IEEE-CIS Computational Intelligence High School Activity 2024

High School Outreach Program on "Computational Intelligence"

Introduction

The IEEE Computational Intelligence Society at M.S. Ramaiah Institute of Technology (MSRIT), in collaboration with the Department of Information Science and Engineering (ISE), organized an **IEEE High School Student Outreach Activity** for 8th-grade students of M.S. Ramaiah High School.

The primary objective of this IEEE initiative was to introduce young learners to the fundamentals of Computer Science, focusing on **Computational Intelligence** and its real-world applications. By engaging students in interactive sessions and practical demonstrations, the program aimed to foster curiosity, critical thinking, and problem-solving abilities at an early stage.

The event was meticulously planned and executed by the Department of Information Science and Engineering, who served as the resource persons, as well as coordinators ensuring the smooth conduct of the program.

Objectives

- To create awareness about Computational Intelligence and its applications.
- To introduce foundational concepts such as Neural Networks, Fuzzy Logic, and Evolutionary Computing in an engaging manner.
- To encourage teamwork and creative thinking through an Ideathon event.
- To inspire young minds to explore careers in Computer Science and Engineering.

Schedule and Session Details

Day 1: *Computational Intelligence – Fundamentals and Significance*

Faculty: Dr. Vijaya Kumar B P (Head and Professor, Department of CSE – AI&DS) The inaugural session introduced students to the concept of computational intelligence (CI). Dr. Vijaya Kumar explained how CI mimics human intelligence to solve complex problems and demonstrated its applications in areas like robotics and data science. Students learned about the significance of CI in today's world and how it impacts various industries.

Ideathon Introduction:
Dr. Sumana Maradithaya (Professor, Department of ISE) introduced the concept of the Ideathon. She explained how students would be given an opportunity to apply their learning towards solving real-world challenges. This announcement sparked excitement among the students, as they looked forward to showcasing their ideas.

Day 2: *Real-World Applications of Computational Intelligence*

Faculty: Ms. Pallavi and Mrs. Pallavi (Department of CSE - Cyber security) This session served as a continuation of Day 1, focusing on how computational intelligence is applied in real life. Ms. Pallavi shared examples from healthcare, transportation, and security systems where CI has made a transformative impact. The students actively participated in discussions, offering their own examples of technology they had encountered, making the session highly interactive.

Day 3: *Introduction to Neural Networks*
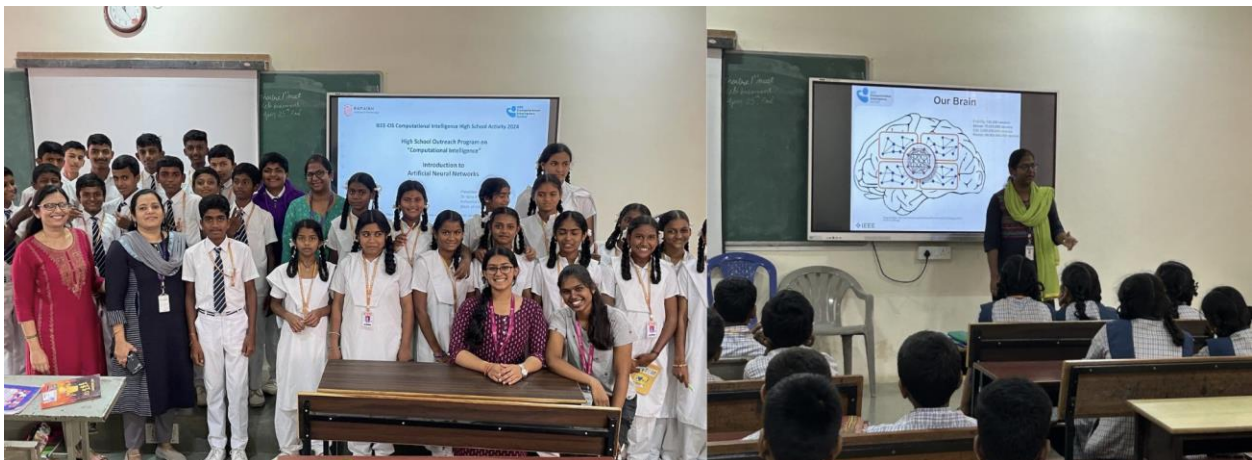
Faculty: Ms. Evangeline D (Assistant Professor, Department of Information Science and Engineering) and Dr. Lincy Meera Mathews (Associate Professor, Department of Information Science and Engineering). Students were introduced to the basics of neural networks. Ms. Evangeline explained how neural networks mimic the human brain and are used in tasks like image recognition and natural language processing. The session was filled with engaging analogies, helping students grasp complex concepts easily. Visual aids and simple problem-solving examples made it easier for students to understand how neural networks function.

