Update on the Soar/Games Project

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What is the Soar/Games Project?

- Use Soar to control agents in computer games
  - Soar serves at the AI Engine
- Builds on previous Soar systems
  - TacAir-Soar, TagSoar, TankSoar, Eaters
- Two part process
  - Develop an interface between Soar and the Game
  - Write productions to control the agent
- Soar has been interfaced to two games
  - Quake II and Descent 3
  - SocketIO provides a common interface
- Agents are currently being developed

Soar/Games Project

- Build an AI Engine around the Soar AI architecture
  - Soar/Quake II project
  - Soar/Descent 3 project

Soar/Quake AI

Interface DLL

Socket

Sensor Data →

← Actions

AI Engine (Soar)

Knowledge Files
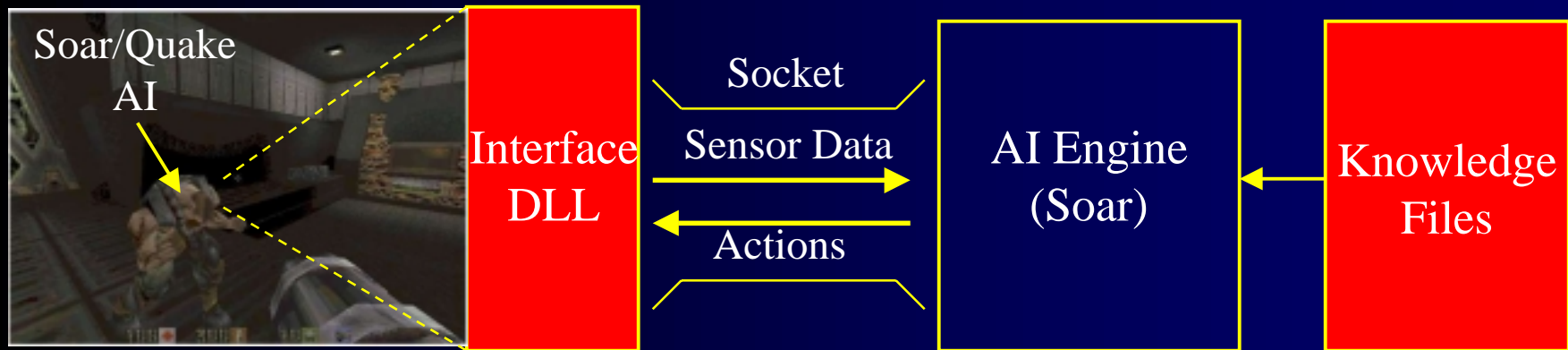
- Artificial Intelligence Research Goals
  - New research domains and issues
  - Develop a relationship with game development companies

Soar/Games Project

- Build an AI Engine around the Soar AI architecture
  - Soar/Quake II project
  - Soar/Descent 3 project

Soar/Descent
AI

| Interface DLL | | Socket
Sensor Data →
← Actions | | AI Engine (Soar) | | ← Knowledge Files |
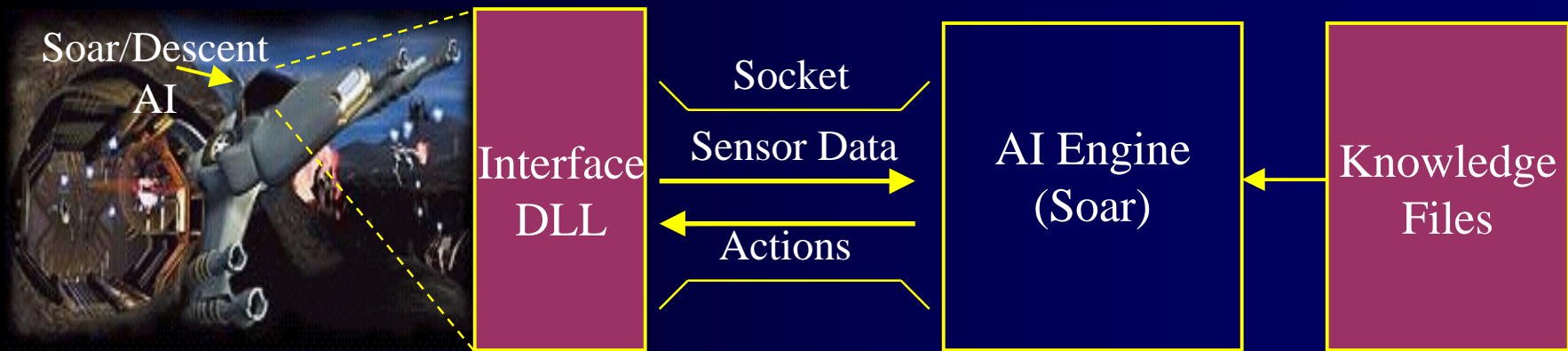
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Soar Engine Interface

