

# WP2: MS2.4: Vision for the final prototype

Tomáš Svoboda, [svobodat@fel.cvut.cz](mailto:svobodat@fel.cvut.cz)

center for machine perception, department of cybernetics  
faculty of electrical engineering, czech technical university

March 20, 2013



# Milestone MS2.4

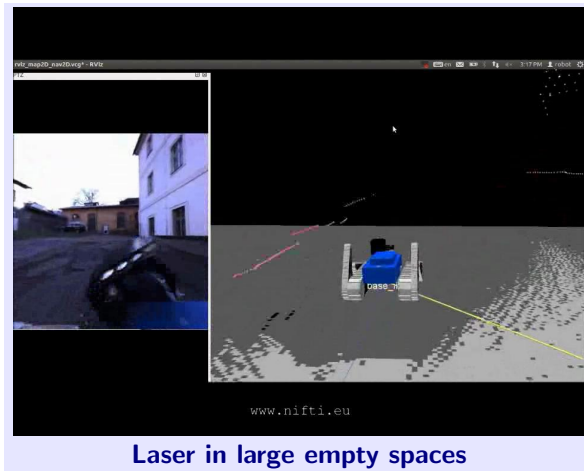
excepts from the description:

- ▶ ... efforts in all tasks will be concentrated towards the best performance of the final prototype ...
- ▶ ... scaling to more difficult situations ...

outdoors, large spaces, long term, ...

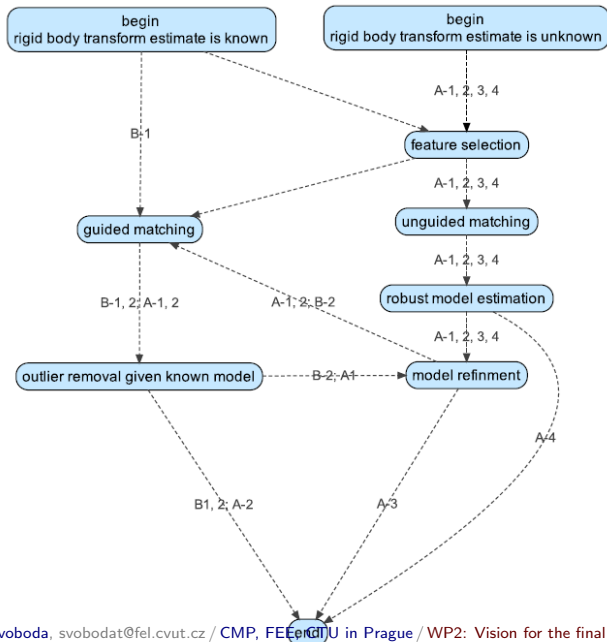


# Going to larger spaces

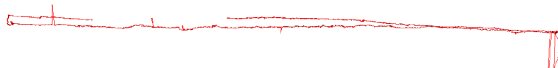
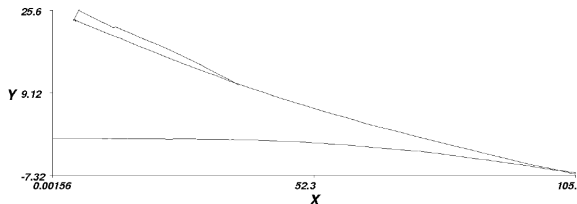


Laser in large empty spaces

# Visual Odometry (LB3)



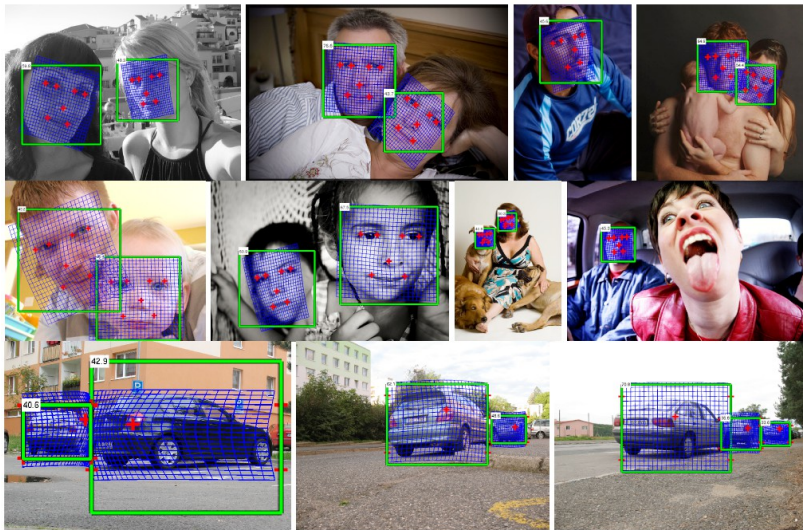
# Visual Odometry (LB3)



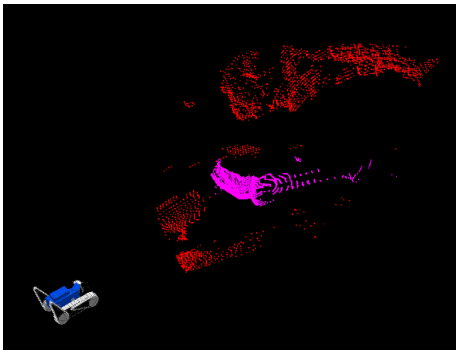
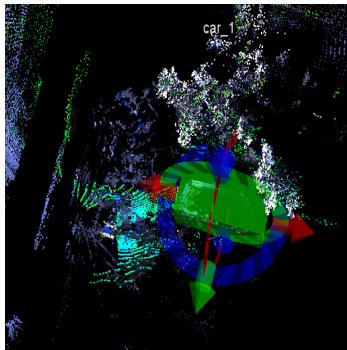
# Visual Compass



