**AUTOMATED SEATING ARRANGEMENT FOR EXAMINATION USING AI**

**Abstract:**

In the realm of educational assessment, the allocation of students to examination rooms and benches while ensuring fairness, adherence to capacity constraints, and maximizing student satisfaction has remained a challenging problem. In this research paper, we propose an innovative solution that leverages the power of Genetic Algorithms (GAs) and Constraint Satisfaction Problems (CSPs) to optimize the seating arrangement process for college examinations.

Our proposed system takes as input the classroom ID, the range of roll numbers of students to be accommodated, the number of benches in each classroom, and the capacity of each bench. The primary objective is to generate an optimal seating arrangement matrix that assigns students to specific positions in examination rooms, ensuring that capacity constraints are met and that no two students with the same examination are seated in close proximity.

The Genetic Algorithm is employed to randomly generate roll numbers and allocate them to classrooms, simulating the process of natural selection and evolution. The algorithm iteratively refines seating arrangements over multiple generations, utilizing fitness functions that consider capacity constraints and fairness in seating distribution.

To satisfy the constraint of maintaining a fair distance between students with the same examination, we employ Constraint Satisfaction Problem techniques. A dedicated constraint satisfaction mechanism is integrated into the genetic algorithm to ensure that students with identical exams are seated at an appropriate distance from each other, promoting an equitable examination environment.

Our system's output is a seating arrangement matrix that provides the roll numbers of students assigned to their allotted positions in examination rooms. This matrix not only adheres to capacity constraints and fairness criteria but also maximizes student satisfaction by ensuring a balanced and efficient allocation of resources.

Through extensive experimentation and evaluation, we demonstrate the effectiveness and efficiency of our proposed system in generating optimal seating arrangements for college examinations. The results show significant improvements in student satisfaction, equitable distribution, and adherence to capacity constraints compared to traditional manual seating allocation methods.

In conclusion, our research presents a novel approach to the challenging problem of seating arrangement optimization for college examinations. By combining Genetic Algorithms and Constraint Satisfaction Problems, we have developed an intelligent system that not only ensures fairness and capacity adherence but also maximizes student satisfaction, ultimately enhancing the overall examination experience.