

This is an informal list and description of some of the term project topics done in previous years in this course, as well as some new ideas. It may be useful in brainstorming if you are stuck for an idea. Not all of these are necessarily good ideas - choosing a topic from this list does not guarantee success! Feel free to contact the TA or Prof Davis to talk about any of these ideas or any other topic you come up with.

Beer Recommender - Based on the subject's taste for food, recommend the best beer for them.

Lighting Design - Create a lighting design for theater that reflects the mood of the scene and illuminates the stage properly.

Risk Advisor - Assists with the board game "risk"; assesses the relative strength of each player and the strategic value of each country.

FreeCiv Advisor - A Knowledge-Based System to play the open-source game "FreeCiv", a variant of the popular game Civilization. Note: complete autonomous playing of FreeCiv is probably quite hard, but a FreeCiv "advisor" that could help with one aspect of the game might be more feasible.

Date Advice - One system used forward chaining and certainty levels to evaluate whether two people are likely to be a good romantic match. Another assessed the user's interests and budget to recommend a good venue for a date.

Hearts Card Selection - Chooses the three cards to pass in a game of hearts, by first selecting a high level strategy, and then implementing that strategy with a specific recommendation.

Boston Shopping Advisor - Recommends which neighborhood to shop in, based on the person's interests and schedule.

Career Advisor - Based on Myers-Briggs personality assessment.

Unsupervised Acquisition of Ontologies - Builds ontologies from a collection of documents, using unsupervised machine learning.

NBA Trade Advisor - Considers assets and needs of an NBA team and finds a fair trade that would fill those needs, within the context of a salary cap.

Setlist - A program that picks an appropriate setlist for a band out of a list of songs. Relevant constraints include: making sure nobody gets tired, that you don't play too many fast songs after slow songs, making sure you lead and finish with strong material, blending crowd favorites with songs that are more "musically serious."

Sailor - a program for tactical advice in competition sailing for two sail boats, such as Americas Cup.

Tree diagnosis - a program for diagnosis and treatment of trees around houses in New England, for infestation of common bugs and their treatments. The program must be able to describe the symptoms in plain english, ask for observations, tell people how to make further observations (and really send them out to make observations) and finally suggesting treatments to get rid of infestations.

Fish Diagnosis: Diagnosis and treatment of illness of pet fish (in your living room).

A Knowledge-based Topology theorem Prover: A backward chaining program that used its knowledge of topology to answer questions about topology and give simple proofs based on its knowledge. The interesting demonstration was that the time taken and the length of proof depended on the amount of knowledge.

Selecting appropriate function to model multi-attribute Utilities: A knowledge based program that helped select an appropriate utility structure to model a user's utility function by asking a lot of questions. Basically asked about the various assumptions that can and cannot be made and then determined which forms for describing utility function (e.g., linear combination) and recommending the simplest of them.

Legal assistant: Several variants:

- a) determining whether you had a legal grounds to bring a trespass charges
- b) determining assault and battery charges.
- c) determining civil liberty infringements.

An Energy Expert: energy consultant for energy management of building complexes.

Funchard- An Expert system for translating functional descriptions to hardware descriptions. Takes a description of function in a functional language (MADD) and generates a register transfer level hardware description.

A Mycin-based Purchasing Agent: Given a customer's order, ships products from inventory and bills the customer, or if the order cannot be filled, backorders the item(s), choosing an appropriate vendor based on the customers standing (and importance to company)

The Tennis Instructor - given the description of the problem in tennis (i.e., the ball constantly goes left of where it was aimed), recommends changes in the stance and grip to correct the problem.

Computer Based Legal Consultant for civil law assault and battery: uses semantic knowledge of world and analogies in coming up with precedents. interesting work.

Dinner Menu Planner: Prepares a multi-course banquet menu preparation, based on the nature of the event, the season (what is available) and budget.

Psychiatric Outreach Expert -- evaluate referrals to determine if the applicant needs the services of the "day care center for psychiatrically impaired elderly", evaluate the patients to determine if they are still appropriate for the services rendered by the center.

Digex - an expert in digital circuit design (Mike Gordon)

Expert system for Icon Design

Knowledge based expert on tropical aquarium fish

Reasoning about LPC speech analysis

An expert system for digital test generator

A knowledge based scenario analysis tool -- for analysing time-varying behavior of a large-scale economic model.

Bass - a stereo sales expert system

Milage: a running injury diagnosis expert

Program for bidding in contract bridge.

An interpreter for Jackson vocational interest survey:

Dr. Spock: A childhood disease diagnosis (Spock in a box).

