



Intelligent Systems

"We achieve more than we know. We know more than we understand. We understand more than we can explain." - *Claude Bernard, 19th Century French scientific philosopher*

Science Fiction authors and moviemakers have had much more freedom to indulge their dreams and fantasies in this area. We often see instances of humanoid robots, smart cars, intelligent buildings - intelligent things limited in diversity only by our own imagination.

Studying Intelligent Systems and their evolution poses its own set of challenges for the experts in this area. Intelligent Systems pose challenges in evaluating problem solving ability - primarily related to defining and agreeing on definitions of intelligence and a set of metrics that could be used to compare performance of individual systems. Perhaps the most famous amongst such benchmarks is the **Turing test**. Newell and Albus have also proposed their own definitions of intelligence and its set of evaluation metrics for systems. However, the most important question still remains unanswered - **To what extent can such systems' performance be compared against human capabilities?**

Although Intelligent Systems originated in cybernetics, they have now grown into independent specialist streams, such as **machine learning** and **knowledge discovery** and are involved with subjects like neural network learning algorithms, on-line learning, statistical approach for Intelligent Systems and data mining. The design and analysis of Intelligent Systems builds on work in artificial intelligence, cognitive science, computational neuroscience, machine learning, simulation, animation, real-time computing, fuzzy logic, distributed systems theory, ecological systems, economics, mechatronics and bionics, neural computing and large-scale software systems. From their earlier unviable and strictly-for-research status, **intelligent solutions currently**



DSS Services at DecisionCraft Analytics

DecisionCraft offers Decision Support System (DSS) **development-consulting services** and **develops other related systems** such as Expert Systems (ES), Executive Information Systems (EIS) and Organizational Decision Support Systems (ODSS) for functional areas including accounting, finance, sales, distribution, strategic management and manufacturing.

Our solutions are based on concepts of Intelligent Systems - strategic tools different from Transaction Systems that are essentially operational tools. While Transaction Systems follow static, arithmetic and repetitive logic, **our solutions follow algebraic, geometric and analytical logic**. Thereby, ensuring ease of use and clarity of interpretation in the

are being adopted readily and in greater numbers than ever before by most progressive organizations.

Understandably, IT and its development have had an important role in development of such intelligent solutions.

"There is a popular cliché...which says that you cannot get out of computers any more than you have put in..., that computers can only do exactly what you tell them to, and that therefore computers are never creative. This cliché is true only in a crashingly trivial sense, the same sense in which Shakespeare never wrote anything except what his first schoolteacher taught him to write-words." - *Stan Franklin*

Some examples of Intelligent Systems are Adaptive and Learning Systems, Unmanned Autonomous Systems, Knowledge Intensive Subsystems based upon Artificial Intelligence, Cognitive and Neural Modeling (Natural or Constructed), Large Systems with Human-Computer Interaction for Decision Making, Cooperating Autonomous Robots, Multi Agent Systems, and Self-organizing Systems.

Critical elements that seem to distinguish Intelligent Systems are recognition, feedback, correction, learning, warning and adaptation. Common ingredients for all such solutions essentially comprise formal data capturing / information collection mixed with domain specific knowledge and rigorous application of one of the aforementioned specialist streams of analytical logic. Broadly though, experts agree on certain basic attributes in such systems namely - **to be able to adapt** - therefore, learning ability, **to be autonomous** - therefore, ability to sense, model and provide output. And hence, the obvious comparison with natural biological systems since the end objective is to be able to survive in an evolving environment and changing circumstances, a representation - of real-world system.

"Our ultimate objective is to make programs that learn from their experience as effectively as humans do. We shall...say that a program has common sense if it automatically deduces for itself a sufficient wide class of immediate consequences of anything it is told and what it already knows." - *John McCarthy, 'Programs with Common Sense'*

We are already witnessing the application of these systems (though primitive in some manner) to build intelligent enterprises and ensuring competitive success. **Information is key for making decisions, though its full value is realized only when linked to strategy and innovations.** In this age of

presentation of analysis results. The users **gain new insights** into the structure of their problems by generating different views of the decision situation and by exploiting their own visual skills so that they can **recognize meaningful alternatives and strategies** during the problem-solving process.

More Resources

- [Issues and Concerns related to Intelligent Systems](#)
 - [Solutions Inspired by Biology](#)
 - [AI's greatest trends and controversies](#)
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DecisionCraft Products

dataOrganizer™

Integrates data from diverse sources on to one destination database

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Synchronizes supply with demand to minimize distribution costs

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information explosion, a plethora of operational level solutions have emerged that support transactions. Competitive strategy however requires linking information with intelligence. While transactional systems- ERP, CRM EAI, EKM provide the first layer for improving efficiency and clearing the ground for information availability, intelligence is injected only through application of strong conceptual knowledge and logic to it. Intelligent Systems" are created by integrating concepts from quantitative (e.g. mathematics) and qualitative (e.g. ethics) domains with logical frameworks or processes. It is evident that for the future, successful enterprises shall strive for agile structures with greatly increased intelligence density and **enhanced problem solving capabilities** through use of **intelligent decision support systems**. Especially so in the current business environment, where we have at most times, weakly structured domain knowledge, different levels of available information and decisions that impact success significantly.

"The ability to learn faster than your competitors may be the only sustainable competitive advantage." - Aaron P. De Geus, former coordinator, group planning, Royal Dutch/Shell

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automates travel planning process