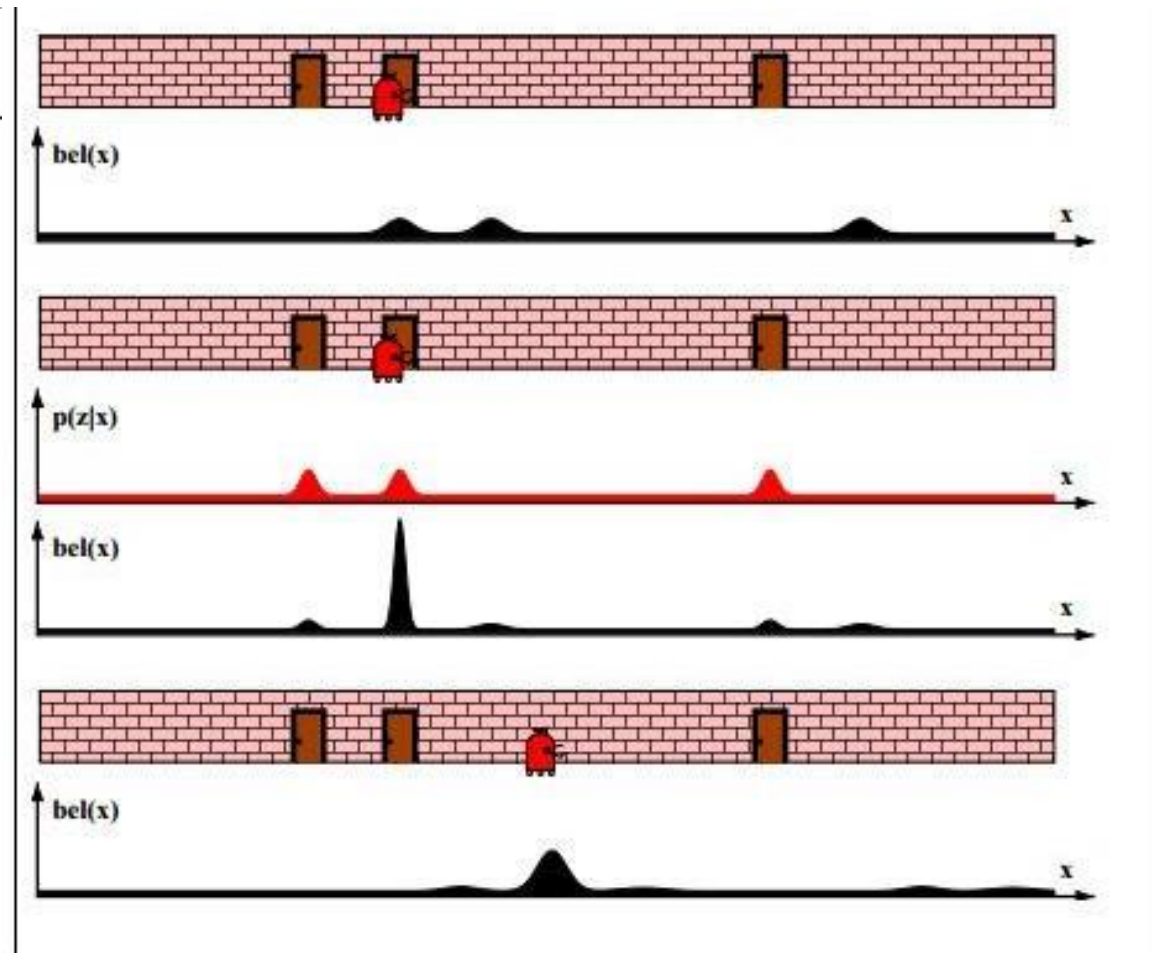
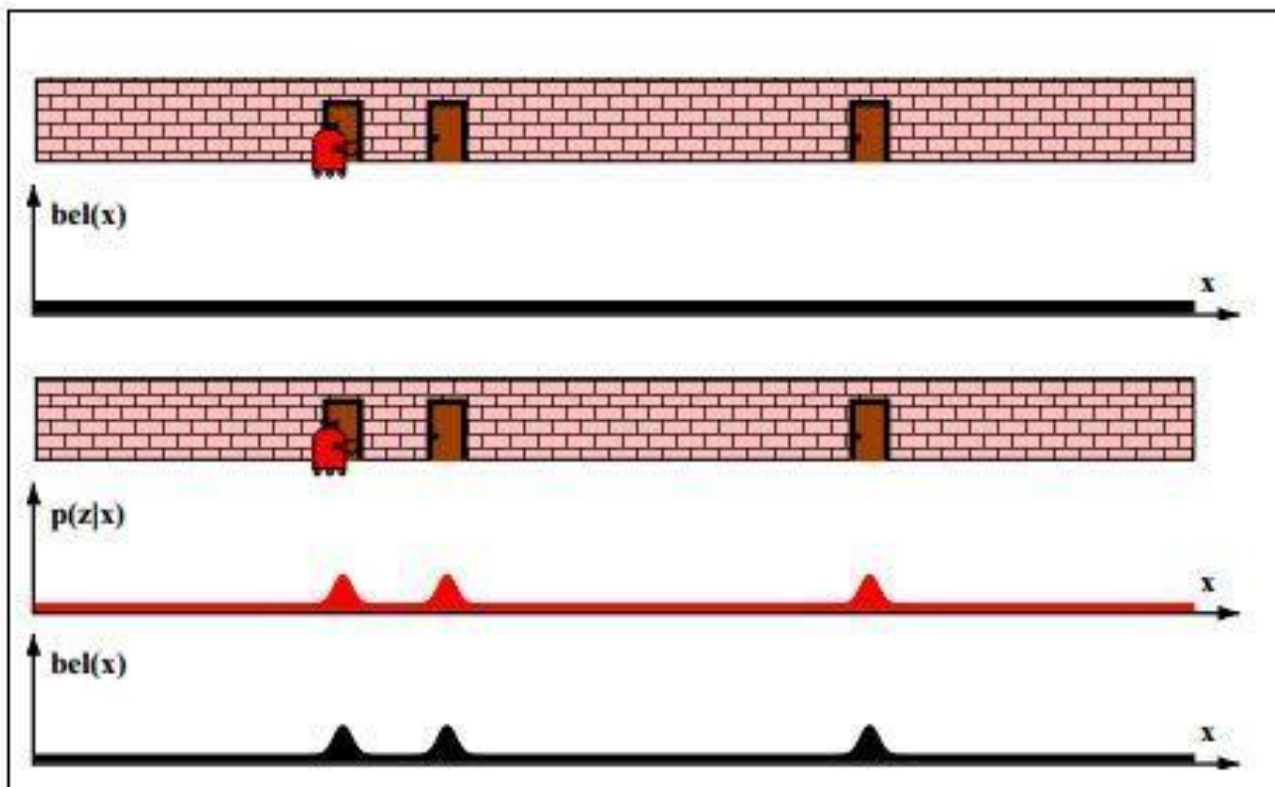
vSLAM

