The Vision Laboratory
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Projects

CMU Direct-Drive Arm II

- Arm Construction
  6 d.o.f.
  brushless DC torque motors
  modular design

- Arm Control
  totally digital control
  M68000-Multibus system for real-time control with TI320 joint processors
  Marinco array processor for dynamics/kinematics computation

- Robot Programming
  3D model-based programming language (CMU/Franz LISP based)
  robot simulator with 3D graphics
  PADL-2 (Unix version) Solid modeling

3D Vision

- Proximity Sensor
  multi-light source
  surface position and orientation
  versatile material surface

- 3D Shape Recognition
  real-time rangedata acquisition system
  shape constraint precompilation method
  fast recognition of objects with arbitrary orientation position
  shape specification by learning or solid-modeling
Facilities

VAX 11/750
- 4 Mbyte Memory
- 400 Mbyte Disk
- Berkeley Unix 4.1
- C, Franzlisp
- PADL2 Solid Modeling System
- Lisp-based interactive Robot Programming Language

IRIS 3D Graphics System
- Unix 4.2, 1.5 Mbyte Memory, 46 Mbyte disk, (1024 x 768 Visible)
- 1024 x 1024 Color display
- Geometry Engine to perform 3D transformations of 65 thousand points for real-time 3D display
- Graphics subroutines

3D Light-Stripe Range Sensor
- speed: 3,000 3D points/sec
- resolution: 1 mm
- accuracy: 1/10,000 field of view
- range: (typical) 8 ft.

Proximity Sensor
- can measure positions and orientations of surface
- precision: 0.1 mm (position), 1° (orientation)
- speed: 1000 measurements/sec