- ## Soar/Quake II
  - ### 80 Sensors
    - Agent
    - Enemies
    - Objects
    - Path nodes
    - Map Info
  - ### 20 Actions
    - Movement
    - Weapons
    - Inventory

Enemy Information
```
^name [string]
^skin [string]
^model [string]
^health [int]
^deadflag [string]
^weapon [string]
^team [string]
^velocity
  ^x [float]
  ^y [float]
  ^z [float]
^range[float]
^angle-off
  ^h [float]
  ^v [float]
^aspect
  ^h [float]
  ^v [float]
^sensor
  ^visible [bool]
  ^infront [bool]
```

Movement Actions
```
^move [forward/off/backward]
^sidestep [left/off/right]
^turn [left/off/right]
^face [degrees]
^climb [up/off/down]
^aim [degrees]
^look [up/off/down]
^jump [yes/no]
^centerview [yes/no]
^run [on/off]
```

Weapon Control Actions
```
^change-weapon [weapon]
^continuousfire [on/off]
^fireonce [yes/no]
```

Soar Engine Advantages

- Goal Directed
  - AI's seem smart because they're achieving goals
- Context Sensitive
  - Actions are consistent with past behavior and sensor data
- Flexible
  - Multiple strategies, tactics and behaviors
- Realistic
  - Similar to real human players
- Reactive
- Easy to Develop

What's happened this year?

- Quake II interface completely rewritten
  - Soar agent receives the same information as a human player
- Descent 3 interface completely rewritten
  - Now uses Descent 3's official API
- Presented at the 1999 Game Developer's Conference
  - Developing an Artificial Intelligence Behavior Engine
- Co-organized the AAAI Spring Symposium on AI and Computer Games
- Map Visualization Tool developed by Karen Coulter
- New website
  - ai.eecs.umich.edu/~soarbot/

