

# Linux-based Laser-following Robot with Stereo Vision

by Paul Marks



# Goals

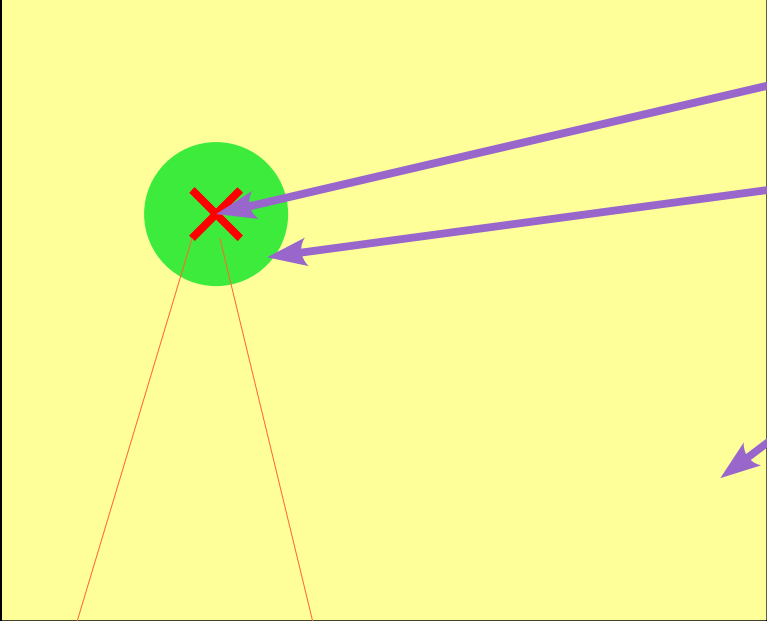
- Robot should locate and follow the red dot from a laser pointer
  - Use two cameras to estimate the dot's proximity and stop before hitting a wall
  - Run on a laptop computer with the Gentoo Linux operating system
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# Hardware

- Logitech Quickcam Orbit MP
- ER1 Robot Chassis
- IBM Thinkpad X41 Tablet



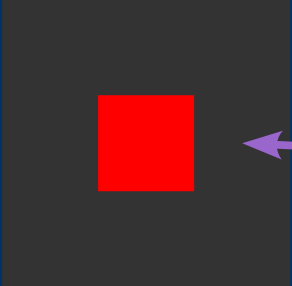
# Laser Tracking



Location from previous frame

Proximity Region

Motion Detection Region

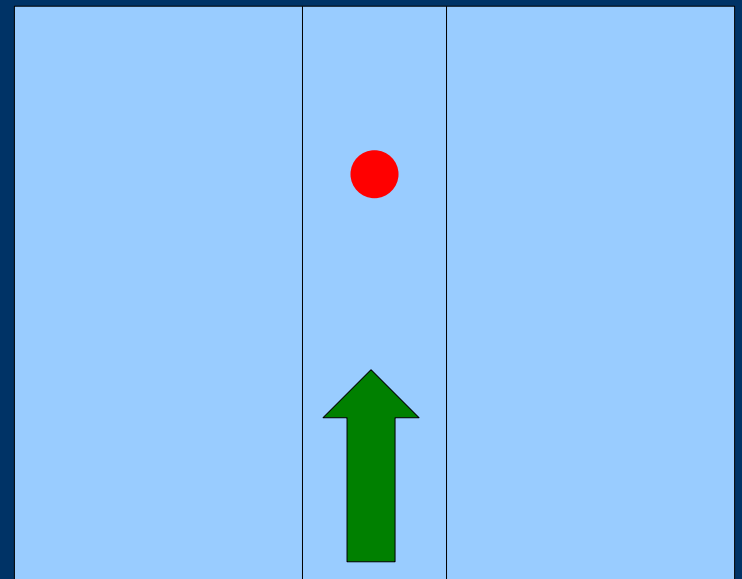
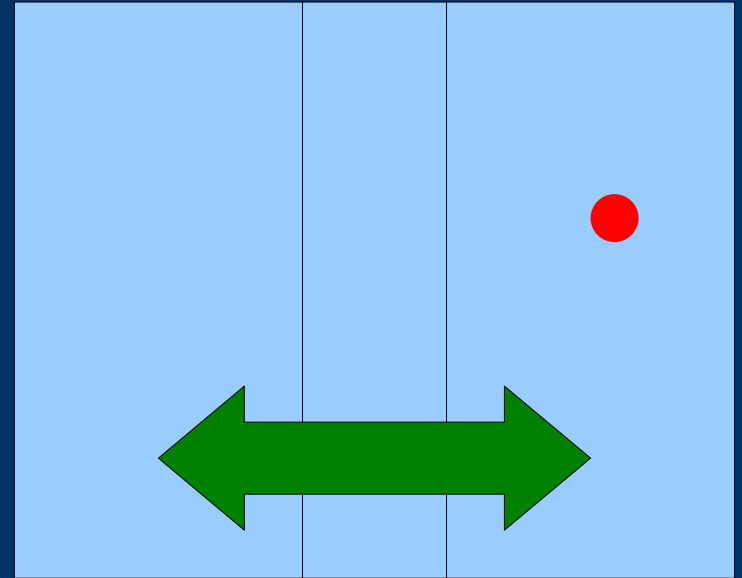


