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Time Factor in Solving Travelling Salesman Problem Using Big Bang Algorithm and Genetic Algorithm

Tejinder Kaur[1] and Er. Anju Bala[2]

ABSTRACT

Travelling salesman problem finding a route covering all cities so that the total distance travelled is minimal. In the Big Bang phase, candidate solutions are randomly distributed over the search space. Deficiencies in performance of the algorithm have led to the further study of its theory and performance and reduce the complexity of Travelling Salesman Problem using genetic algorithm after reduced complexity using big bang. Evaluate the proposed work big bang by comparison with Genetic Algorithm.

Keywords: Genetic algorithm, travelling salesperson problem, operators.

INTRODUCTION TO TRAVELLING SALESMAN PROBLEM

This problem visiting all over city travel starting point to end point come back starting point this is called travelling salesman problem or consists of as many salesman persons and a set of many cities connected with each other one city another city. The salesman has to visit each one of the cities one time travelled starting from a point one cites and travel from all cites one time only and (e.g. the hometown, vehicle routing) and returning to the starting city. The main problem or challenge issue phase of the main problem is that the travelling salesman wants to minimize the total length of the each trip tour or cost of minimize. This is called travelling salesman problem, travelling salesman problem complexity (n-1

HISTORY

Salesman Problem was found by numerical equation presented in the 1800s century by the Irish numerical English man person W.R.H English man person and by the numerical equation perform T.K all person foreign scientific.[2] Game theory based many weighted graph cycle means weighted graph more remove highest edge cost. Considers most biggest example the brute-force algorithm example same as a travelling salesman problem, and observes the non- better best optimality solution means not optimal solution find only nearest point calculates.

DESCRIPTION

Travelling salesman problem, the distance Travelled in way in different -different sides. travel means symmetric way, form direction travelled an undirected complete graph no vertex or edge directed connected. Graph provide feasible solution example A to B C to D etc

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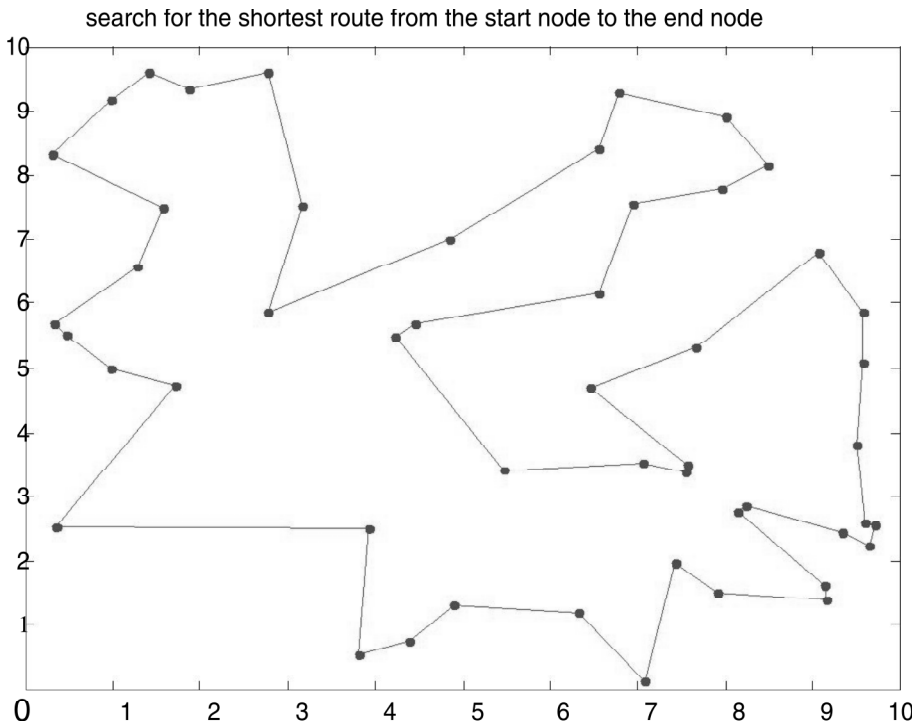


Figure 1: Search start city to end city

MORE PROBLEMS

Salesman means start point to start travel and come back to starting point this is called travelling salesman problem . Bottle-neck edge remove travelling salesman problem this is called define of bottleneck (bottleneck TSP): Hamiltonian biggest remove highest weighted edge removed . The problem is of only consider-able only theory but not practical importance only theory concept ,apart from transportation area find out profit or cost loss or given and logistics areas define logic function only.

