

## **CS607 - Artificial Intelligence FAQs By www.virtualians.pk**

Question: What is Artificial Intelligence about?

Answer: Artificial intelligence (abbreviated AI, also some times called Synthetic Intelligence) is defined as intelligence exhibited by an artificial entity. Such a system is generally assumed to be a computer. Although AI has a strong science fiction connotation, it forms a vital branch of computer science, dealing with intelligent behavior, learning and adaptation in machines. Research in AI is concerned with producing machines to automate tasks requiring intelligent behavior

Question: What is the difference between Computational Intelligence and AI?

Answer: Conventional AI mostly involves methods now classified as machine learning, characterized by formalism and statistical analysis. This is also known as symbolic AI, logical AI, neat AI and Good Old Fashioned Artificial Intelligence (GOFAI). (Also see semantics.) Methods include: Expert systems: apply reasoning capabilities to reach a conclusion. An expert system can process large amounts of known information and provide conclusions based on them. Case based reasoning Bayesian networks Behavior based AI: a modular method of building AI systems by hand. Computational Intelligence involves iterative development or learning (e.g. parameter tuning e.g. in connectionist systems). Learning is based on empirical data and is associated with non-symbolic AI, scruffy AI and soft computing. Methods mainly include: Neural networks: systems with very strong pattern recognition capabilities. Fuzzy systems: techniques for reasoning under uncertainty, has been widely used in modern industrial and consumer product control systems. Evolutionary computation: applies biologically inspired concepts such as populations, mutation and survival of the fittest to generate increasingly better solutions to the problem. These methods most notably divide into evolutionary algorithms (e.g. genetic algorithms) and swarm intelligence (e.g. ant algorithms). With hybrid intelligent systems attempts are made to combine these two groups. Expert inference rules can be generated through neural network or production rules from statistical learning such as in ACT-R. A promising new approach called intelligence amplification tries to achieve artificial intelligence in an evolutionary development process as a side-effect of amplifying human intelligence through technology.

Question: What is the focus of this course?

Answer: In this course we will try to envelop some important and basic concepts that will help the students to get an insight into the main topics that Artificial Intelligence deals with.

Question: Are there any prerequisites to the AI course?

Answer: In general, the following background is strongly recommended: knowledge of basic computer science principles and skills, understanding of basic propositional logic (predicate logic is a plus) as well as graph theory, ability to understand and analyze fairly complicated algorithms and data structures, familiarity with the basic concepts of probability theory.

Question: Where is the timetable for this course?

Answer: Details are provided on the LMS Course Website Page.

Question: How to contact the lecturer(s) and tutor(s)?

Answer: You can contact the lecturer(s) and tutor(s) by mailing them at the email address [cs607@vu.edu.pk](mailto:cs607@vu.edu.pk). Unless there is a valid reason, questions sent to the lecturer(s) via e-mail will be redirected to and answered in the appropriate forum on the Discussion Board.

Question: Is there any dedicated AI news site?

Answer: The American Association for Artificial Intelligence (AAAI) provides a daily news feed on AI Topics - a most recommended bookmark to anyone interested in the latest AI applications, research, and developments!

Question: What is the major area's where AI is used?

Answer: AI systems are now in routine use in economics, medicine, engineering and the military, as well as being built into many common home computer software applications, traditional strategy games like computer chess and other video games. Also AI include control, planning and scheduling, the ability to answer diagnostic and consumer questions, handwriting, speech, and facial recognition. As such, it has become a scientific discipline, focused on providing solutions to real life problems.

Question: What are the recommended books for this course?

Answer: There are three books; 1: Artificial Intelligence, 3rd edition by Winston. 2: Artificial Intelligence by Elaine Rich, Kevin Knight. 3: Artificial Intelligence : Structures and Strategies for Complex Problem Solving 5th edition by George Luger.

Question: What's the difference between strong AI and weak AI?

Answer: Strong AI makes the bold claim that computers can be made to think on a level (at least) equal to humans. Weak AI simply states that some "thinking-like" features can be added to computers to make them more useful tools... and this has already started to happen (witness expert systems, drive-by-wire cars and speech recognition software). What does 'think' and 'thinking-like' mean? That's a matter of much debate.

Question: What is the history of AI?

Answer: For an online timeline of artificial intelligence milestones, see <ftp://ftp.cs.ucla.edu/AI/timeline.txt> The appendix to Ray Kurzweil's book "Intelligent Machines" (MIT Press, 1990, ISBN 0-262-11121-7, \$39.95) gives a timeline of the history of AI. Pamela McCorduck, "Machines Who Think", Freeman, San Francisco, CA, 1979. Allen Newell, "Intellectual Issues in the History of Artificial Intelligence", Technical Report CMU-CS-82-142, Carnegie Mellon University Computer Science Department, October 28, 1982

Question: What has AI accomplished?

