NEW HORIZON COLLEGE OF ENGINEERING

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

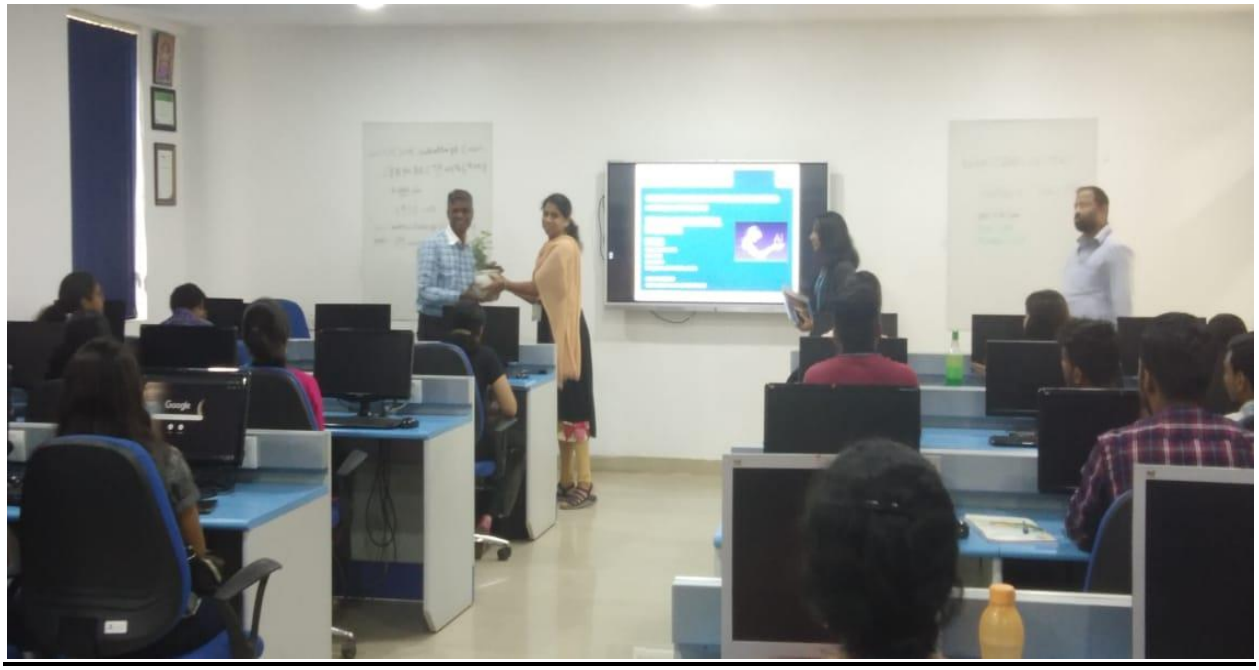
Workshop on Artificial Intelligence

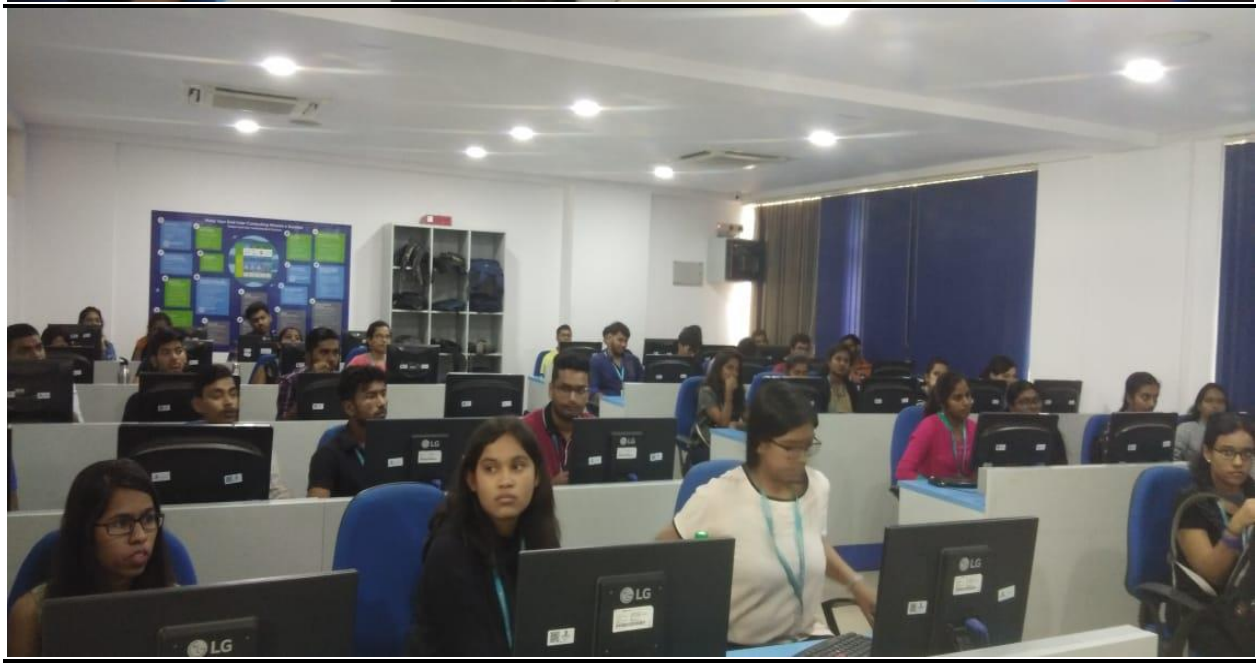
ResourcePerson : Mr. Ramakant **Date: 26-10-2019**

The department of Information Science and Engineering in association with iSWET(G) club has conducted Expert talk on the topic "Artificial Intelligence" for the 5th A&B semester students on 26th OCTOBER, 2019 under the supervision of ISE Head of the department, Dr.Anandhi R J at ISE department. The Resource person , Mr. Ramakantha K.S, was invited to conduct the same.

Speaker is multi skilled professional with 12+ years of experience spread across database in IT Sector. The need for database with the Real time applications was considered as the key area.

VARIOUS SESSIONS THROUGHT THE PROGRAM:

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TOPICS COVERED:

- ✓ Introduction of Artificial Intelligence
- ✓ Challenges
- ✓ Approaches
- ✓ Tools

➢ Artificial Intelligence Introduction:

In computer science, artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. Leading AI textbooks define the field as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully

achieving its goals. Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".

As machines become increasingly capable, tasks considered to require "intelligence" are often removed from the definition of AI, a phenomenon known as the AI effect.[3] A quip in Tesler's Theorem says "AI is whatever hasn't been done yet." For instance, optical character recognition is frequently excluded from things considered to be AI, having become a routine technology. Modern machine capabilities generally classified as AI include successfully understanding human speech, competing at the highest level in strategic game systems (such as chess and Go), autonomously operating cars, intelligent routing in content delivery networks, and military simulations.

Artificial intelligence can be classified into three different types of systems:

- Analytical
- Human-inspired
- Humanized artificial intelligence.

➢ Challenges of Artificial Intelligence

- Default reasoning and the qualification problem

  Many of the things people know take the form of "working assumptions". For example, if a bird comes up in conversation, people typically picture an animal that is fist-sized, sings, and flies. None of these things are true about all birds. John McCarthy identified this problem in 1969 as the qualification problem: for any commonsense rule that AI researchers care to represent, there tend to be a huge number of exceptions. Almost nothing is simply true or false in the way that abstract logic requires. AI research has explored a number of solutions to this problem.

- The breadth of commonsense knowledge

  The number of atomic facts that the average person knows is very large. Research projects that attempt to build a complete knowledge base of commonsense

knowledge (e.g., Cyc) require enormous amounts of laborious ontological engineering—they must be built, by hand, one complicated concept at a time.