INTRODUCTION GENETIC ALGORITHM

Optimal solution is method optimal best or near of good solution .This more information heuristic apply is daily used to better useful solutions or optimization best solution provide. Genetic algorithms belong to the larger area class 5000 9000 city apply of evolutionary algorithms growth describe or genetic algorithm expression capital .best solution only select fit values, such as inheritance provide child, mutation change of city, selection select the fit city, and crossover operator change the city interchange city. Salesman Problem combine set of object combinatorial optimization. [5] S.A method feasible solution to optimal solution means difficult method as compare to genetic algorithm , genetic algorithm, ant algorithm means ant travel one cites to come back starting point but in case of time not consuming process , particle swarm optimization problems search of food sources.[6]. problems cost provide every variables means number , job planning means scheduling problems task divided and vehicle scheduling same as travelling salesman problem routing problem proper travel relatives , mission planning , etc.

STEPS INVOLVED IN GENETIC ALGORITHM

- Common cycle of genetic algorithm step describe in genetic algorithm
- Initial population describe in population routes path
- Fitness value check the fit values of city
- Fit values check the best solution choose

- After operator used mutation or crossover

APPLICATIONS OF GENETIC ALGORITHMS

- Order picking problem in warehouse
- Artificial creativity performs genetic algorithm .
- Audio watermark detection perform detect only minor part .
- Building phylogenetic tree like first parents another produce child perform.
- tree like expressions operation perform.
- Wireless sensor/ad-hoc networks ad hoc network with in infrastructure used only genetic algorithm

POPULATION

A Group of atoms operation performs only an excited state than in lower energy states two operation perform lower or higher energy states means upper values.. population consists a groups of individuals only one selected value operation perform only define only complete solution problem. Population Number of cities are Generated.

Population Number of cities are Generated. The initial set of Population is a randomly generated set of individuals.

FITNESS

According, means x or y sexual relationship material only provide reproduction means child produce in this sexual relationship.

Formula fitness calculation

$$F(t)=\frac{\text{old fitness} - \text{average fitness}}{2\ \text{Variance}}$$

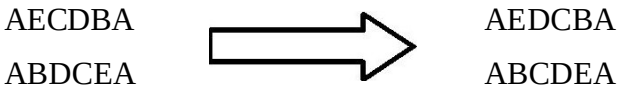
Fitness Calculated in this Project city randomly generated short city selected. This Method way avoids a large number of city. Small city are selected.

SELECTION

The selection process selected based values means cites determines which of the chromosomes rep 0 or 1 means child produced. This mixed population perform selection based on criteria. Selection operator chooses any selected values then operation perform.

CROSSOVER

Means Operator combined relationship produce child. Crossover is a operator 0 or 1 other crossover developing in various process. Crossover single only single point value change or two point information two values changed. Crossover is to choose two different city. Crossover to exchange two city.



MUTATION

- Values changed form of bits.
- One values changed D-B.

Example

BCADEB **BCABED**

Mutation operators only bits changed shown in example :D->B changed B->D. Firstly BCADEB-> converting in BCABED. only flip bit changed this is called mutation5 city each every nodes are connected or edge connected. this example distance find out using genetic algorithm and time elapsed find out this example .genetic algorithm find shortest distance every routes calculates minimum distance find out.

Table 1
Distance Between Cities

City	*A*	*B*	*C*	*D*	*E*
A	0	6	8	7	1
B	6	0	5	8	2
C	8	5	0	4	3
D	7	8	4	0	5
E	**1**	**2**	**3**	**5**	**0**

STEP 1: AECDBA,CBDAEC,BCDAEB SO….

AECDBA=22 or CBDAEC=24 or BCDAEB=19

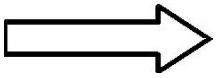
ROUTE 12: E->D->B->A->C->E->30

And so on till we get distances of all routes.