Day 4: *Artificial Neural Networks (ANN): Tools and Techniques*

Faculty: Dr. Ajina A and Ms. Aishwarya M F Prabhakar (Department of CSE – AIML) This session built on the previous day's introduction by delving deeper into the structure and working of Artificial Neural Networks. The faculty used graphical representations to explain how ANNs process data through layers of neurons. Simple coding demonstrations were provided to show how machines "learn" from data. Students gained a better understanding of supervised learning through live examples and exercises.

Day 5: *Evolutionary Computing – Basic Tools and Techniques*

Faculty: Dr. K. M. Vanitha and Dr. J. V. Alamelu (Department of Electronics and Instrumentation Engineering)

The concept of Evolutionary Computing was introduced with examples from nature, such as survival of the fittest. The faculty explained how these natural processes inspire algorithms used in optimization problems. Hands-on activities included simple games where students simulated natural selection, helping them understand the process intuitively.

Day 6: *Fuzzy Logic – Basics, Tools, and Techniques*
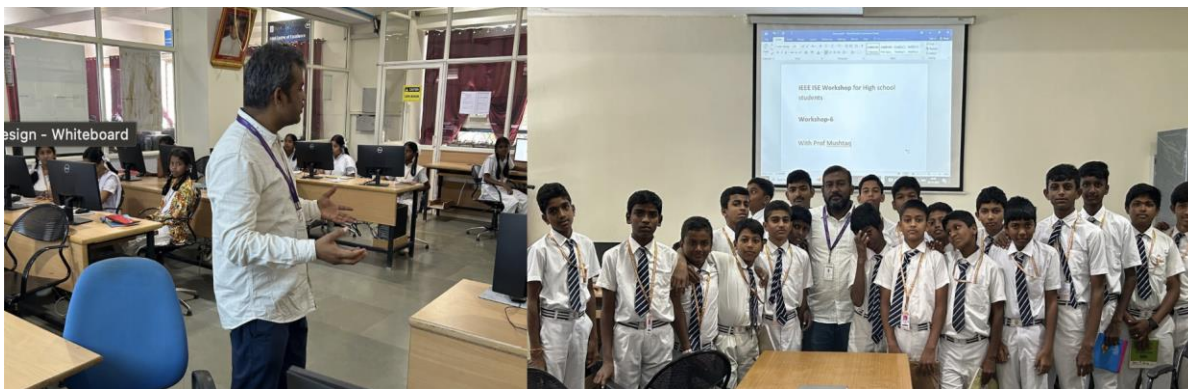

Faculty: Mr. Shivananda S and Mr. Mushtaq Ahmed D M (Assistant Professors, Department of ISE)

This session was one of the most interactive. Students were introduced to Fuzzy Logic and how it differs from traditional binary logic. With practical examples like temperature control in

appliances and automated decision-making, students engaged in activities on computer systems where they experimented with fuzzy control systems. The hands-on aspect helped students relate to everyday technologies that use fuzzy logic.

Day 7: *Computational Intelligence for Computer Vision and Robotics*
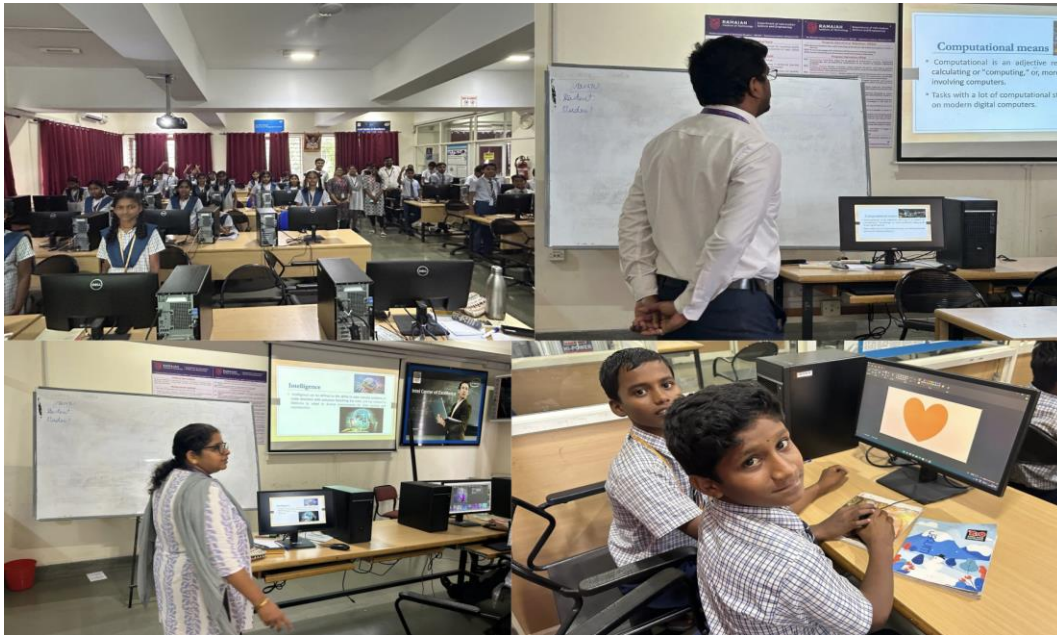
Faculty: Mr. Prashanth Kambli and Ms. Prathima M. N. (Assistant Professors, Department of ISE) Students learned how computational intelligence is used in computer vision and robotics. Through engaging videos and demonstrations, they saw how robots interpret visual data to make decisions. Practical case studies in autonomous vehicles and industrial automation were discussed. The session concluded with a Q&A, where students enthusiastically asked about the future of robotics.

