Viper Challenges and Research Opportunities

Sept. 18th, 2001

Viper goals

- Speed part design and redesign
- Integrate history, context, and intent into the design process
- High–powered interface for
  - model navigation
  - access to multiple sources of data
  - agent–based design tools

Viper Design Cycle

- Model acquisition
- Simulation, Analysis, (Re)Design
- Process Planning and Fabrication

Model Acquisition

- 2D drawing analysis
  - Annotate images (Lavanya)
  - Useful models from images (Jim)
  - Work with Hampton?
- 3D acquisition from exemplars
  - coarse framework for detailed modeling
  - fine detail for feature extraction

Model Acquisition (cont.)

- DesignWeb
  - framework for data/complexity management
- External datasets
  - converting from low–level geometry representations

Simulation, Analysis, (Re)Design

- DesignWeb
- Simulation
  - geometric computation, animation, design for assembly, ergonomics, manufacture
- Agents
  - Engineering Assistants: Detailing
  - Management: Alarms, Wizards
- Immersive and Tele UI's
- Design Interface

Process Planning and Fabrication

- Fixturing
- Manufacture analysis
  - agents to suggest options
- Molds
  - geometric computation : parting planes, etc
  - mold flow

Formula Car


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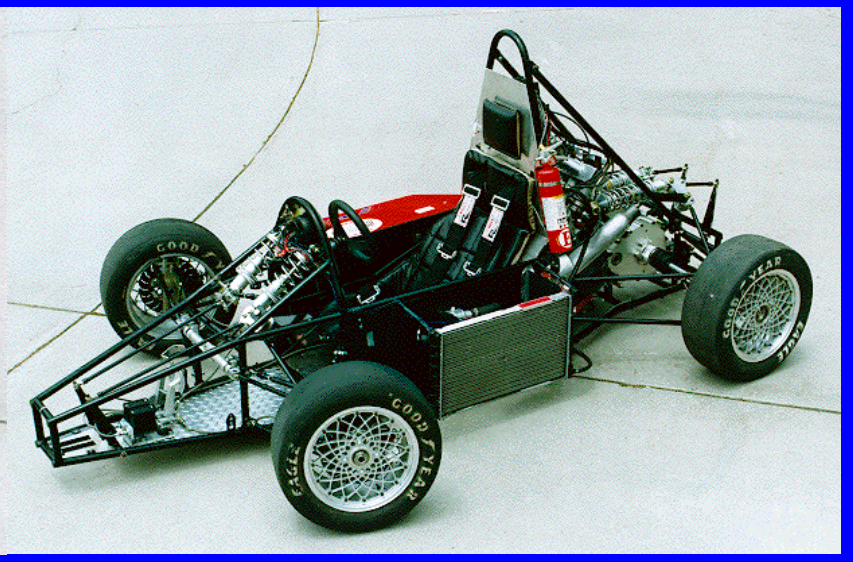
JENSON
REFRIGERATION
PLAZA CYCLE
University of Utah
GOODYEAR
EAGLE


GOODYEAR
EAGLE

Formula Car Characteristics

- Multi–year history
- 10 person team with sub–groups
- Multiple systems
  - mechanical, electrical, cooling, acoustic
- Multiple CAD packages and sketches
- Analysis tools used
- Last minute modifications done on site
- Complicated rule set
- Parts get built