# Deformable visual object detector

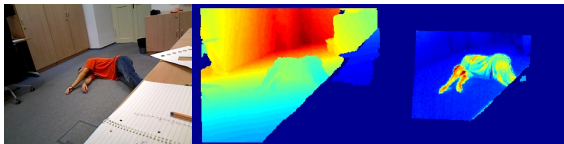


# 3D detector

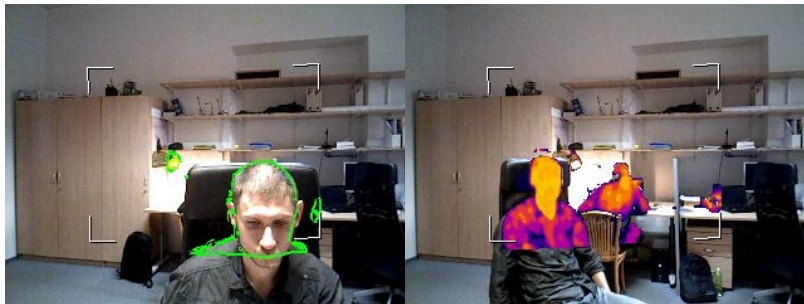




# Combining visual, depth and thermal data

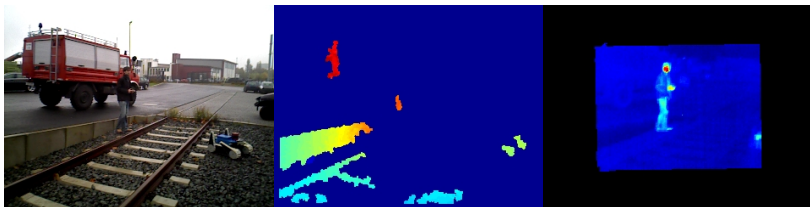


# Victim Detection, pixel-wise classifier



- ▶ clothes get colder outdoor, skin not affected
- ▶ bi-modal pixel-wise classifier

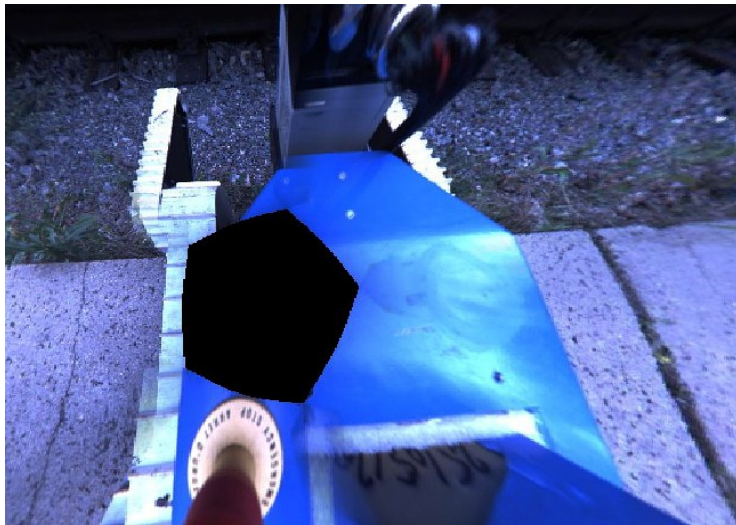
# No depth from Kinect outside



# perfecting Virtual Camera



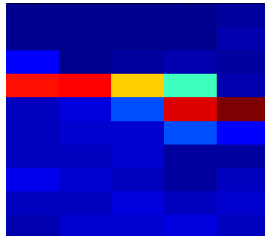
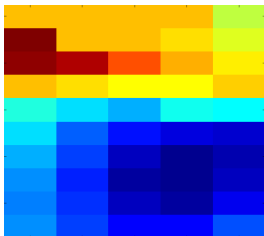
# Virtual Camera - bird's view



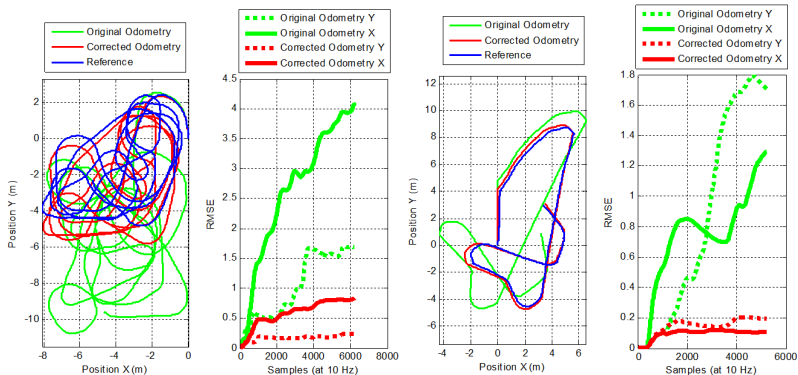
# Virtual Camera - close up



# Terrain perception for automated robot morphology



# Improving odometry by terrain recognition



IMU data mapped onto correction coefficients  
(learned regression function)



# Filtering all together

Global position estimator based on:

- ▶ odometry
- ▶ IMU data
- ▶ visual odometry
- ▶ ICP mapper
- ▶ . . .



# summary I: Localization

- ▶ close collaboration with WP1
- ▶ visual odometry, compass
- ▶ filtering all



# summary II: victim localization

- ▶ thermal imaging
- ▶ possibly with depth



# summary III: terrain perception

- ▶ focused on automatic robot morphology (WP5,WP6)
- ▶ learning from data
- ▶ mainly on depth data