機器人視覺地圖定位&導航

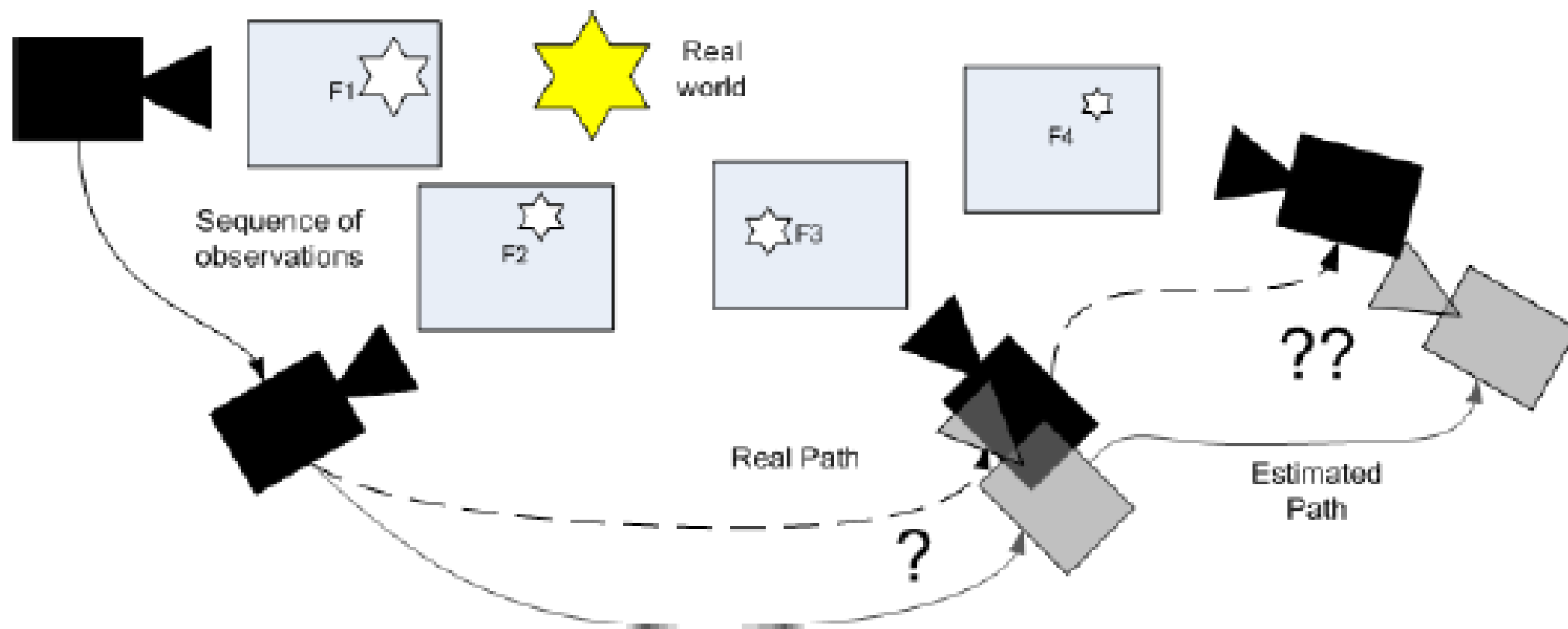
- 概念
- 視覺特徵簡介
- vSLAM



概念



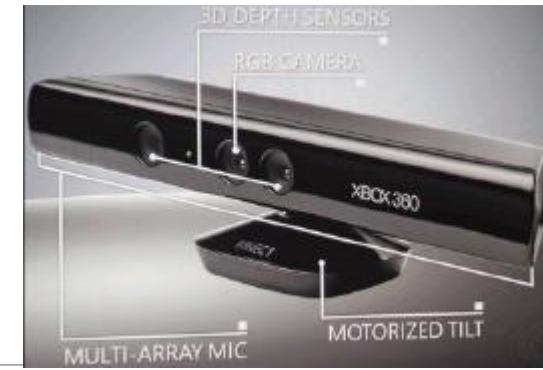
概念



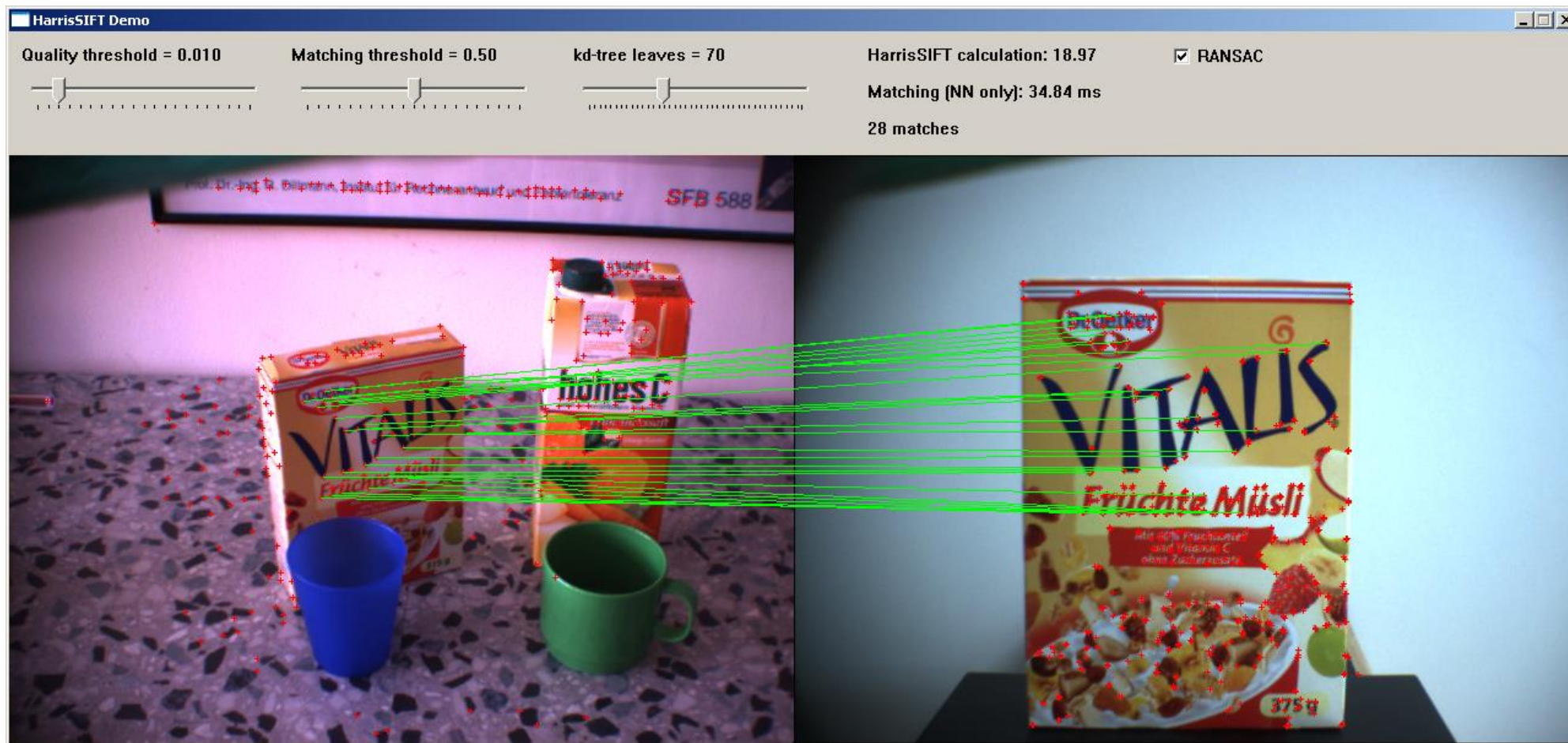
單眼視覺Monocular



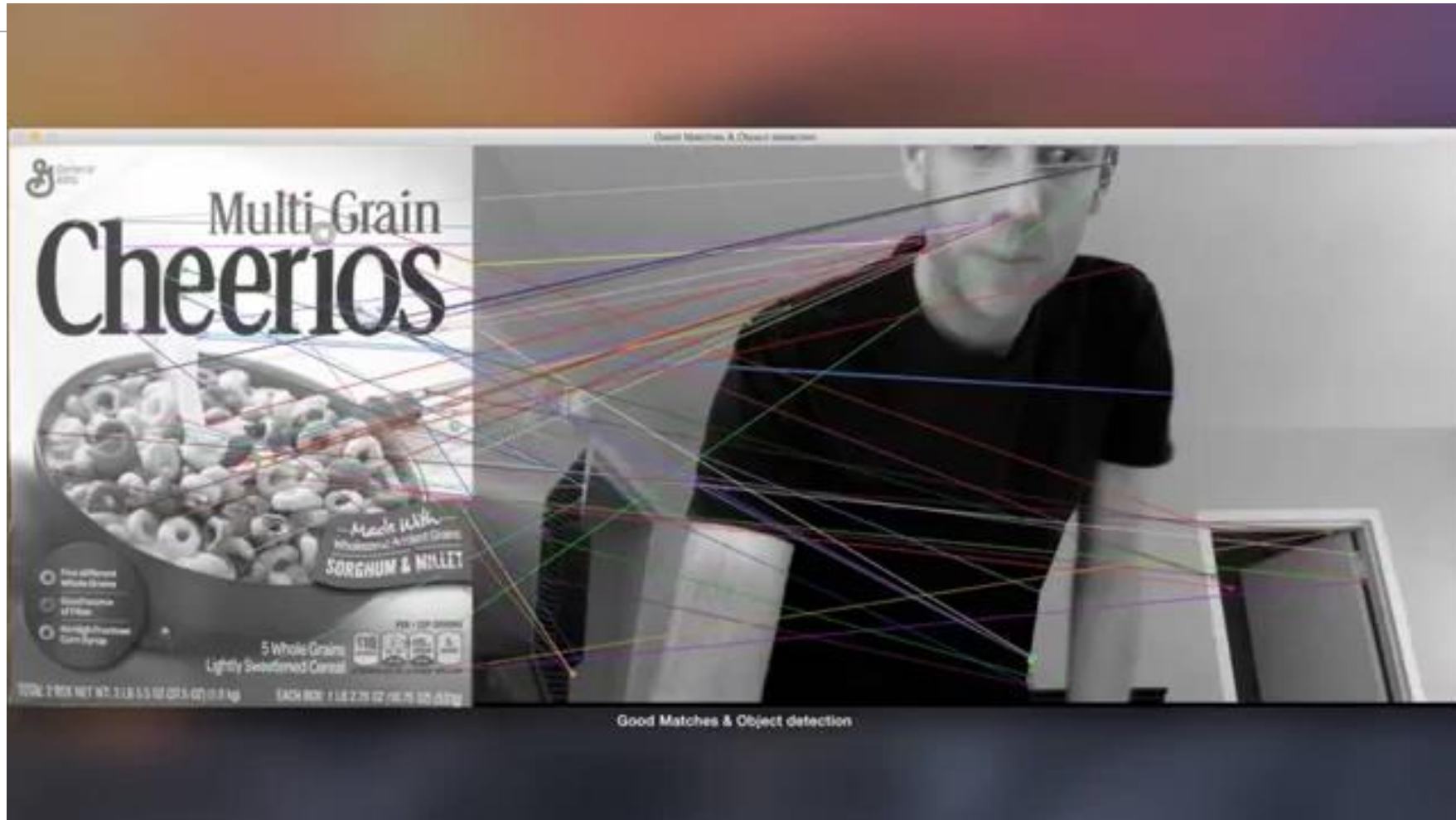
