

National University of Computer & Emerging Sciences



Project

Artificial Intelligence

Submitted by:

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Submitted to:

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Genetic Algorithm

Random Population

The ***generate_initial_population*** creates an initial population of timetables. Each timetable is a list of lectures, where each lecture has a course, section, professor, day, timeslot, and room assigned randomly.

Fitness

The ***fitness_function*** function is used to calculate the fitness of a timetable. The function checks for conflicts based on the given hard and soft constraints.

Selection

The ***selection*** function is used to select individuals (timetables) from the population for reproduction. It uses tournament selection, where k individuals are selected randomly and the one with the highest fitness is chosen.

Crossover

The ***crossover*** function creates a new population by combining the genes of two parent individuals. It uses single-point crossover, where a point on the parent individuals' gene sequence is selected.

Mutation

The ***mutation*** function is used to introduce random changes in the individuals. It changes the day and time slot of a lecture based on whether it is a theory or lab.

Evolution

The ***evolve_population*** function is used to create a new population by repeating the selection, crossover, and mutation processes.

Main Execution

The ***run_genetic_algorithm*** function is used to run this whole genetic algorithm. It generates an initial population and then evolves it over a certain number of generations. The best timetable from each generation is printed.

Example Output

Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:30 - 09:50	Software Engineering (Theory) B Prof. Moore 302-C Artificial Intelligence (Theory) C Prof. Zille Huma 301-C	PDC (Theory) C Prof. Moore 304-C PDC (Theory) E Prof. Muhammad Ali 305-C Artificial Intelligence (Theory) F Prof. Johnson 102-D	Software Engineering (Theory) B Prof. Moore 302-C Artificial Intelligence (Theory) C Prof. Zille Huma 301-C	PDC (Theory) C Prof. Moore 304-C PDC (Theory) E Prof. Muhammad Ali 305-C Artificial Intelligence (Theory) F Prof. Johnson 102-D	
10:05 - 11:25	Numerical Computing (Theory) A Prof. Muhammad Ali 305-C	Web Programming (Theory) A Prof. Muhammad Ali 305-C Web Programming (Theory) B Prof. Saad Salman 304-C Numerical Computing (Theory) E Prof. Aqib Rehman 302-C Numerical Computing (Theory) F Prof. Bilal Khalid 101-D	PDC (Theory) D Prof. Anderson 301-C PDC (Theory) F Prof. Moore 102-D Numerical Computing (Theory) A Prof. Muhammad Ali 305-C	Web Programming (Theory) B Prof. Saad Salman 304-C Numerical Computing (Theory) E Prof. Aqib Rehman 302-C Numerical Computing (Theory) F Prof. Bilal Khalid 101-D	PDC (Theory) D Prof. Anderson 301-C PDC (Theory) F Prof. Moore 102-D Web Programming (Theory) A Prof. Muhammad Ali 305-C
11:40 - 13:00	Web Programming (Theory) F Prof. Saad Salman 101-D	Software Engineering (Theory) E Prof. Johnson 304-C	PDC (Theory) A Prof. Bilal Khalid 302-C	Web Programming (Theory) F Prof. Saad Salman 101-D	PDC (Theory) A Prof. Bilal Khalid 302-C Software Engineering (Theory) E Prof. Johnson 304-C
13:15 - 14:35	PDC (Theory) B Prof. Saad Salman 302-C Numerical Computing (Theory) D Prof. Moore 305-C	Software Engineering (Theory) A Prof. Muhammad Ali 304-C Software Engineering (Theory) C Prof. Moore 302-C Numerical Computing (Theory) B Prof. Moore 305-C	PDC (Theory) B Prof. Saad Salman 302-C Software Engineering (Theory) D Prof. Aadil Ur Rehman 301-C Numerical Computing (Theory) C Prof. Aadil Ur Rehman 304-C	Software Engineering (Theory) A Prof. Muhammad Ali 304-C Software Engineering (Theory) C Prof. Moore 302-C Numerical Computing (Theory) D Prof. Moore 305-C	Software Engineering (Theory) D Prof. Aadil Ur Rehman 301-C Numerical Computing (Theory) B Prof. Moore 305-C Numerical Computing (Theory) C Prof. Aadil Ur Rehman 304-C
14:50 - 16:10	Artificial Intelligence (Theory) A Prof. Johnson 302-C Artificial Intelligence (Theory) D Prof. Muhammad Ali 305-C Web Programming (Theory) D Prof. Saad Salman 304-C AI LAB (Lab) B Prof. Aadil Ur Rehman 301-C AI LAB (Lab) F Prof. Moore 101-D	Software Engineering (Theory) F Prof. Usama Imtiaz 102-D AI LAB (Lab) A Prof. Aqib Rehman 301-C AI LAB (Lab) D Prof. Thomas 305-C	Artificial Intelligence (Theory) E Prof. Moore 301-C Web Programming (Theory) D Prof. Saad Salman 304-C AI LAB (Lab) C Prof. Muhammad Ali 302-C	Software Engineering (Theory) F Prof. Usama Imtiaz 102-D Artificial Intelligence (Theory) A Prof. Johnson 302-C Artificial Intelligence (Theory) D Prof. Muhammad Ali 305-C AI LAB (Lab) E Prof. Zille Huma 301-C	Artificial Intelligence (Theory) E Prof. Moore 301-C
16:25 - 17:45	AI LAB (Lab) B Prof. Aadil Ur Rehman 301-C AI LAB (Lab) F Prof. Moore 101-D	Artificial Intelligence (Theory) B Prof. Moore 302-C Web Programming (Theory) C Prof. Johnson 304-C AI LAB (Lab) A Prof. Aqib Rehman 301-C AI LAB (Lab) D Prof. Thomas 305-C	Web Programming (Theory) E Prof. Anderson 301-C AI LAB (Lab) C Prof. Muhammad Ali 302-C	Web Programming (Theory) C Prof. Johnson 304-C AI LAB (Lab) E Prof. Zille Huma 301-C	Artificial Intelligence (Theory) B Prof. Moore 302-C Web Programming (Theory) E Prof. Anderson 301-C