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PERSONALIZED ITINERARY PLANNING FOR TRAVELERS USING AN ADAPTIVE GENETIC ALGORITHM

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Abstract
Traveling as a very popular leisure activity enjoyed by many people all over the world. Typically, tourists have different kinds of preferences about their itineraries, limited time budgets, unfamiliar with the wide range of Points-of-Interest (POIs) in a city, so that planning an itinerary is quite tedious, time-consuming, and challenging for them. In this paper, we propose an adaptive genetic algorithm for personalized itinerary planning for travelers to plan their itineraries better. Firstly, desired starting POIs (e.g., POIs that are close to their hotels) and destination POIs (e.g., POIs that are near train stations or airports) are considered in our approach. Secondly, we also take some general factors into account that travelers would consider in their preferences of an itinerary, which are the total number of POIs, the overall POI popularity, the overall cost, and the overall rating.

I. INTRODUCTION

The travelling salesman problem (TSP) is the most well-known combinatorial optimization problem. TSP is used to find a routing of a salesman who starts from a home location, visits a prescribed set of cities and returns to the original location in such a way that the total distance travelled is minimized and each city is visited exactly once. This problem is known to be NP-hard, and cannot be solved exactly in polynomial time. Many exact and heuristic algorithms have been developed in the field of operations research (OR) to solve this problem. TSP is solved very easily when there is less number of cities, but as the number of cities increases it is very hard to solve, as large amount of computation time is required. The numbers of fields where TSP can be used very effectively are military and traffic. Another approach is to use genetic algorithm to solve TSP because of its robustness and flexibility. Some typical applications of TSP include vehicle routing, computer wiring, cutting wallpaper and job sequencing. The main application in statistics is combinatorial data analysis, e.g., reordering rows and columns of data matrices or identifying clusters.

II.LITERATURE SURVEY

Various Approaches Used FOR SOLVING TSP In 1997, Rong Yangintroduce several knowledge-augmented genetic operators which guide the genetic algorithm more directly towards better quality of the population but are not trapped in local optima prematurely. The algorithm applies a greedy crossover and two advanced mutation operations based on the 2-opt and 3-opt heuristics. In 2001, Chiung Moon introduces the concept of topological sort (TS), which is defined as an ordering of vertices in a directed graph.Also, a new crossover operation is developed for the proposed GA .In 2004, new knowledge based multiple inversion operators and a neigh bourhood swapping operator is proposed by ShubhraSankar Ray.In 2005,

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Lawrence V. Snyderpresents a heuristic to solve the generalized traveling salesman problem. The procedure incorporates a local tour improvement heuristic into a random-key genetic algorithm.
The algorithm performed quite well when tested on a set of 41 standard problems with known optimal objective values. In 2005, Milena Karova introduces the solution, which includes a genetic algorithm implementation in order to give a maximal approximation of the problem, modifying a generated solution with genetic operators. In 2006, Plamenka Borovska investigates the efficiency of the parallel computation of the travelling salesman problem using the genetic approach on a slack multicomputer cluster. In 2007, a two-level genetic algorithm (TLGA) was developed for the problem, which favours neither intra-cluster paths nor inter-cluster paths, thus realized integrated evolutionary optimization for both levels of the CTSP. In 2007, A novel particle swarm optimization (PSO)-based algorithm for the travelling salesman problem (TSP) is presented, and is compared with the existing algorithms for solving TSP using swarm intelligence. In 2008, A software system is proposed to determine the optimum route for a Travelling Salesman Problem using Genetic Algorithm technique.In 2009, S.N. Sivanandampresents two approaches i.e Genetic Algorithms and Particleswarm optimisation tofind solution to a given objective function employing different procedures and computational techniques; as a result their performance can be evaluated and compared. In 2010, a novel hybrid discrete PSO algorithm has been presented by add heuristic factor, crossover operator and adaptive disturbance factor into the approach. Numerical results show that the proposed algorithms are effective. In 2011, Ivan Brezina Jr.discusses the Ant Colony Optimization (ACO), which belongs to the group of evolutionary techniques and presents the approach used in the application of ACO to the TSP. In 2011, a comparative performance of roulette wheel, Elitism and tournament selection method is presented to solve the Travelling Salesman problem. In 2012, different authors present a critical survey to solve TSP problem using genetic algorithm methods.