STEP 2: fitness criteria we select the route

Only selected BCDAEB

STEP 3: Crossover operation perform

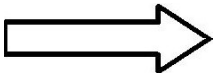


AECDBA AEDCBA

ABDCEA ABCDEA

STEP 4: mutation operation perform

AEDCBA AEBCDA



ACBDEA ABCDEA

Child routes C1 =AEBCDA

And C2=ACBDEA

STEP 3.Crossover operation perform

BCDAEB ⟹ BDCAEB

ECADBE EACDBE

STEP 4 mutation operation perform

BCADEB BCAEDB

EADCBE ECDABE

EADCBE=19

AEBCDA=19

BIG BANG INTRODUCTION

Centered of mass calculated light only single point find out the main point these points are single path follow are describe. It consists two phases:. Then calculates fitness fit only values in selected city. Second phase new -new child created.

Table 2
Distance Between Cities

City	*A*	*B*	*C*	*D*	*E*
A	0	6	8	7	1
B	6	0	5	8	2
C	8	5	0	4	3
D	7	8	4	0	5
E	1	2	3	5	0

STEP 1: AECDBA,CBDAEC,BCDAEB SO….

AECDBA=22 or CBDAEC=24 or BCDAEB=19

And so on till we get distances of all routes.

STEP 2: fitness criteria we select the route

Only selected BCDAEB route.

STEP 3. centre of mass we select the individual. Many input produced but result output one produced this is called a centre of mass.

$$\overline{x}^{c} = \frac{\sum_{i-1}^{n} \frac{1}{f^{i}} \overline{x}^{i}}{\sum_{i-1}^{n} \frac{1}{f^{i}}} \tag{1}$$

Table 3
Centre of mass calculating

Population	*Centre of mass calculating*
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	512
9	1024
10	2048
11	4096
12	8192

Total centre of mass= 2+4+8+16+32+64+128+256+512+1024+2048+4096+8192=16382

Big bang theory based on mass big bang theory first calculated in population or fitness next find out centered mass are calculated in city then new mass calculates shortest distance path easy calculated using big bang theory.

New centre mass calculating

$$x^{new} = \overline{x}^{c} + r1 * k \tag{2}$$

- R= normal random number
- K= iteration step
- L= max-min value

Table 4
Comparison TSP GA BIG Bang Literature Survey

comparison between TSP GA OR BIG BANG

TSP	*GA*	*BIG BANG*
The travelling salesman problem visiting all the city travel starting point to end point come back starting point this is called travelling salesman problem or consists of as many salesman persons and a set of many cities connected with each other one city another city	The Genetic Algorithm (GA) is method optimal best or near of good solution. This more information heuristic apply.	feasible solution divided randomly.
Operators not used tsp	Operators are used in genetic algorithm	Operators are used not in big bang
Speed slow in tsp	Speed slow in genetic algorithm	Speed slow in big bang
Process slow	Process slow of genetic algorithm	Process slow of big bang
Mathematical easy no numerical process	Mathematical difficult process	Mathematical difficult not process

contd. table 4

TSP	*GA*	*BIG BANG*
Mass centre are not found	Mass centre are not find	Mass centre are found
Offspring are not produced	Offspring are produced	Offspring are not produced
Tsp not used of adding subtracting concept big bang theory in normal random number	Genetic algorithm not used of adding subtracting concept big bang theory in normal random number	Big bang used of adding subtracting concept big bang theory in normal random number
They trouble finding not exact global optimum	They trouble finding exact global optimum	They trouble finding exact global optimum
Coding problem not require	Coding problem require	Not problem coding require
Small problem only solve mathematical	Small problem only solve mathematical	Large problem solve
They perform very well for no large scale optimization problem	They perform very well for large scale optimization problem	They perform very well for large scale optimization problem
Not produced of children	Produced of children	Produced of children
Population reputed	Population reputed avoided	Not population reputed avoided
Not coding problem	Problem varies coding to coding	Not coding problem required
Complex problem	Not complex problem	Not complex problem
Cost high produced	Minimum cost produced	Minimum cost produced
Not very biggest platform used	Biggest platform are used	Biggest platform are used

Poorti Sharma et al. [1] described local optimum are used in feasible solution. near bee only used in global optimum .bees are divided in small -small part or search the food divided group.