Sensor



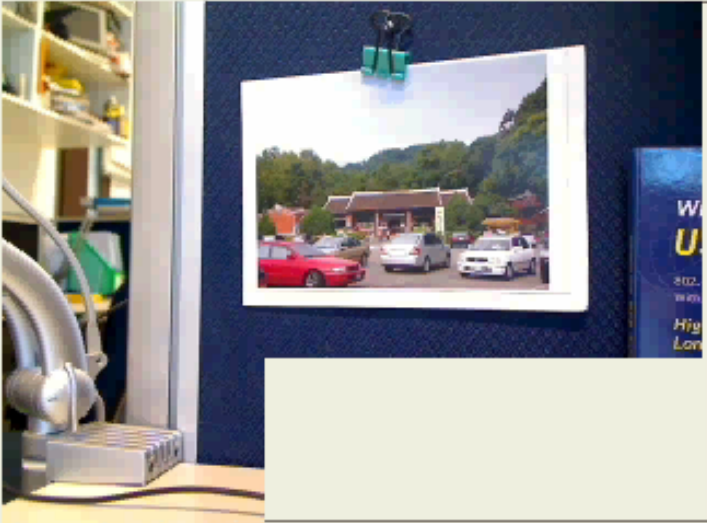
SIFT特徴



SIFT特徴



SIFT_UI



obj_comers)

c:\s\Car\SIFT\SIFT_UI_solo\Debug\SIFT_UI

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Left hand side<15>

Depth= 29.648241
Left hand side<13>