III. PROBLEM STATEMENT

Many methods such as Dynamic Programming technique, Branch and Bound technique, Heuristic method, technique have been developed for solving this problem. Recent implementations of branch-and-bound and cut based on linear programming works very well for up to 5,000 cities, and this approach has been used to solve instances with up to 33,810 cities. An exact solution for 15,112 German cities from TSPLIB was found in 2001 using the cutting-plane method proposed by George Dantzig, Ray Fulkerson, and Selmer Johnson in 1954, based on linear programming.

IV. PROPOSED SYSTEM

In the field of artificial intelligence genetic algorithm is a search heuristic that mimics the process of natural evolution. Genetic Algorithm belongs to class of evolutionary algorithm.GA begin with various problem solution which are encoded into population, a fitness function is applied for evaluating the fitness of each individual, after that a new generation is created through the process of selection, crossover and mutation. After the termination of genetic algorithm, an optimal solution is obtained. If the termination condition is not satisfied then algorithm continues with new population. The flowchart for proposed GA is described.

Advantages:

The major advantage of genetic algorithms is their flexibility and robustness. They are also readily amenable to parallel implementation. Using this method repeatedly, the population will hopefully evolve good solutions.

V. PROPOSED ALGORITHM:

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5.1 Genetic Algorithm:

A Genetic Algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. The genetic algorithm (GA) transforms a population (set) of individual objects, each with an associated fitness value, into a new generation of the population using the Darwinian principle of reproduction and survival of the fittest and analogs of naturally occurring genetic operations such as crossover (sexual recombination) and mutation.

Genetic Algorithm Basics

The basic terms and definitions in Genetic Algorithm are explained below.

➢ GA Representation methods: Common representation approaches are to encode solutions as binary strings (1's and 0's), arrays of integers or decimal numbers, strings of letters, where each position stands for a specific aspect of the solution.

➢ Population: The collection of all individuals is called as population. The genetic algorithm attempts to find a very good (or best) solution to the problem. By genetically breeding the population of individuals over a series of generations.

➢ Chromosome: A set of genes which define a proposed solution to the problem is called chromosome. The chromosome is often represented as simple string.

➢ Gene: A part of chromosome is called gene and it determines the solution

➢ Fitness function: Fitness function assigns fitness value to the individual. It is based on how far or close a individual is from the solution. Greater the fitness value better the solution is.

Genetic Operators: The important genetic operators applied onto the individuals are explained below.

➢ Encoding: The first step in using a GA is to define the "chromosome" encoding (the gene sequence). Encoding techniques such as bit string encoding, permutation encoding, tree encoding, etc., can be applied.

➢ Selection: The selection operation randomly chooses members of the population based on their fitness to enter a mating pool. Better an individual's fitness, the more likely it is to be selected. Some of the selection methods are Tournament selection, Ranking selection and Proportional selection.

➢ Crossover: Crossover is a genetic operator that combines (mates) two chromosomes (parents) to produce a new chromosome (offspring). There are many crossover techniques like one-point, two-point, uniform, half uniform crossover.

➢ Mutation: Mutation is used to maintain genetic diversity from one generation to the next. It helps to prevent the population from stagnating at any local optima. Different types of mutation are flip bit, boundary, uniform, non-uniform, etc.

VI .DESIGN

System design is transition from a user oriented document to programmersor data base Personnel. The design is a solution, how to approach to the creation of a new system. This is composed of several steps. It provides the understanding and procedural details necessary for implementing the system recommended in the feasibility study. Designing goes through logical and physical stages of development, logical design reviews the present physical system, prepare input and output specification, details of implementation plan and prepare a logical design walkthrough.

