Neural Network Vision for Robotic Navigation

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Autonomous Mobile Robots (AMRs)

Some uses:

- Disarm bombs
- Explore hostile environments (volcanoes, other planets)
- Transport materials
Example AMRs

- CMU’s ALVINN (Autonomous Land Vehicle In a Neural Network)
- NASA’s MER (Mars Exploration Rovers)
- NASA’s Dante
- CMU’s Boss
ALVINN (1991)
ALVINN: Architecture

- Single hidden layer back-propagation
- Input: 30x32 unit image
- Output: Linear representation of direction

Figure 2: ALVINN Architecture
ALVINN: Training

- Observes human driver
  - ~2 minutes to learn a new type of road
- Steers in direction between the 2 most active output units
  - Gaussian interpolation
My Future Implementation

- Create neural network based on ALVINN’s architecture
- Train on 30 road images of varying curvature
- Test on individual road images
Picture/Video Sources

http://m1.i.pbase.com/o4/35/11435/1/52993991.r130f034.jpg


https://www.youtube.com/watch?v=0GXuqw3cgwU

http://ak.picdn.net/shutterstock/videos/3928358/preview/stock-footage-driving-a-car-on-a-country-road-pov-point-of-view-front-windshield-day.jpg

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