

When the Need to Know is Now!

Mission Critical Advisory Systems

Advisory solutions based on Exsys technology enable people to interact with a computer system in much the same way they would consult one-on-one with a human advisor. Exsys software and the services of knowledge engineering, consulting and training, capture and deliver advice in virtually any subject area, not only for specific vertical markets but cross-industry as well. Whether client side or online, our advisory solutions combine a firm's unique market knowledge with proprietary software to replicate the decision-making process a domain expert would use to arrive at specific advice.

Our company develops and deploys advisory systems across a wide variety of industries, including financial services, government, telecommunications, health care, regulatory compliance, and manufacturing. Thousands of systems are now in routine use worldwide and span a full spectrum of activities in business, industry and government.

Economic gain has been realized along many dimensions: new or improved ways companies do business, speed-up of professional work, internal cost savings on operations, return on investment, improved quality and consistency of decision making, new products and services, captured organizational know-how and crisis management.

Using our proprietary expert system and delivery software. Advisory systems help automate many decision-making tasks resulting in numerous benefits that:

- Serve as “virtual” consultants to support advisors and clients
- Empower staff with knowledge about many complex problem-solving
- Increase cross-selling potential
- Provide better customer service and support
- Help attract and qualify prospects
- Shorten training time and make it self-paced and easily accessible
- Increase the speed and consistency of decision-making and problem-solving
- Enhance operational productivity and cut maintenance costs, enterprise-wide

Many Fortune 100 business have implemented systems using our software and services to bring trust-building and profitable, expert advice to potential customers, clients and employees. They provide a flexible platform for access to a company's unique and customized knowledge - 24 hours a day. Our teams of knowledge engineers and technical specialists work closely with clients to elicit expert knowledge from key business decision-makers and strategists.

*Online e-Business
advisory solutions
for many industries
are helping firms
capture and deliver
their most valuable
asset –
expert advice.*

Advisory Solutions for the Healthcare Industries

Admission Protocols, X-ray Analysis, Hematological Diagnoses, Psychiatric Interviewing, Pediatric Auditory Brainstem Response Interpretation, Medical Decision Making, Respirator Selection for Preschool Children, Health Services Utilization and Modeling, Diagnostic Systems, In-Vitro Fertilization, Symptom Analysis, Voice-Driven Lab Diagnosis, Rehabilitation Feasibility Strategies, Billing and Account Management, Disease Research, Drug Interaction, Rating for Life Insurance, Workers Comp Classification, Underwriting Assistance, Help Desk, Benefit Identification, Insurance Eligibility, Customer Services “Virtual” Assistance, Infant Monitoring, Disease Prevention, Emergency Triage Procedures, ...

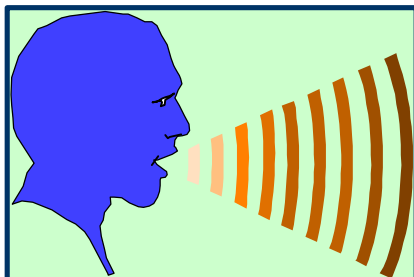
Exsys software technology has been used worldwide by thousands of users. The healthcare industry is certainly one of our major markets and a broad spectrum of systems have been built. As with all industries, the growth of the Internet will soon provide numerous benefits and opportunities for advisory interaction.

“A critical element in making a medical diagnosis is suspecting the diagnosis, for it is usually not hard to establish a diagnosis once one thinks of it. Medicine is too complex and changes too rapidly for any one person to know everything, or even almost everything”

D. Steinberg, Anemia

Below are some examples of applications that show our credibility within this industry. This experience shows us as a leader in expert systems in the medical field and related businesses and institutions across the board. Our company will continue to strengthen and broaden our market status as we accommodate exponential technology growth, expansion and opportunities.

Case Studies



A Voice Driven Expert System to Aid in Medical Diagnosis

Groves, E.W., Medical Univ. of South Carolina (used by the Family Medicine Center and its consortium.)

Anemia is widely perceived as a single disease when, in fact, it is the presence of a variety of disorders that cause decreased hemoglobin concentration. Many diseases can cause anemia and thus the skilled

physician must collect and organize all the clues he can and then try to decipher the underlying cause.

Clinical Hematology Expert Support System (CHESS) was designed to assist the practicing physician in making an efficient and accurate hemotological diagnosis. The system is used and accepted by those within the medical profession who are less knowledgeable about blood disorders. For routine use, data needed to interact with the system is input through a keyboard or a voice-recognition unit, primarily as numbers either of options displayed or quantitative data.

The commercial diagnostic system was built with Exsys software and the knowledge was acquired through numerous discussions with practicing expert clinical hematologists. While the prototype system was first designed for anemia, erythrocytosis decision logic was incorporated to include red cell, white cell and platelet problems. The knowledge base captures the usual sequence of thought and questioning while examining a patient. The system is designed to guide the user to diagnosis in an optimal manner by minimizing the requirement for quantitative laboratory data, while at the same time, asking pertinent questions in the same sequence that an expert clinical hematologist would ask them.