Depth= 30.412371
Left hand side<12>

Depth= 29.648241
Left hand side<15>

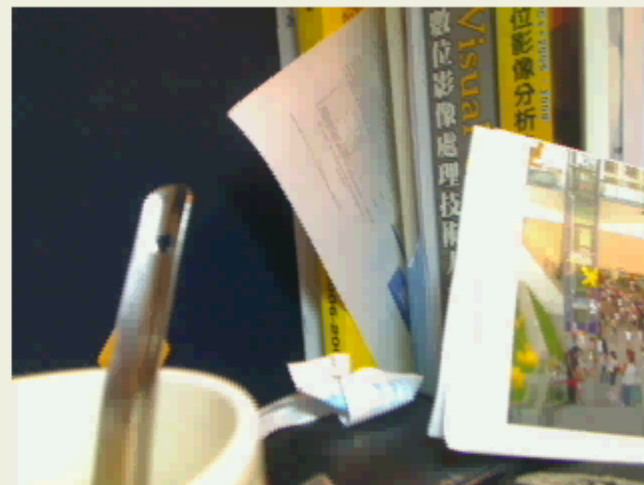
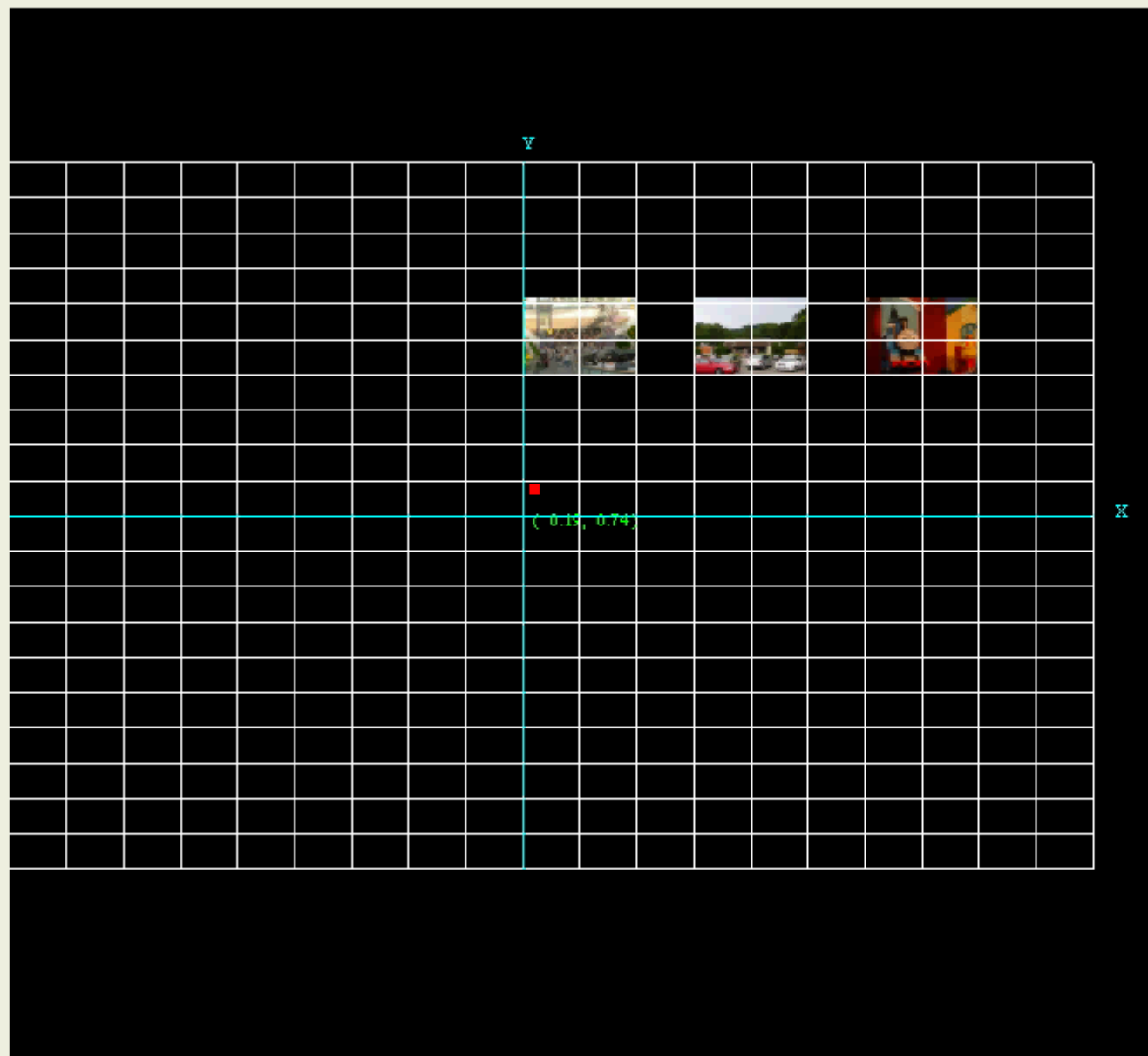
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Left hand side<16>