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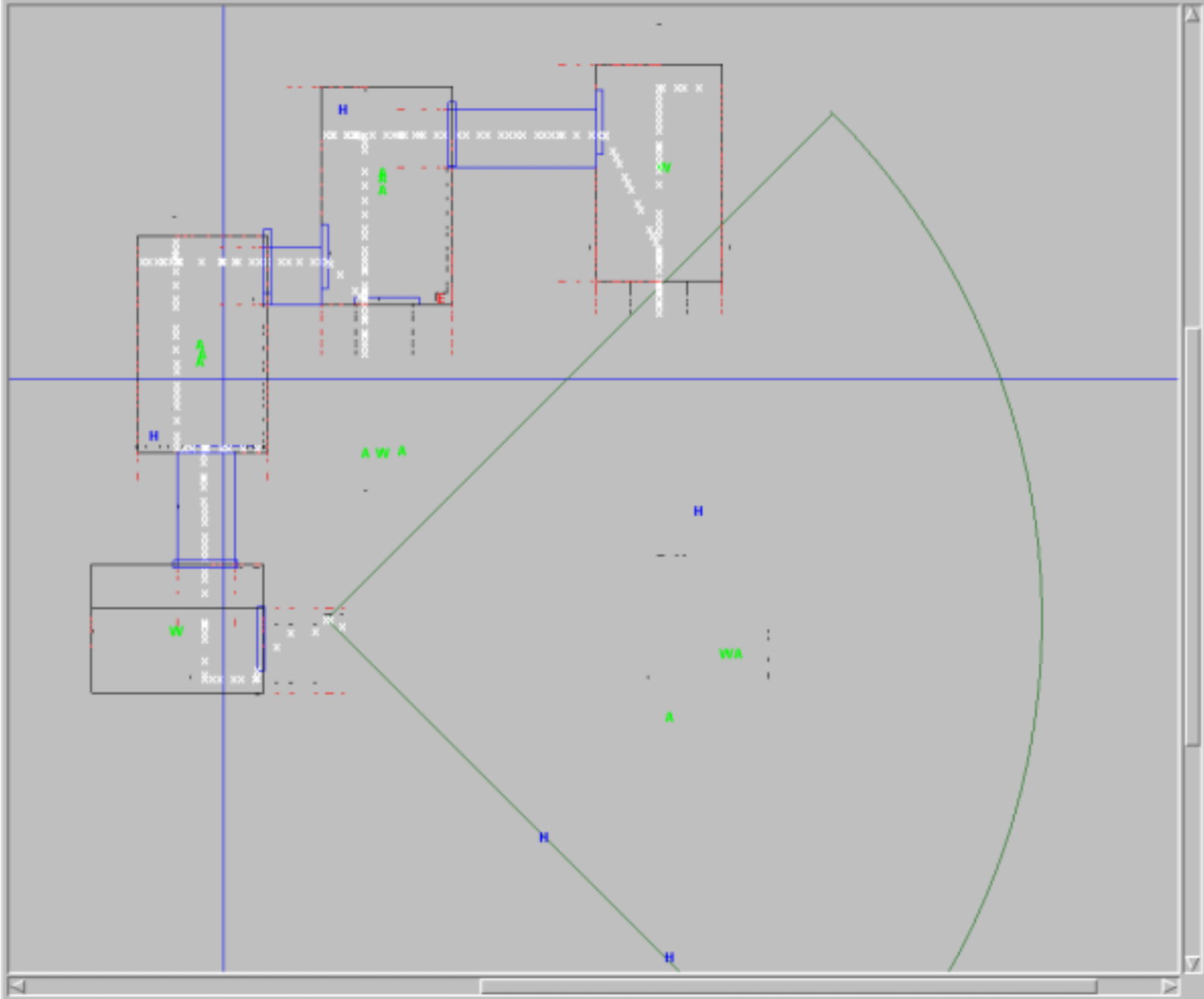
Current Status

- Quake II Interface: beta release
  - Looking for more Soar programmers to develop agents
  - Still some hard problems to resolve
    - Projectiles, Sounds, Map representation, Moving platforms, Lava
- Quake II Agents: in progress
  - Destroyerbot (John)
    - 500 productions, focus on mapping
  - Simplebot (Mike)
    - 140 productions, focus on combat
- Descent 3 Interface: alpha release
  - Ready to be tested
  - Also has some issues remaining

What's going on this summer

- Intelligent Systems Demo at AAAI
  - End of July in Orlando
  - Quake II and Descent 3
- More complex agents being developed
  - Finish Simplebot and Destroyerbot
- Interface to Half-Life (Steve Houchard)
- ViaVoice speech recognition system (Ben Houchard)
  - Human Lieutenant commands 3-4 Soar Privates
- Adventure Game using Quake II engine (Amy Unger)
- Demo at Activision (Quake II publisher)

Future Plans

- Public Release of Quake and Descent interfaces
  - with sample Soar agents
- Soar/Quakebot programming contest
- Experiment with Soar-Lite
- Explore reusing knowledge between games
  - Game independent, genre specific knowledge
- Explore other game genres
  - Adventure games
  - Strategy games (Dark Reign, Battlezone)
- Evaluate Soar as a game AI programming language
- Develop relationships with game companies

Nuggets and Coal

- Nuggets
  - Interfaces are up and working, realistic and somewhat robust
  - Soar is becoming known in the computer game community
  - Work has begun in lots of exciting new directions
  - Soar/Games is suggesting new research topics
    - Knowledge reuse
    - Evaluate Soar as an agent programming language

- Coal
  - Agent development is hard
  - No new demo
    - unless John is the greatest Soar programmer in all the land

Acknowledgement

- Steve Houchard, Joe Hartford: Quake II interface
- Russ Tedrake, Josh Buckman, Damien Neff: Descent 3 interface
- Kurt Steinkraus: SocketIO

- Outrage Entertainment
  - Allowing us to work with Descent 3
  - Finding time to assist and support our work

- id software for providing a code level interface