The system is not only an expert diagnostic system but also an expert teaching system for medical students as well. CHESS provides the user with the ability to ask why a specific statement is displayed, how a conclusion was reached, and shows the user the optimal sequence of questions.



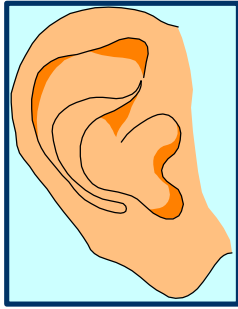
CEDARS-SINAI COMPREHENSIVE CANCER CENTER

Efficient Handling of Medical Information of Lung Cancer Patients

An expert system was developed that provides staging, prognostic and therapeutic information relevant to patients with lung cancer. The user interacting with the system is asked sequential questions regarding:

- Characteristics of the tumor of a particular patient
- The nodal status
- The presence or absence of metastasis
- How the staging information was derived (clinically or at surgery)
- The tumor cell type
- Therapeutic options being considered (different surgical procedures, radiotherapy, chemotherapy and others)

The system selects the appropriate answers and displays the stage of tumor and relevant prognostic information. The user can change all or some of the conditions (i.e., therapeutic options) and compare the results of the various “WHAT-IF” simulations.



Pediatric Auditory Brainstem Response Interpretation

Anne Marie Tharpe, James W. Hall, III, Gautam Biswas - Div. of Hearing and Speech Sciences, Dept. of Otolaryngology and Dept. of Computer Sciences, Vanderbilt University

A diagnostic expert system named *AUDEX* was developed using Exsys software that can interpret infant auditory brainstem response (ABR) data. Identification of hearing loss in the pediatric population poses a difficult diagnostic challenge to the audiologist. Developmental age, gestational age, and chronological age are considered when interpreting test data used in the diagnoses. Also, adjustments must be made if an infant is premature or developmentally delayed. These considerations require a certain level of expertise in the domains of electrophysiological and behavioral pediatric testing. The authoring of the expert system was conducted by a professional in the domain of audiology. The system user provides history information, absolute and interwave latency values, waveform threshold values, and tympanometric data. The diagnostic system then provides the user with the following information:

1. Hearing sensitivity classification based on click or tone burst thresholds
2. Type of hearing loss, (i.e.: conductive, sensorineural or mixed)
3. Auditory brainstem status (i.e. normal or abnormal)
4. Certainty factors associated with each of these conclusions

AUDEX allows the user to query about what rule it is trying to affirm and how it reached certain conclusions.

Five certified audiologists with extensive experience in ABR measurement with young children were utilized for testing purposes. They were instructed to use *AUDEX* after they completed ABR assessments and made diagnoses. Cases that included children between the ages of 34 weeks and 3 years of age and having a full range of degrees and types of hearing impairment were run. A total of 73 were analyzed and in the final evaluation, and the expert agreed with the computer diagnosis for 100% of the cases. Plans are being made to explore potential benefits of *AUDEX* in audiology training programs.



Cycle Stimulation in an In Vitro Fertilization Program

P. Riss, A. Reinthaller, J. Deutinger – OB/GYN Dept., University of Vienna, Austria

Nothing says “mission critical” like the precise timing for cycle stimulation needed in infertility diagnosis and treatment. Below are the results from an expert system built with Exsys software that was presented at the World Congress of In Vitro Fertilization and Embryo Transfer.

The following variables were included: cycle day, urinary luteinizing hormone (LH), yesterday’s and today’s serum-estradiol (E2), yesterday’s and today’s progesterone (P),

increase of E2 and P, and the number and size of sonographically measured follicles. After extensive testing the system displayed the correct choice in 90%. It is the opinion of these doctors that this expert system presents a valuable tool to simplify routine procedures in IVF programs. It is also used as a teaching instrument for residents. This system dramatically speeds up decision processes for treatment, which is so important to anxious patients often at the limits of time and resources.



Urodynamic Diagnosis in a Gynecologic-Urologic Outpatient Clinic

P. Riss and H. Kolbl - OB/GYN Dept., University of Vienna, Austria

Often several diagnoses are possible and the expert system lists them in order of probability. Using Exsys software, the knowledge base was developed by experts in this field who defined the rules. They added notes and references to every rule to provide an explanation of how the expert system arrived at a given conclusion. The system uses five variables obtained at urodynamic investigation: unstable bladder, first desire to void, maximum urethral resting pressure, score of a questionnaire, urethral closure pressure and standing clinical stress test. It then rates five possible urodynamic diagnosis in order of probability which include: genuine stress incontinence, motor urge incontinence, sensory urge, mixed incontinence, and no incontinence demonstrable.



Respiratory and Anesthesia Monitoring

Rader, C.D., Crowe, V.M., and Marcott, B.G.

CAPS combines a pattern-recognition module with an expert system to characterise and analyse each segment of a capnogram. A capnogram is a carbon dioxide wave form produced by monitoring patient respired gases during surgery. The analysis of the capnogram is used by the expert system to generate a probable diagnosis and to recommend a therapy or equipment adjustments.

For more information on Exsys Knowledge Automation Expert System applications, including the Medical, Healthcare, Insurance and Research & Development areas, contact EXSYS today.



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