Depth= 29.949239
Left hand side<15>

Message

(0.92, -0.41)

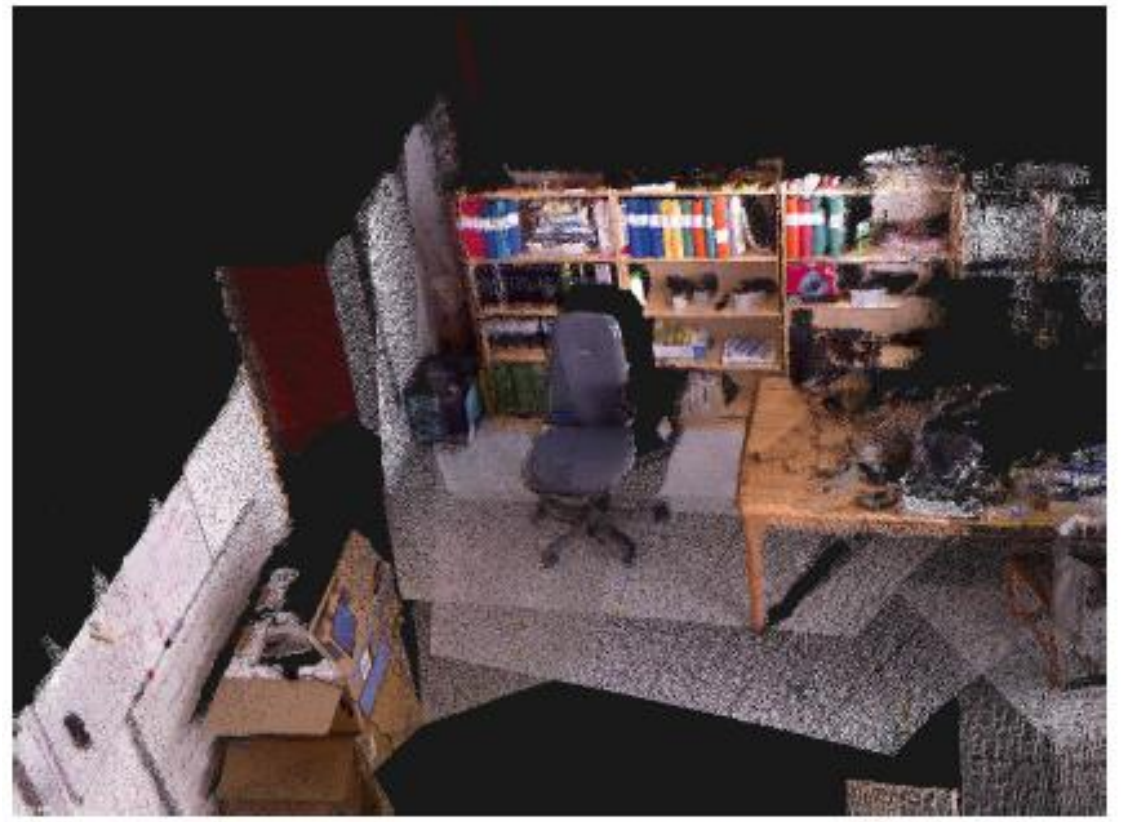
1.080925



RGBD-SLAM



(a) from initial graph



(b) from optimized graph

RTAB-Map

Online Simultaneous Localization and Mapping
with
RTAB-Map and TORO on ROS

Mathieu Labbé

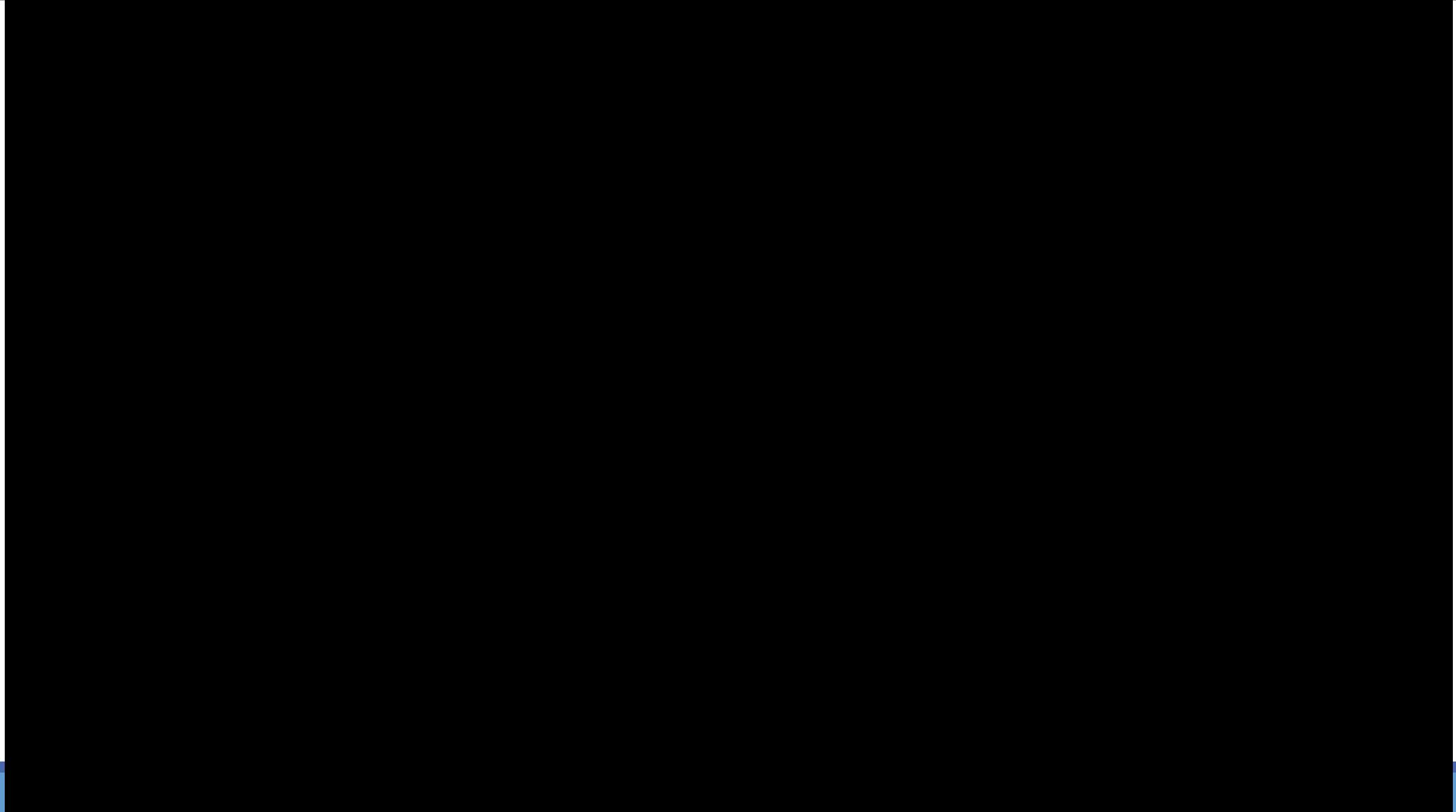
