HIGH-IMPACT FUTURE RESEARCH DIRECTIONS
FOR ARTIFICIAL INTELLIGENCE

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Panelists:
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Across much of the field of AI, a gap exists between research scientists seeking to extend the frontiers of knowledge and practitioners in Industry and government seeking to solve important applied problems using AI technology. Addressing this gap, this panel will discuss significant applications of the 1990's whose development will depend on advances in AI beyond the horizon of today's knowledge. The goal of the panel is to present for consideration and discussion significant technical problems whose solution will enable the development of dramatic applications with the potential for high social or economic impact.

During the past 15 years, significant progress in many areas of AI has been achieved through the focused efforts of researchers on benchmark, applied problems. During the latter half of the 1970's, speech and language understanding technology and work on problem-solving architectures advanced as a result of the DARPA Speech Understanding Program. This program had the explicit target of working systems capable of accurate identification of 90% of human-generated utterances from a 1000-word vocabulary. Similarly, in the 1980's the Strategic Computing Program applications benchmarks have stimulated new research and results in vision and image processing, planning, and real-time knowledge processing.

Presentations by panelists will propose key technical issues and driving applications for the 1990s, selected to provide challenging research problems and subsequent dramatic applications successes. The target for results in proposed research areas will be 5-7 years with subsequent applications that could be fielded by 2000. Example applications might include real-time intelligent control and collision-avoidance systems for automobiles and aircraft, housekeeping robots, automated product design systems, personal electronic tutors, or instantaneous language translators for telephones.

The research challenges underlying these applications span a broad spectrum of substrate technologies. The supporting technologies to be discussed include natural language understanding, large knowledge-base representation and use, real-time knowledge systems, vision, and robotics.

Presentations by panelists will address several specific points:

- Application opportunities for the 1990's with the potential for significant impact on society.

- The technology barrier to be overcome during the next 5-7 years in order to enable development of the application (s).

- The current state of the relevant AI technology with respect to the barrier.

- Proposed research and development approaches to extend the state of the art beyond the technology barrier.