Zbigniew Swiitnicki et.al.[2] described perform operation only start to initial point or come back to starting point but one ant follow path another ant move on this sites example A ant follow >-B>-C-> . The based only not theory based but information are different collected.

Mohammad Asim [3] described Genetic Algorithm used natural selection techniques like crossover change city interchange process ,mutation flip bit change and selection city select only.

Aleksandar milajic, et.al. [4] described for solving truss problems one point another site wires calculated in nearest wires in centered point optimization problems.

Ryouei Takahashi et.al. [5] described travelling using generates changed the values example city , means combinations of two operators means combination of two things to unite all starting point to end point with those generated by edge assembly crossover operators.

Devasenathipathi N.Mudaliar et al. [6] described Based on a techniques operator based m- mapped crossover operator perform of genetic algorithm operations . we compare to the other crossover operators comparing only.

Xiaobin Wang, Daibo Liu, Mengshu Hou et al. [7] described A simple model SModel is generates visit into larger edge remove. or small edge selected preferentially as possible.

Peng Chen [8] described chid produce or mutation flip bit operation perform. Finally, experimental results better result provide.firstly calculation fitness next mutations.

Shih-Hsin Chen et al.[9] described starting point to end point visiting all the cites. used only two time crossover or operation method used.

V. Selvi, Dr. R.Umarani et.al, [10] described produced better solution different algorithm used.

YuYang, Hongwei Dai, Hui Li [11] described The 2-opt mutation exchanges some edges of parents to generate new children.

PROBLEM FORMULATION

Many different algorithm have been proposed by researchers across the world with respect to advancement and applications of different algorithm in the area of solving travelling salesman problem. But in some algorithm it was not feasible to solve the problem for salesman travelling issues in case of a larger area with a number of cities. There was also a problem for developing the shortest routes with minimum iterations, minimum distance travelled and minimum cost of tour in lesser time consumptions In the proposed work we will try to solve the problem with two different approaches : First approach, is genetic algorithm which is an optimized technique which can be applied to various problem in travelling salesman problem with less time and better results. Second approach, will be big bang theory which is also a better algorithm with travelling salesman solving approach.

OBJECTIVE

- In Travelling Salesman Problem scenario will create with 50 cities.
- To find the optimal path using Genetic Algorithm.
- To reduce the complexity of Travelling Salesman Problem using Big Bang.