Day 8: *Ideathon – Conceptualizing Solutions for Real-World Challenges*

Facilitators:

- Dr. Sumana Maradithaya (Professor, Department of ISE)
- Dr. Lincy Meera Mathews (Associate Professor, Department of ISE)
- Mr. Shivananda S (Assistant Professor, Department of ISE)
- Mr. Suresh Kumar K. R. (Assistant Professor, Department of ISE)

The final day of the program was dedicated to the Ideathon. Students were divided into teams of 2-3 members and given two hours to brainstorm and develop innovative ideas to address real-world problems using the concepts they had learned.

Each team presented their ideas to the faculty panel. The judging criteria included creativity, feasibility, and relevance. The best three teams were awarded first, second, and third prizes. All participating students received certificates and small gifts as tokens of appreciation. The session ended with students expressing their excitement and gratitude for the experience.

Winning Teams and Their Innovative Ideas:

As part of the event, students participated in a mini-project competition where they showcased their understanding and creativity. The winners were announced based on originality, presentation, and feasibility.

1st Prize - Team 6

- **Participants:** Bhagyashree B, Renuka
- **Topic:** *"Technology and Society"*
- **Idea:** They highlighted how technology has become an integral part of modern life, discussing both its advantages and the need for mindful usage. They emphasized that while technology makes life easier, it's important to balance its use to avoid dependency.

2nd Prize - Team 15

- **Participants:** Rukksana B, Akshitha
- **Topic:** *"Smart Solutions for Civic Responsibility"*
- **Idea:** The team proposed an innovative mobile application designed to enhance citizen engagement and responsibility. They highlighted how technology can empower individuals to contribute actively to nation-building, encouraging young citizens to take initiative and be part of societal improvements through smart, accessible tech tools.

3rd Prize - Team 5

- **Participants:** Nitish M, Nithin B
- **Topic:** *"Magic Helmet for the Blind"*

- **Idea:** They proposed an innovative helmet designed to assist visually impaired people in driving. The helmet interprets vehicle radiation and sound, providing directions through speakers. It even includes a feature for music playback controlled by voice commands.

Program Coordinators

Faculty Coordinators

- Dr. Sumana Maradithaya (Professor, Department of ISE)
- Dr. Lincy Meera Mathews (Assistant Professor, Department of ISE)

Student Coordinators

- Chamili Suresh (Year 3, Department of ISE)
- Bontha Nithish Reddy (Year 2, Department of ISE)
- Cherukupalli Sri Ramya (Year 2, Department of ISE)
- Alapati Nikhila Divya (Year 2, Department of ISE)

The combined efforts of both faculty and student coordinators ensured the program was organized efficiently, fostering an engaging and enriching environment for participants.

Outcomes and Learnings

- Students acquired foundational knowledge of computational intelligence and its practical uses.
- Interactive sessions and activities helped in simplifying complex topics for young learners.
- The Ideathon fostered critical thinking, teamwork, and innovation.

Conclusion

The **IEEE-CIS High School Student Outreach Activity**, organized by the Department of Information Science and Engineering (ISE), successfully bridged the gap between foundational academic knowledge and practical exposure for young learners. Over eight insightful days, the initiative aimed to spark curiosity and foster a deeper understanding of computational thinking and computer science fundamentals among high school students.

Through a carefully structured program, the sessions introduced students to key concepts such as problem-solving approaches, logical reasoning, basic programming, and real-world applications of computational intelligence. The interactive sessions encouraged active participation, enabling students to engage in hands-on learning while developing critical thinking and problem-solving abilities essential in today's technology-driven world.

This outreach activity not only imparted technical knowledge but also inspired students to explore potential career paths in science and technology. By creating an inclusive learning environment, the program empowered students from diverse backgrounds and promoted awareness about the opportunities within the field of computer science and engineering.

The combined efforts of the IEEE-CIS team and the Department of ISE underscore a shared commitment to social responsibility and academic excellence. The success of this outreach activity sets a promising precedent for future initiatives aimed at nurturing the next generation of innovators and technologists.

Media Coverage and Documentation

Photos and videos documenting the entire event, including session highlights, student interactions, and the Ideathon presentations, can be accessed at the following link:

https://drive.google.com/drive/u/2/folders/1uoLbExpb153rjKuvtqrfn6TUdAHaaaqZ