Stottler Henke
Smarter Software Solutions

Mission: Artificial Intelligence Research and Development

Stottler Henke applies artificial intelligence and other advanced software technologies to solve problems that defy solution using traditional approaches.

Stottler Henke Associates, Inc. was founded in 1988 as an artificial intelligence (AI) consulting and software development firm. Much of the firm's early work was applied research and specialized system development for NASA and other Government agencies. It has expanded its client base over the years to commercial enterprises in knowledge-intensive industries such as aerospace, manufacturing, electronics, retail, and health care.

Since its founding, Stottler Henke has embraced a practical, problem-solving philosophy—and, as a result, has successfully completed over 600 AI-oriented projects. It has developed expertise in five major application areas where intelligent systems are especially valuable: autonomous operations, planning and scheduling, education and training, knowledge management and discovery, and decision support.

In the course of its project work, the company has built several tool kits that it has used to streamline the development of intelligent systems—and, seeing an opportunity, has then packaged them as standalone commercial products, creating a new revenue stream and an opening to new markets. For example, in 1991 Stottler Henke developed and successfully marketed the industry-leading tool called ESTEEM, which enabled people to develop case-based reasoning applications without programming. The company has launched several other tools:

Products:

SimBionic®, a now open-source tool that speeds and simplifies the process of specifying intelligent monitoring and control behaviors within simulations, games, and real-time systems, without programming. Stottler Henke created SimBionic while building intelligent training systems for the U.S. Navy and Air Force. SimBionic is used by commercial training system developers and computer game designers who need to build extremely advanced simulations quickly and cost-effectively.

Aurora™, a sophisticated scheduling system that combines a variety of scheduling techniques, intelligent conflict resolution, and decision support to make scheduling faster and easier.

DataMontage™, a set Java software library that enables rapid visual analysis of complex, time-oriented data.

ReadOn!™, an intelligent tutoring system that teaches reading comprehension skills to adults by assessing and diagnosing each student's specific reading skill deficiencies and tailoring its instructions accordingly.

The Task Tutor Toolkit™, a set of Java software libraries and applications that let you create intelligent tutoring system scenarios quickly and easily without programming.

The SimVentive™ system, which provides all the tools you need to quickly create complete, Java-based training games and simulations.

TaskGuide™, which enables organizations to rapidly develop intelligent, electronic job aids that help users carry out complex procedural tasks quickly and accurately.

Solutions:

Stottler Henke systems help organizations schedule operations and allocate resources more effectively; train their employees more quickly and cost effectively; capture and apply institutional knowledge; improve decision making; and effectively develop intelligent software systems.

- **Intelligent Planning and Scheduling Systems**—apply heuristics and algorithms used by human experts to solve scheduling problems whose constraints are too complex for traditional optimization or dispatch rule techniques.

- **Intelligent Training Systems**—complement traditional classroom and computer-based training (CBT) software by letting students "learn by doing" using simulated scenarios. The systems apply *intelligent tutoring system (ITS)* techniques to infer each student's understanding (and misunderstanding) of relevant concepts and principles for his or her actions. ITSs select scenarios for each student that use concepts and principles that are not well understood in order to focus the student's time on those areas which require the most attention and practice.

- **Intelligent Knowledge Management & Discovery Systems**—capture the knowledge of in-house experts as rules, models, and case bases of previously encountered situations and solutions. These knowledge repositories enable advisory systems to help companies assess situations, diagnose and repair problems, design products and processes more quickly and consistently, extract valuable knowledge from large databases, and conduct comprehensive online research.

- **Autonomous Systems**—automate sense-making of sensor data through extracting high-level abstractions, correlating, and fusing; autonomously determine course of action and plan in response to dynamic and unexpected situations; and independently diagnose and correct for system and component failures.

Technology Expertise:

Stottler Henke is unique in the breadth of AI technologies it can employ to create software solutions: planning and scheduling, case-based reasoning, model-based reasoning, machine learning, computer vision, Bayesian networks, constraint satisfaction, adaptive training systems, data mining, etc. The company combines this AI expertise with broad skills in database design and application development, data visualization, object-oriented software development, statistical and time-series data analysis, and graphical user interface design. This breadth enables Stottler Henke to select and apply the most effective combination of techniques to address each client's individual needs.

Thanks to its conservative, rigorous project management, technical breadth (the company's expertise spans a wide range of AI techniques, which it often customizes or combines in unique ways for each specific client), application focus, and ability to see new commercial market opportunities—Stottler Henke has been profitable since its inception, and it has never sought outside investment. The company has grown from two to 40 people. In a White House ceremony, it received the Tibbetts Award for outstanding technical excellence and innovation.

Clients: Include companies in knowledge-intensive industries such as aerospace, manufacturing, electronics, retail, and health care. Government clients include the National Aeronautics and Space Administration (NASA), Department of Commerce, Department of Education, National Institutes of Health (NIH), National Science Foundation (NSF), U.S. Air Force, U.S. Army, and U.S. Navy.

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