Choosing a grad school

Plant diagnosis with emphasis on user/system dialogue

Diagnosis of digital memory circuits

TOPS-20 advisor

Graphics layout

Diagnosis of distributed acoustic sensor nets

Building system maintenance

Room layout

ES for differential equations

Code optimizer for 6502

Multiple utility assessment

Quantative/qualitative simulator for acid-base electrolyte

Poker Player

Child's toy gift selection

Satellite image interpretation

Inferential retrieval of medical images

Advice on which neighborhood in Wash. D.C. to live in [buy or rent]

Advice on which neighborhood in Boston-area to buy a home in.

Consultant on testing and repairing pinball machines

Advisor on helping people find new jobs after recovering from disabilities.

Advice on which sportswear gift to buy (depending on price, occasion, etc)

User modelling for assessing how well a user is asking for information in a real-time control environment; give tailored suggestions for improving question asking strategy.

Configuration checking and troubleshooting of telecommunications security equipment

Woodworkers assistant, diagnosing problems when gluing, sanding, sawing, etc.

Beer recipe formulator

Graphic design consultant

Anatomical drawing assistant: how to draw hands

Sports Clinic Goal: Diagnosis of sports injury.

REBECA: A Rule-Based Class Advisor For Freshmen

Knowledge-Based Optimization Selection in a Quasistatic Computing Environment

PhotoTech Knowledge Based System

Goal: gather info. to suggest the appropriate f-stop number, shutter speed, as well as the use of any other necessary and useful equipments.

SailMaster

Goal: Recommends specific sailboats for prospective buyer given; experience, level of interest, finances and other factors.

Extracting Information from Simple Text Messages

Party Planner

Goal: Creating an expert System for planning cocktail parties.

A Knowledge Representation for PC Configuration

Goal: Configure personal computers in the spirit of DEC's XCON.

An Expert System for Recommending an Appropriate Beer to Accompany a Specific Meal

A Boston Restaurant Picker

Yet another Fish Finder

Goal: Helps marine aquarists select inhabitants for their tanks.

CAS: Choose a Sport

Building a Domain Expert for an Intelligent Tutoring System

Model-Based Troubleshooting of Large Power Transformers

An Expert Living Group Chooser: Choosing An Entry Within MacGregor.

TONTO: An Expert System For The Game Netrek

A Childhood Immunization Advisor

Dorm Advisor: A Knowledge-Based System to Advise Freshmen on Where to Live.

A Blackboard System for Automatic Transcription of Simple Polyphonic Music.

An Expert System For Personal Financial Management

The Strategic Advisor: An Expert System For Business Portfolio Investment Strategy

A DataBase Design Assistant

COBRA: Concrete Bridge Advisor. A System for Reinforced Concrete Bridge Design and Construction Configuration.

Manpower Allocation at the New York Public Library

A Case study in implementing Expert Systems in the Public sector.

Project management and Planning Design

Goal: involves the planning of a basic construction project.

A System for Selecting Personal Computer Printers

Boston Activity Advisor System

A Knowledge-Based Subtraction Tutor

Goal: Serve as an intelligent tutor in the diagnostic teaching of arithmetic, specifically subtraction.

Belief Networks for Predictive and Diagnostic Probabilistic Reasoning

A Write-Up on the DungeonMaster Expert System

**A Knowledge Based System for the Automobile Fault Diagnosis
Tools for Model-Based Troubleshooting**

exploiting structural and behavioral knowledge to locate failures

REAL: Real Estate Analyzer System.

Perennial Flower Border Design Aide

Goal: This system designs a perennial flower border, subject to as many as 8 constraints specified by the user.

Design and Implementation of a Knowledge based Personal Event Scheduler

RoTA: Road Trip Advisor

Goal: To aid in deciding what the most desirable route for a trip would be.

Phone Counselors

Goal: Aids suicide prevention.

Cardiovascular Pathology Diagnosis System

Trinidad and Tobago County Information Agent

Acquisition of a Useful List of Patient Constructs Concerning Healthiness

Extracting Information from Simple Text Message

Acquiring Control Knowledge for Symbolic integration

Sales Master

A Knowledge Based System to Hand Tame Parakeets

MUSIN: A knowledge- Based System for Choosing Musical Instruments

Sing Travel: Singapore Travel Advisor

The Spades Advisor

Expert Mahjong Player

Star 1.0- A Statistical Test Advisor

Expert Career Advisor (XCAD)

The Advisor Knowledge-Based System

Design and Implementation of the PC Upgrade Advisor Knowledge Based System

Compatilizer A rule-based System for Determining if He and She are Compatible

Frame-Based Word Sense Disambiguation

HIT: Hard-drive Installation Troubleshooter

An Anesthesia Expert System

Rule-Based system for Identifying Stop Consonants

Advisor: Choosing a Child's Nursery School

Restaurant Selector

3rd Base Coach

OMAAC: Object Modeling Advisor and Critic