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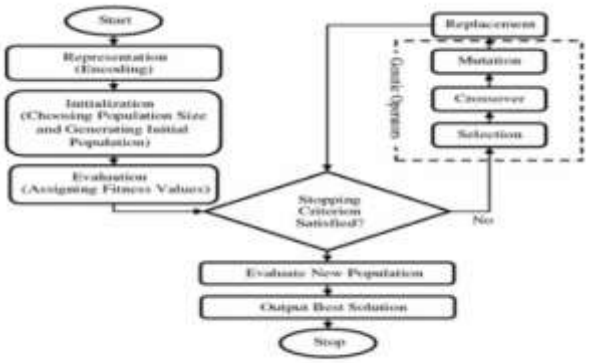
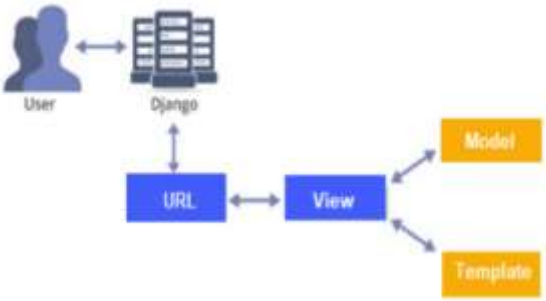
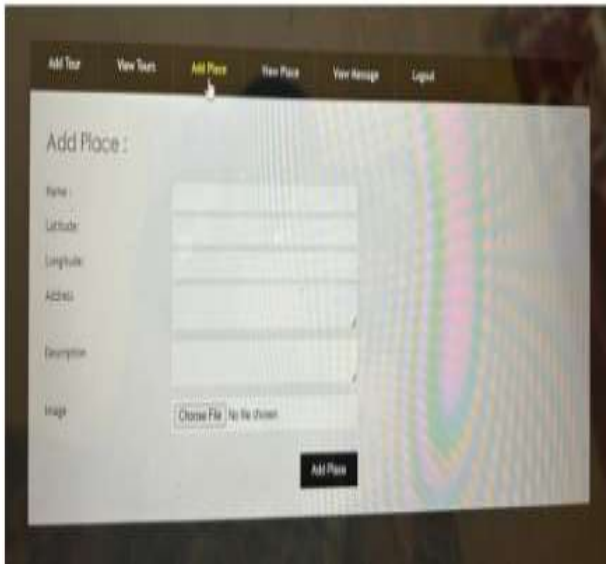


Fig 5. Architecture

Technical Architecture:





VII .RESULTS

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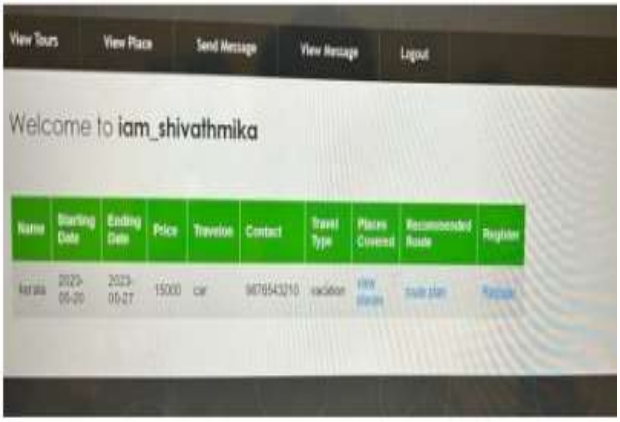