  To evaluate the proposed work by comparison with Genetic Algorithm

METHODOLOGY

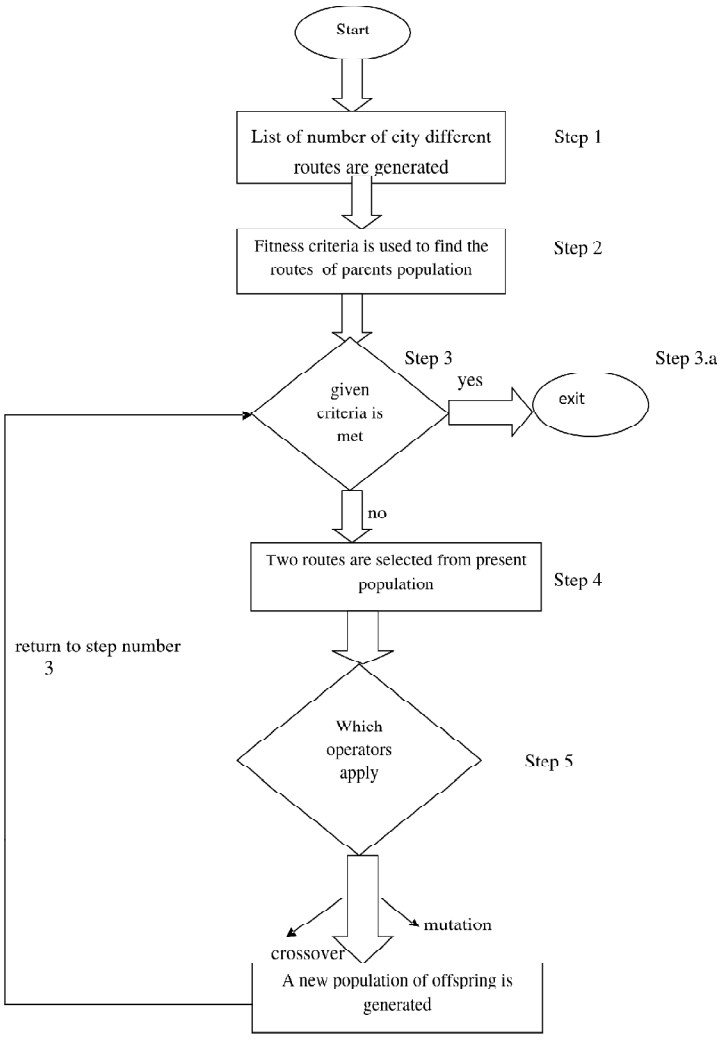


Figure 5: Flowchart to Find Shortest Route Using Big Bang

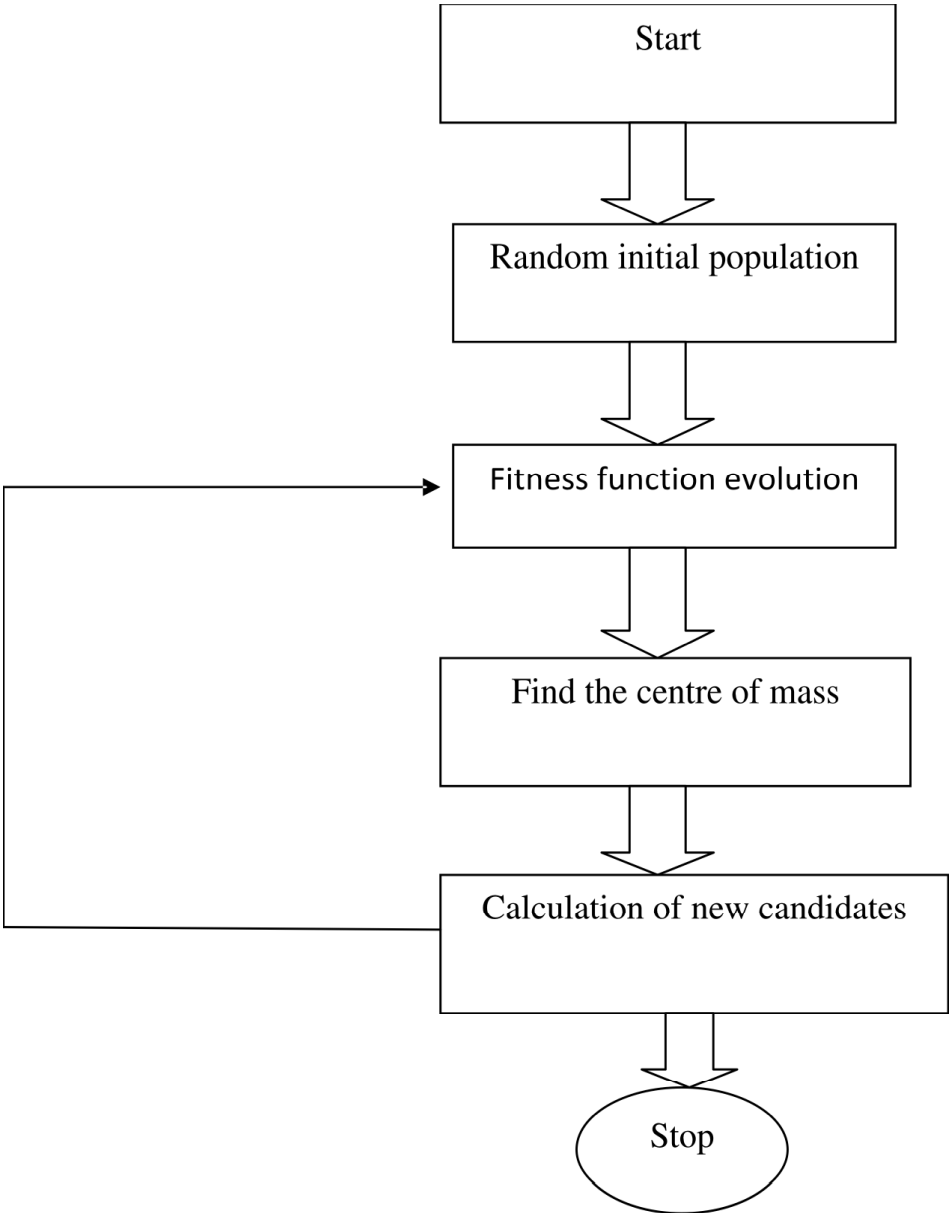


Figure 6: Flowchart to Find Shortest Route Using Big Bang

PROPOSED IMPLEMENTATION BIG BANG

Step 1: randomly selected in routes .randomly selected routes or only fit city selected

Step 2: fit only city values in selected of all the candidate solutions means feasible solution. fitness chromosomes provide in the population calculating depending on the basis criteria using fit the values city.

