A ‘Smarter’ Computer Controlled Car

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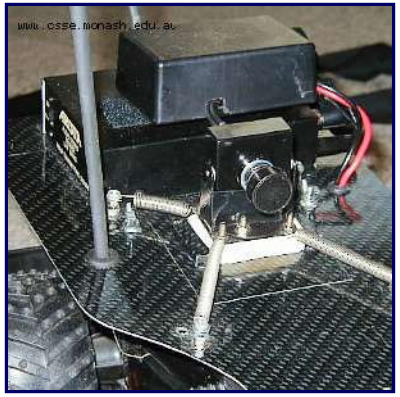
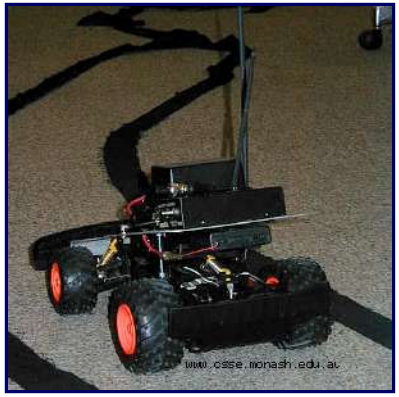
Presentation Plan

- background: the concept of a CCC
- project aims
- progress & the issues i face
- some possible solutions
- concluding thoughts

The Concept

- RC vehicle
- vision based control
- ‘intelligent’ autonomous operation





The Aims

- keep features of the car
  - solving main goal - driving
  - basic setup
- new additions: build upon basics
  - more accurate control
  - speed sensor, mirrors
  - software & hardware problem

Other Work

- Mercedes-Benz
  - "following" prototype (Franke, 1999)
- Carnegie Mellon robotics institute
  - full robust autonomous driving (Thorpe, 1997)
- CyCab
  - paradigm shift

The Issues

- accurate control
- speed detection
- edge detection
- field of view
- useful function

Accurate Control

- problem: turning
  - current vehicle capabilities
- solution: a new vehicle
  - need to rewrite software
- a faster computer

Speed Detection

- also a factor in accurate control
- 2 problems:
  - detection
  - transmission

Detection

- solutions:
  - hardware solution
    - magnetic (Gilbert, 2001)
    - optical – 1st prototype (Jones, 1999)
  - software solution
    - object tracking / flow

Transmission

- solutions:
  - visual
  - audio
  - separate from transmitter

Edge Detection

- current software
  - 1999: scan line
  - 2000: auto nodes
- improvements
  - does it meet the new criteria?

Field of View

- car has only 90 degree vision
- car only sees in front
- car only uses a small part of this
- solutions:
  - mirrors
  - extra cameras

Current Progress

- re-creating previous results
  - need previous setup to build on
- testing prototype speed detector
  - optical device (vehicle independent)

Useful Function

- concluding thoughts on the car
  - what good is it really?
    - ‘racing mode?’
    - as an experimental test base
  - applications
    - automobile industry ($$$)
    - fun

References

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- Magneto-Resistive Wheel Speed Sensors
  D Gilbert. *AutoInc. Magazine* vol. 49, © ASA 2001
- Mobile Robots: Inspiration to Implementation
  J Jones & A Flynn. Natick, 1999

Thank You

Any Questions ?