Answer: Quite a bit, actually. In 'Computing machinery and intelligence.', Alan Turing, one of the founders of computer science, made the claim that by the year 2000, computers would be able to pass the Turing test at a reasonably sophisticated level, in particular, that the average interrogator would not be able to identify the computer correctly more than 70 per cent of the time after a five minute conversation. AI hasn't quite lived upto Turing's claims, but quite a bit of progress has been made, including: - Deployed speech dialog systems by firms like IBM, Dragon and Lernout&Hauspie - Applications of expert systems/case-based reasoning: a computerized Lukemia diagnosis system did a better job checking for blood disorders than human experts! - Machine translation for Environment Canada: software developed in the 1970s translated natural language weather forecasts between English and French. Purportedly still in use. - Deep Blue, the first computer to beat the human chess Grandmaster - Fuzzy controllers in dishwashers, etc. One persistent 'problem' is that as soon as an AI technique truly succeeds, in the minds of many it ceases to be AI, becoming something else entirely. For

example, when Deep Blue defeated Kasparov, there were many who said Deep Blue wasn't AI, since after all it was just a brute force parallel minimax search (!)

Question: What are the branches of AI?

Answer: There are many, some are 'problems' and some are 'techniques'. Automatic Programming - The task of describing what a program should do and having the AI system 'write' the program. Bayesian Networks - A technique of structuring and inferencing with probabilistic information. Natural Language Processing(NLP) - Processing and (perhaps) understanding human ("natural") language Knowledge Engineering/Representation - turning what we know about a particular domain into a form in which a computer can understand it. Planning - given a set of actions, a goal state, and a present state, decide which actions must be taken so that the present state is turned into the goal state Constraint Satisfaction - solving NP-complete problems, using a variety of techniques. Machine Learning - Programs that learn from experience. Visual Pattern Recognition - The ability to reproduce the human sense of sight on a machine. Speech Recognition - Conversion of speech into text. Search - The finding of a path from a start state to a goal state. Similar to planning, yet different... Neural Networks(NN) - The study of programs that function in a manner similar to how animal brains do. AI problems (speech recognition, NLP, vision, automatic programming, knowledge representation, etc.) can be paired with techniques (NN, search, Bayesian nets, production systems, etc.) to make distinctions such as search-based NLP vs. NN NLP vs. Statistical/Probabilistic NLP. Then you can combine techniques, such as using neural networks to guide search. And you can combine problems, such as posing that knowledge representation and language are equivalent. (Or you can combine AI with problems from other domains.)

Question: Is AI an inherited branch of different disciplines?

Answer: It has inherited its ideas, concepts and techniques from many disciplines like philosophy, mathematics, psychology, linguistics, biology etc.

Question: Who is concerned with Neural Networks?

Answer: Neural Networks are interesting for quite a lot of very different people: • Computer scientists want to find out about the properties of non-symbolic information processing with neural nets and about learning systems in general. • Statisticians use neural nets as flexible, nonlinear regression and classification models. • Engineers of many

kinds exploit the capabilities of neural networks in many areas, such as signal processing and automatic control. • Cognitive scientists view neural networks as a possible apparatus to describe models of thinking and consciousness (High-level brain function). • Neuro-physiologists use neural networks to describe and explore medium-level brain function (e.g. memory, sensory system, motorics). • Physicists use neural networks to model phenomena in statistical mechanics and for a lot of other tasks. • Biologists use Neural Networks to interpret nucleotide sequences. • Philosophers and some other people may also be interested in Neural Networks for various reasons. For world-wide lists of groups doing research on NNs, see the Foundation for Neural Networks's (SNN) page at <http://www.mbfys.kun.nl/snn/pointers/groups.html> and see Neural Networks Research on the IEEE Neural Network Council's homepage <http://www.ieee.org/nnc>.

Question: Isn't there a solid definition of intelligence that doesn't depend on relating it to human intelligence?

Answer: Not yet. The problem is that we cannot yet characterize in general what kinds of computational procedures we want to call intelligent. We understand some of the mechanisms of intelligence and not others.

Question: Isn't AI about simulating human intelligence?

Answer: Sometimes but not always or even usually. On the one hand, we can learn something about how to make machines solve problems by observing other people or just by observing our own methods. On the other hand, most work in AI involves studying the problems the world presents to intelligence rather than studying people or animals. AI researchers are free to use methods that are not observed in people or that involve much more computing than people can do.

Question: What about IQ? Do computer programs have IQs?

Answer: No. IQ is based on the rates at which intelligence develops in children. It is the ratio of the age at which a child normally makes a certain score to the child's age. The scale is extended to adults in a suitable way. IQ correlates well with various measures of success or failure in life, but making computers that can score high on IQ tests would be weakly correlated with their usefulness. For example, the ability of a child to repeat back a long sequence of digits correlates well with other intellectual abilities, perhaps because it measures how much

information the child can compute with at once. However, "digit span" is trivial for even extremely limited computers.

Question: When did AI research start?

Answer: After World War II, a number of people independently started to work on intelligent machines. The English mathematician Alan Turing may have been the first. He gave a lecture on it in 1947. He also may have been the first to decide that AI was best researched by programming computers rather than by building machines. By the late 1950s, there were many researchers on AI, and most of them were basing their work on programming computers.