www.rtabmap.googlecode.com



IntRoLab
UNIVERSITÉ DE
SHERBROOKE

January 2013

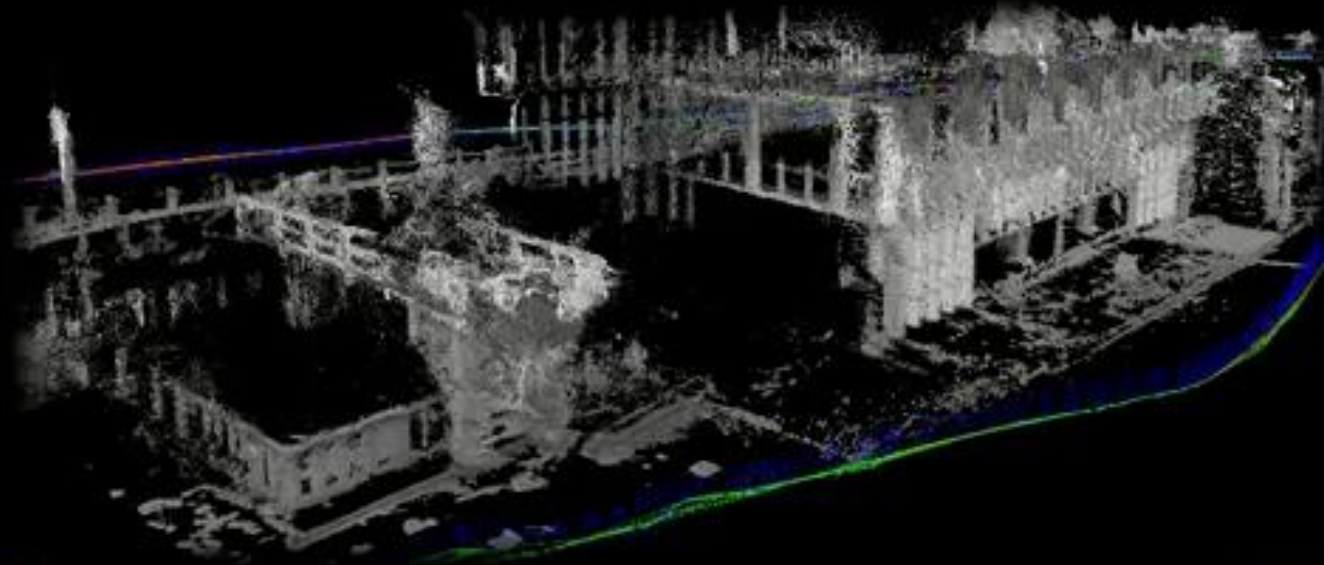
RTAB-Map



LSD-SLAM

LSD-SLAM: Large-Scale Direct Monocular SLAM

Jakob Engel, Thomas Schöps, Daniel Cremers
ECCV 2014, Zurich



Computer Vision Group
Department of Computer Science
Technical University of Munich