- The sub symbolic form of some commonsense knowledge

  Much of what people know is not represented as "facts" or "statements" that they could express verbally. For example, a chess master will avoid a particular chess position because it "feels too exposed" or an art critic can take one look at a statue and realize that it is a fake. These are non-conscious and sub-symbolic intuitions or tendencies in the human brain. Knowledge like this informs, supports and provides a context for symbolic, conscious knowledge. As with the related problem of sub-symbolic reasoning, it is hoped that situated AI, computational intelligence, or statistical AI will provide ways to represent this kind of knowledge.

➢ Approaches

- Cybernetics and brain simulation

  In the 1940s and 1950s, a number of researchers explored the connection between neurobiology, information theory, and cybernetics. Some of them built machines that used electronic networks to exhibit rudimentary intelligence, such as W. Grey Walter's turtles and the Johns Hopkins Beast. Many of these researchers gathered for meetings of the Teleological Society at Princeton University and the Ratio Club in England.[151] By 1960, this approach was largely abandoned, although elements of it would be revived in the 1980s.

- Symbolic

  When access to digital computers became possible in the mid 1950s, AI research began to explore the possibility that human intelligence could be reduced to symbol manipulation. The research was centered in three institutions: Carnegie Mellon University, Stanford and MIT, and as described below, each one developed its own style of research. John Haugeland named these symbolic approaches to AI "good old fashioned AI" or "GOFAI".[152] During the 1960s, symbolic approaches had achieved great success

at simulating high-level "thinking" in small demonstration programs. Approaches based on cybernetics or artificial neural networks were abandoned or pushed into the background.[153] Researchers in the 1960s and the 1970s were convinced that symbolic approaches would eventually succeed in creating a machine with artificial general intelligence and considered this the goal of their field.

- *Cognitive simulation*

  Economist Herbert Simon and Allen Newell studied human problem-solving skills and attempted to formalize them, and their work laid the foundations of the field of artificial intelligence, as well as cognitive science, operations research and management science. Their research team used the results of psychological experiments to develop programs that simulated the techniques that people used to solve problems. This tradition, centered at Carnegie Mellon University would eventually culminate in the development of the Soar architecture in the middle 1980s.[154][155]

➢ TOOLS

Many problems in AI can be solved in theory by intelligently searching through many possible solutions: Reasoning can be reduced to performing a search. For example, logical proof can be viewed as searching for a path that leads from premises to conclusions, where each step is the application of an inference rule. Planning algorithms search through trees of goals and subgoals, attempting to find a path to a target goal, a process called means-ends analysis. Robotics algorithms for moving limbs and grasping objects use local searches in configuration space. Many learning algorithms use search algorithms based on optimization.

Simple exhaustive searches are rarely sufficient for most real-world problems: the search space (the number of places to search) quickly grows to astronomical numbers. The result is a search that is too slow or never completes. The solution, for many problems, is to use "heuristics" or "rules of thumb" that prioritize choices in favor of those that are more likely to reach a goal and to do so in a shorter number of steps. In some search methodologies heuristics

can also serve to entirely eliminate some choices that are unlikely to lead to a goal (called "pruning the search tree"). Heuristics supply the program with a "best guess" for the path on which the solution lies. Heuristics limit the search for solutions into a smaller sample size.

A very different kind of search came to prominence in the 1990s, based on the mathematical theory of optimization. For many problems, it is possible to begin the search with some form of a guess and then refine the guess incrementally until no more refinements can be made. These algorithms can be visualized as blind hill climbing: we begin the search at a random point on the landscape, and then, by jumps or steps, we keep moving our guess uphill, until we reach the top. Other optimization algorithms are simulated annealing, beam search and random optimization.

The outcome of this program to the students provided good knowledge about Artificial Intelligence.

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