Question: Does AI aim to put the human mind into the computer?

Answer: Some researchers say they have that objective, but maybe they are using the phrase metaphorically. The human mind has a lot of peculiarities, and I'm not sure anyone is serious about imitating all of them.

Question: Does AI aim at human-level intelligence?

Answer: Yes. The ultimate effort is to make computer programs that can solve problems and achieve goals in the world as well as humans. However, many people involved in particular research areas are much less ambitious.

Question: Where is Fuzzy logic used?

Answer: Fuzzy logic is used directly in very few applications. The Sony PalmTop apparently uses a fuzzy logic decision tree algorithm to perform handwritten (well, computer lightpen) Kanji character recognition. Most applications of fuzzy logic use it as the underlying logic system for fuzzy expert systems.

Question: Where are Fuzzy Experts Systems used?

Answer: To date, fuzzy expert systems are the most common use of fuzzy logic. They are used in several wide-ranging fields, including: Linear and Nonlinear Control Pattern Recognition Financial Systems Operation Research Data Analysis

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Question: Isn't "fuzzy logic" an inherent contradiction? Why would anyone want to fuzzify logic?

Answer: Fuzzy sets and logic must be viewed as a formal mathematical theory for the representation of uncertainty. Uncertainty is crucial for the management of real systems: if you had to park your car PRECISELY in one place, it would not be possible. Instead, you work within, say, 10 cm tolerances. The presence of uncertainty is the price you pay for handling a complex system. Nevertheless, fuzzy logic is a mathematical formalism, and a membership grade is a precise number. What's crucial to realize is that fuzzy logic is a logic OF fuzziness, not a logic which is ITSELF fuzzy. But that's OK: just as the laws of probability are not random, so the laws of fuzziness are not vague.

Question: How many assignments will be there for this course?

Answer: There is an updated course calendar for the details of assignments and quiz at course website link.

Question: CLIPS Stands for?

Answer: CLIPS stands for C Language Integrated Production System.

Question: What is CLIPS and from where I can download it?

Answer: CLIPS is an expert system tool which provides a complete environment for the construction of rule and object based expert systems. Download CLIPS for windows (CLIPSWin.zip) from: <http://vulms.vu.edu.pk/Courses/CS607/Downloads/CLIPSWin.zip> Also download the complete documentation including the programming guide from: <http://www.ghg.net/clips/download/documentation/> The guides that you download will provide comprehensive guidance on programming using CLIP. Here are some of the basics to get you started.

Question: What is the difference between admissibility and monotonicity?

**Answer:** The admissibility is the property of a search method (heuristic) that ensures that we find optimal path to a goal from all possible paths. The monotonicity is the property of a search method (heuristic) that also ensures that every node in the way of finding optimal path also has minimum distance from start state. So we can say that to follow the property of monotonicity our search space is arranged such that whenever we reached a certain node we are certain that this node's distance is minimum from the starting node.

**Question:** which software have been used for diagrams?

**Answer:** No specific software has been used for searching related diagrams however in later topics Math Type has been used for Mathematical Symbols and there are images from AI related software's like Matlab.

**Question:** How to distinguish between the Resolution Strategies • Refraction •  
Regency • Specificity

**Answer:** 1. Specificity If a rule has all the conditions of another rule in it then only that rule can be taken for processing and second rule can be ignored, in this way we can say that first rule is more specific (contains more conditions and details) For example Rule I = if there is rain then I will not go to school Rule II = if there is rain and I don't have an umbrella then I will not go to school. Here we can ignore rule I and can take only rule II. 2. Recency We give priority to most recently used rules over the least recently used rules for deducing conclusions. 3. Refraction If a rule is being used time and again and is not producing any results and causing our program to trap in loops we keep on decreasing its weight and a time comes when we simply ignore this rule and use only other rules.

**Question:** Whether clips and/or matlab software will be allowed in the exams or not?

**Answer:** No, there will be no need to use clips or matlab in the examination

**Question:** What is the difference between Crisp values and Fuzzy values?

**Answer:** Crisp values are those values which belong to a fixed set they can't be the part of more than one set for example value four 4 will be the part of set of even numbers it can't be the part of set of odd numbers similarly value 5 will be part of set of odd numbers. But in some situations a value can be taken as the part of more than one sets for example if the exam score of someone is 70 it may be considered as Good by some people and may be considered as Very

Good by some other people so this value is member of two sets at a time so we can say that this value is fuzzy value now we will find the membership of this values is both the sets for example its membership in Good Set may be .7 (can be taken as 70%) and in Very Good set it may be .3 (30%) so in case of fuzzy logic we consider fuzzy values there is no absolute value, for example there is no absolute definition of tall man the person with height of 6 feet is also tall and person with height 6.5 feet is also tall but the membership value for the second person height will be greater than the first one in the set of persons who are Tall.

Question: Can we use another version of clips or other tool as lisp or Prolog?

Answer: Yes we can use other version of Clips but the mention version of CLIPS in MDB is latest one so it's better to use this version of clips. We are using just Clips in this course so it's better for you to use this one.