vSLAM模組 應用

雙足機器人-vSLAM

Visual Servoing and SLAM
CNRS-AIST JRL
29th of October 2013
Tsukuba, Japan



Australian
National
University

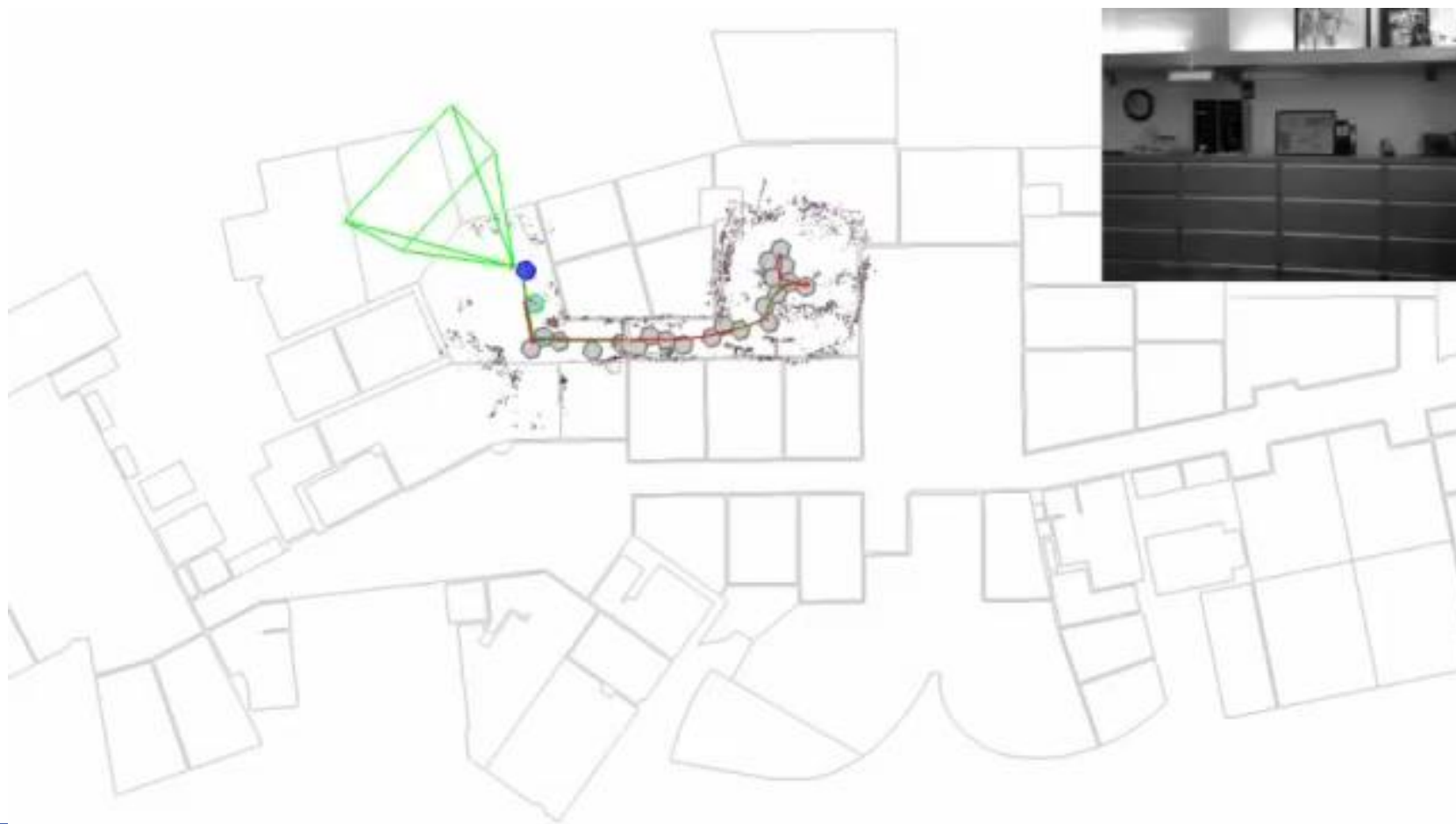
Graceful Degradation of Inertial-Kinect for MAV Navigation in Outdoor Cluttered Environment