High-contrast Mask



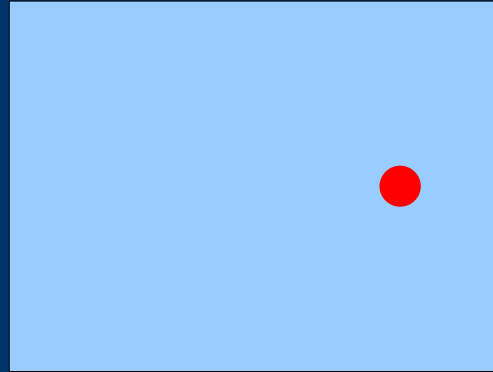
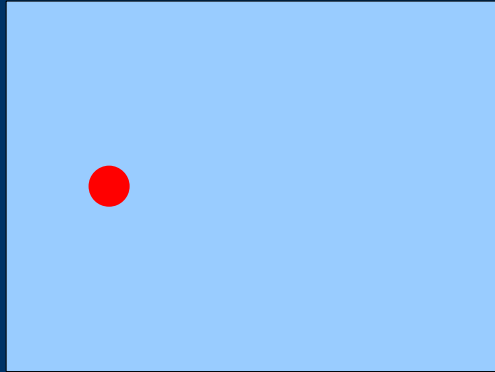
# Motor Control

- Rotate left/right as necessary to bring the dot to the center.
- While dot is in the center, step forward until distance limit is reached.

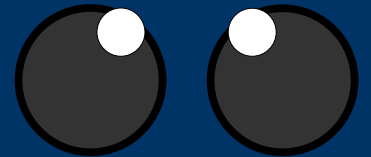
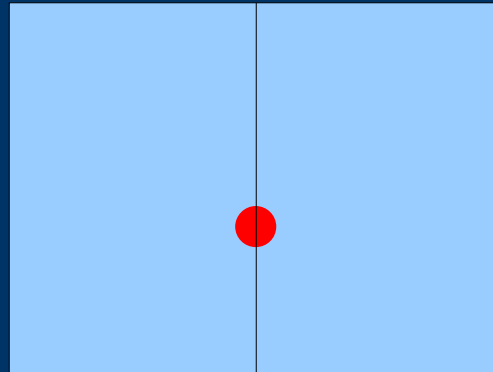
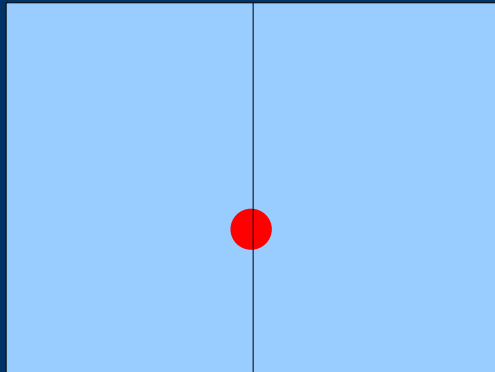


# Distance Limiting

Far  
 $x_2 > x_1$



Near  
 $x_2 \leq x_1$



# *Potential Future Work*

- Use of stereo image analysis to construct a live 3D depth map
- Autonomous robot navigation



# References

Klette, Schluns, Koschan. Computer Vision: Three-Dimensional Data from Images. Singapore: Springer-Verlag, 1998

Ballard, Brown. Computer Vision. Prentice Hall, 1982.

*Demo*