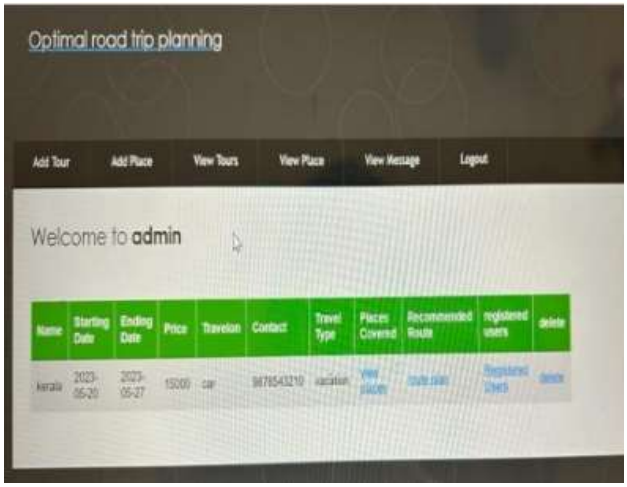

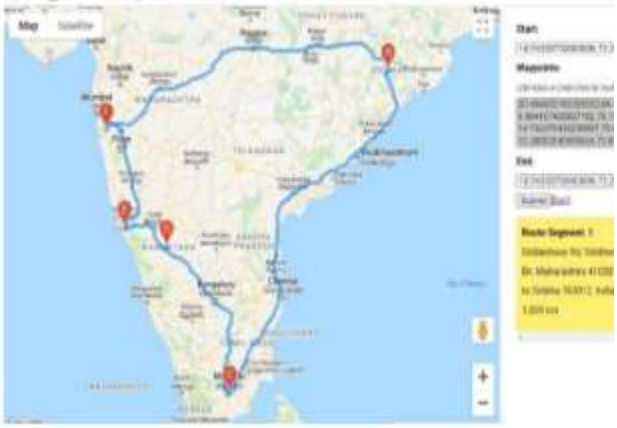

VIII. CONCLUSION

Combining the knowledge from heuristic methods and genetic algorithms is a promising approach for solving the TSP. Genetic algorithms appear to find good solutions for the travelling salesman problem, however it depends very much on the way the problem is encoded and which crossover and mutation methods are used. A number of genetic algorithm techniques have been analyzed and surveyed for solving TSP. The research work can be extended for different hybrid selection, crossover and mutation operators. The proposed approach can be applied for various advanced network models like logistic network, task scheduling models, vehicle navigation routing models etc. The same approach can also be used for allocation of frequencies in cells of cellular network.

REFERENCES

[1] ChetanChudasama, S. M. Shah and Mahesh Panchal, "Comparison of Parents Selection Methods of Genetic Algorithm for TSP", International Conference on Computer Communication and Networks (CSI-COMNET), 2011.

[2] Dwivedi, TarunaChauhan,SanuSaxena and PrincieAgrawal, "Travelling Salesman Problem using Genetic Algorithm", International Journal of Computer Applications(IJCA), 2012, pp. 25-30.

[3] Naveen kumar, Karambir and Rajiv Kumar, "A Genetic Algorithm Approach To Study Travelling Salesman Problem", Journal of Global Research in Computer Science, 2012, Vol. 3, No. (3).

[4] Adewole Philip, AkinwaleAdioTaofiki and OtunbanowoKehinde, "A Genetic Algorithm for Solving Travelling Salesman Problem", International Journal of Advanced Computer Science and Applications, 2011, Vol. (2), No. (1).

[5] Ivan Brezina Jr.,ZuzanaCickova, "Solving the Travelling Salesman Problem using the Ant

colony Optimization", Management Information Systems, 2011, Vol. (6), No.(4).

[6] ButhainahFahran, Al-Dulaimi, and Hamza A. Ali, "Enhanced Traveling Salesman Problem Solving by Genetic Algorithm Technique (TSPGA)", World Academy of Science, Engineering and Technology, 2008, Vol. (14).

[7] Rong Yang, "Solving Large Travelling Salesman Problems with Small Populations". IEEE 1997.

[8] Chiung Moon, Jongsoo Kim, GyunghyunChoi ,YoonhoSeo," An efficient genetic algorithm for the traveling salesman problem with precedence constraints", European Journal of Operational Research 140 (2002) 606–617, accepted 28 February 2001.

[9] ShubhraSankar Ray, Sanghamitra Bandyopadhyay and Sankar K. Pal," New Operators of Genetic Algorithms for Traveling Salesman Problem", 2004 IEEE.

[10] Lawrence V. Snyder a,*, Mark S. Daskin ," A random-key genetic algorithm for the generalized traveling salesman problem", European Journal of Operational Research 174 (2006) 38–53, 2005.

[11]Milena rova,VassilSmarkov,StoyanPenev," Genetic operators crossover and mutation in solving the TSP problem", International Conference on Computer Systems and Technologies- CompSysTech' 2005.

[12] Plamenka Borovska," Solving the Travelling Salesman Problem in Parallel by Genetic Algorithm on Multicomputer Cluster", International Conference on Computer Systems and Technologies - CompSysTech'06

[13] DING Chao, CHENG Ye , HE Miao," Two-Level Genetic Algorithm for Clustered Traveling Salesman Problem with Application in Large-Scale TSPs", TSINGHUA SCIENCE AND TECHNOLOGY ISSN 1007-0214 15/20 pp459-465 Volume 12, Number 4, August 2007.

[14] X.H. Shi , Y.C. Liang, H.P. Lee, C. Lu, Q.X. Wang," Particle swarm optimization-based algorithms for TSP and generalized TSP", Information Processing Letters 103 (2007) 169–176,2007.

[15] S.N. Sivanandam,S.N.Deepa,"A Comparative Study Using Genetic Algorithm