Usman Qayyum, Josiah Khor and Jonghyuk Kim

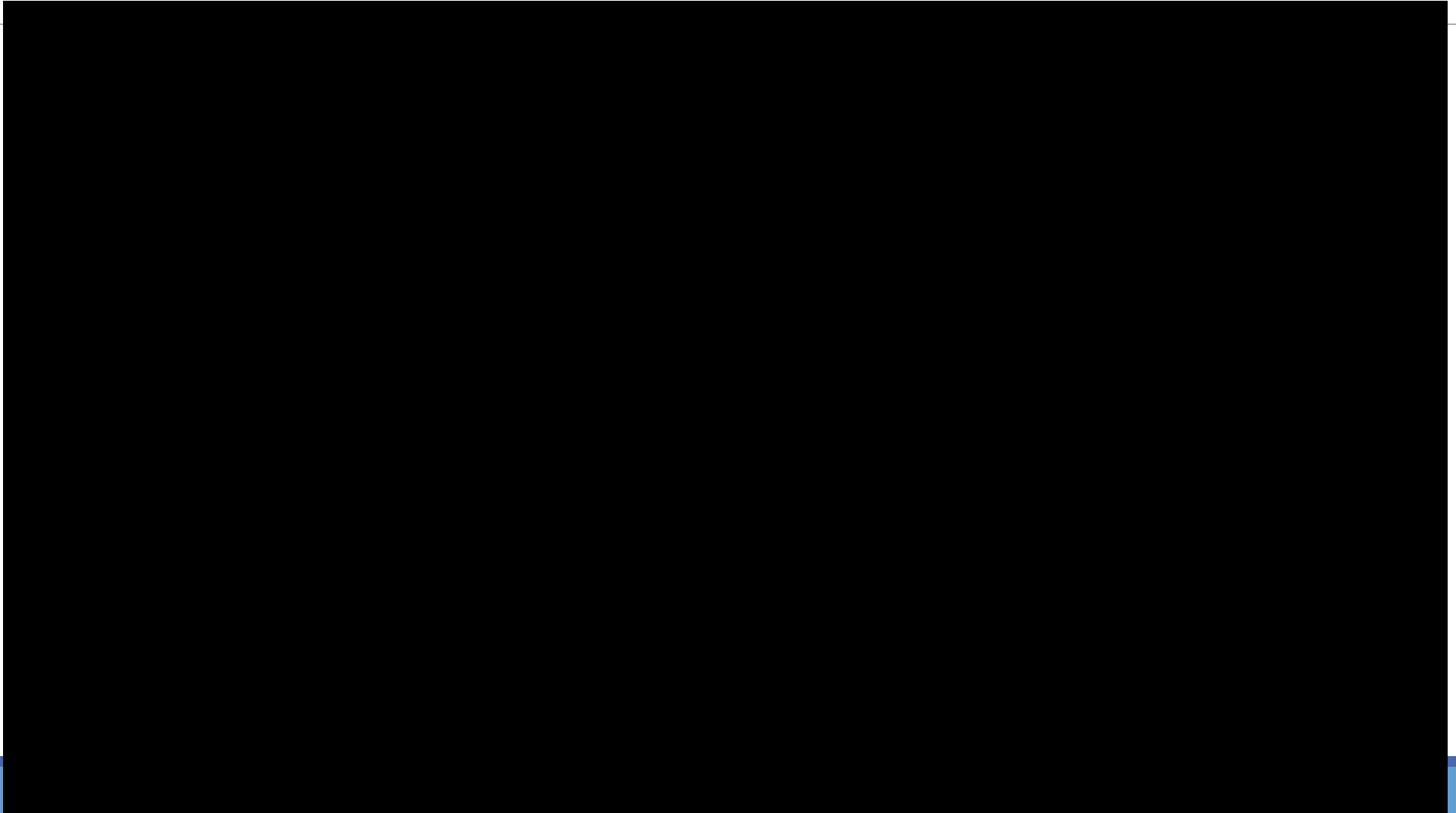
場景重建

Real-time Monocular Scene
Reconstruction
in a Public Environment
(Home Improvement Store)

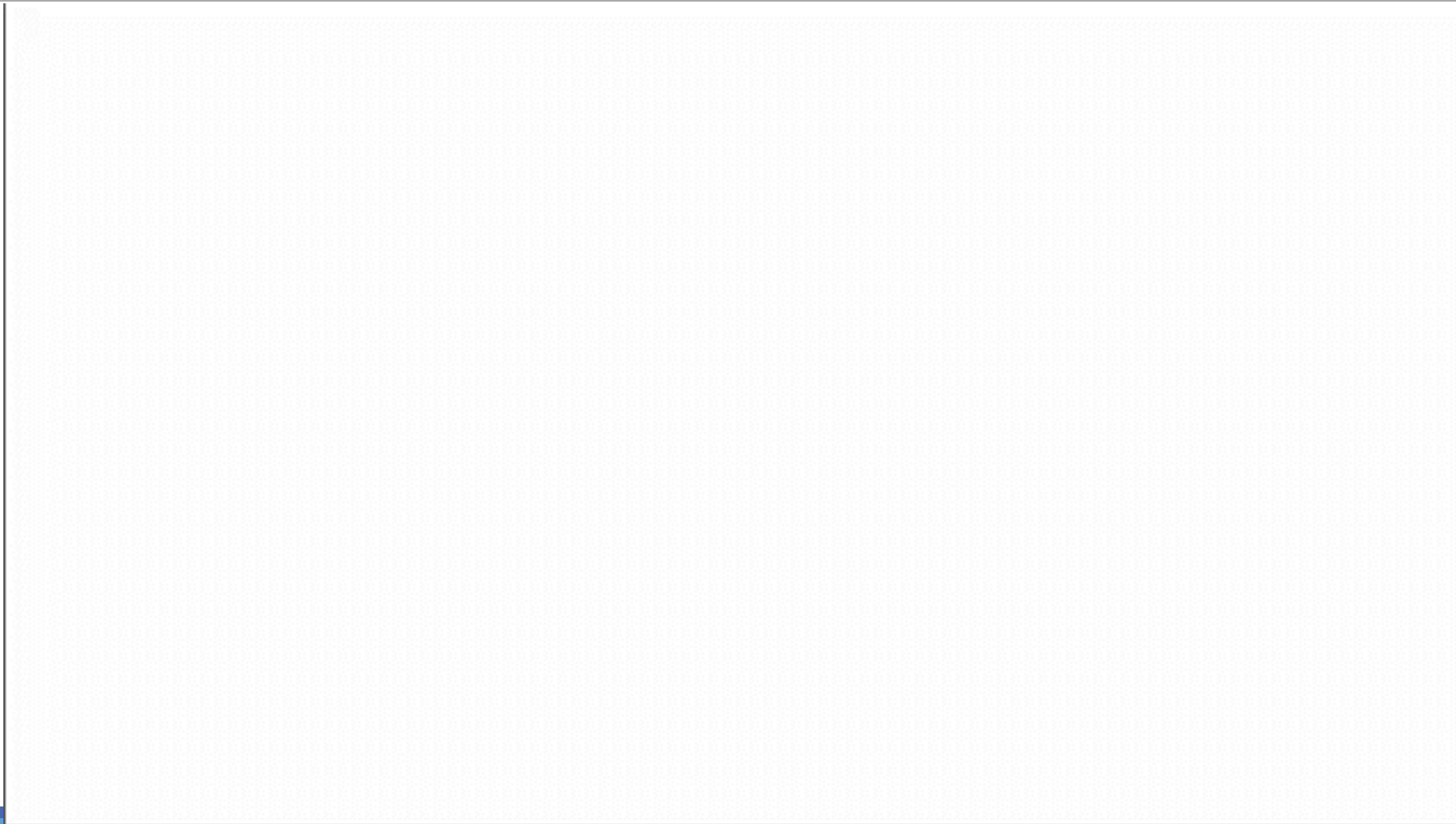
場景重建



Google 自動導航車



Google自動導航車



工廠自動化



Service Robot

定位與導航系統-智慧導航系統



Thanks for your
attentions !

