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St. JOSEPH'S INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

St. Joseph's Group of Institutions

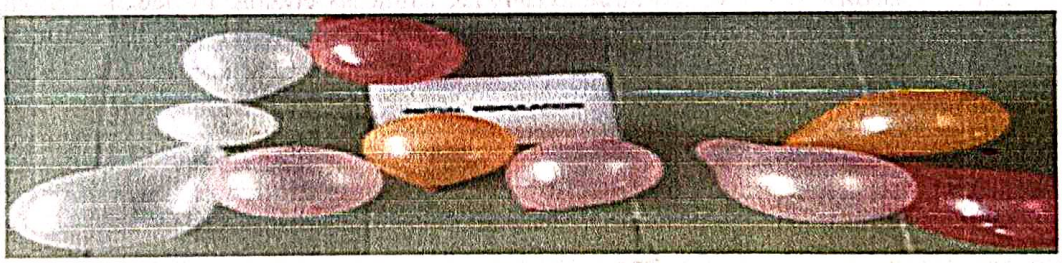
OMR, Chennai - 119

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

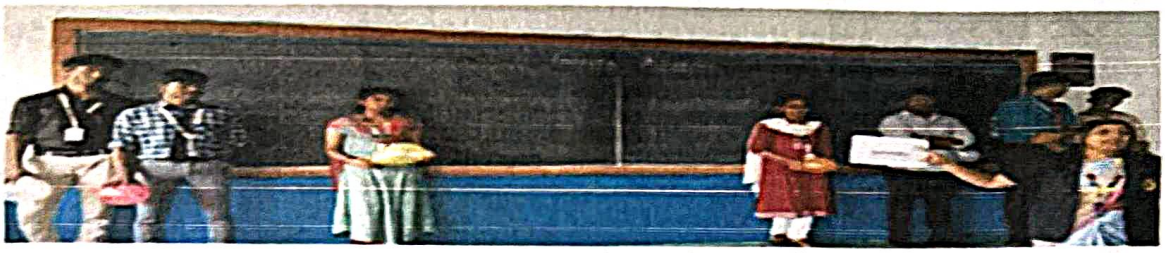
ACADEMIC YEAR (2024-2025) ODD SEMESTER

INNOVATIVE TEACHING

Name of Pedagogy Used	Class Room Activity
Branch/Year/Sem/Sec:	**CSE/III/V/B**
Subject Code/Subject Name:	CS4502 – Soft Computing
Topic:	**"BALLOON EVOLUTION THROUGH GENETIC ALGORITHM"**
Date/Period/Timing	**24.09.2024 / 8.40 AM TO 9.30 AM**
Description	Students will simulate the working of a genetic algorithm by evolving balloon characteristics (such as size, shape, or features) over several generations, demonstrating selection, crossover, mutation, and convergence toward optimal solutions.



Photos



Students Feedback	***312422104121:*** This experiential learning encourages deeper engagement and understanding of genetic algorithms. ***312422104119:*** Students engage in peer teaching, sharing ideas about fitness function in the most effective way.
Total No. of Students	***63***
No. of Students Present	***54***
No: of Students Absent	***9***
Action Plan for Absentees	Planned to have another session with different activity by involving them.

DOCUMENT PROOF:

Activity Outline: "Balloon Evolution through Genetic Algorithm"

Objective: Students will simulate the process of a genetic algorithm by evolving balloon characteristics (such as size, color, and performance) through selection, crossover, and mutation. The aim is to help students understand how genetic algorithms work to find optimal solutions over successive generations.

Materials:

- Balloons (various sizes/colors)
- Markers, rulers, weights, string
- **Empty box** (for fitness testing)
- Sticky notes, timers

Steps:

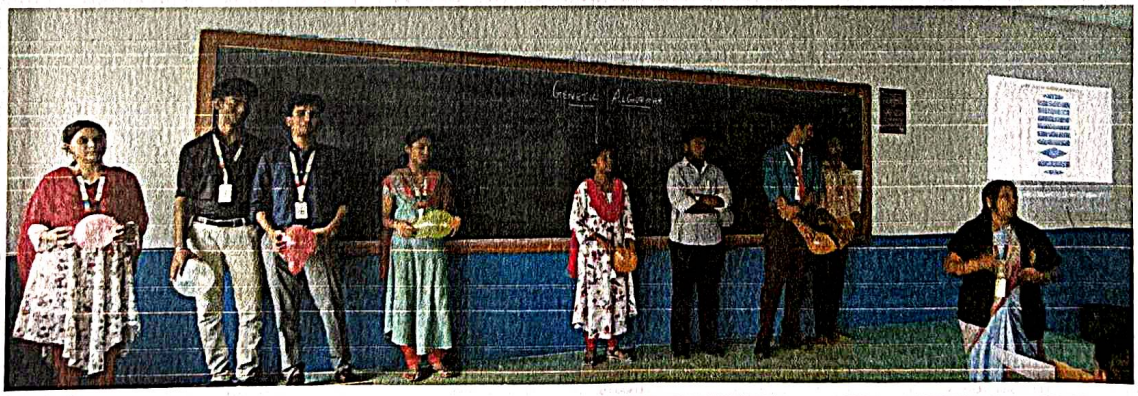
1. **Initial Population Setup**:
   Each group inflates 3-5 balloons, modifying them (e.g., size, weight) to create the initial population. Fitness scores are assigned based on criteria like air time, distance, or fitting inside the empty box.
2. **Selection**:
   Groups select the two fittest balloons to be "parents" based on fitness scores.
3. **Crossover**:
   Students combine traits from the parent balloons (e.g., size from one and color from another) to create offspring for the next generation.
4. **Mutation**:
   Small random changes (e.g., varying size or weight) are introduced to the offspring to simulate mutation.
5. **New Generation**:
   The new offspring are tested, assigned fitness scores(balloon fit in to box), and compared to previous generations. Repeat the process for further improvement.
6. **Convergence**:
   When offspring performance stabilizes, the population is said to have converged. Discuss how genetic algorithms gradually evolve better solutions.

Discussion:

- Ask students to reflect on the evolution of their balloon population. Did their balloons improve with each generation? What trade-offs did they encounter between different traits?
- Discuss how genetic algorithms are used to solve real-world optimization problems in fields like engineering, AI, and biology.

By incorporating an empty box as a fitness test with balloons as a gene, students gain an additional performance metric, making the concept of fitness evaluation more concrete and adding another layer of challenge to the activity.

OVERALL VIEW:



Faculty In-charge

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