Step 3: operators only one output but many input

Step 4: in big bang theory .new candidates provides different –different population provide.

Step 5: city in fit stop the algorithm. mass calculating or produced in feasible solution so on.... .best solution given then algorithm stop

RESULT

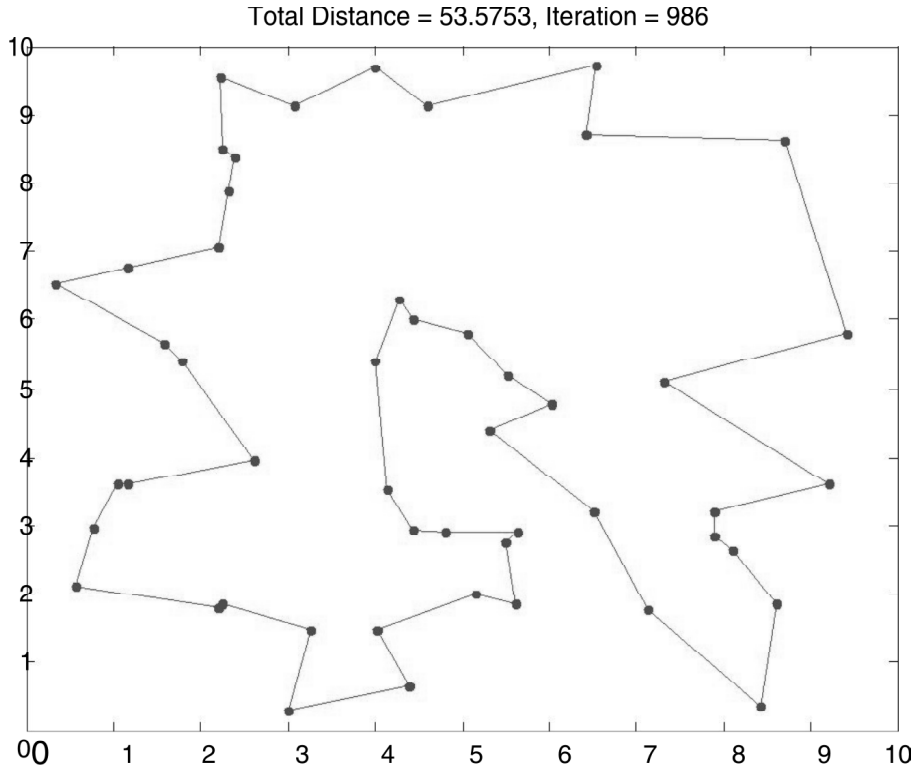


Figure 7: Shortest Distance Path Find Out Using Iteration Using Genetic Algorithm

In order according to testify whether the improved algorithm is effective, a number of experiments were done with different-different number of cities. The results show the significant differences in the number of iterations, times, distance short. 50 city coordinates were randomly selected. 1300 generations iterations were calculated applying the algorithm and the best path long about was found 50.

Table 5
Output of TSP taking as number of Cities 20

No of Cites	*No. of Salesman*	*No. of iteration*	*Total Distance*	*Time Taken*
20	1	117	38.8048	Elapsed time is 5.4606637 seconds

No. of cites 20 no of salesman 1 using find out the total distance 38.8048 elapsed time is taken 5.4606637 seconds. no of iterations total 117.output of TSP taking as number of cities 20 using total distance short 38.8048 time elapsed 5.460 seconds.

Total distance 38.8048 shortest distance path find out using 20 city location using apply genetic algorithm. No. of cites 20 no of salesman 1 using find out the total distance 38.8048 elapsed time is taken 5.4606637 seconds. no of iterations total 117.output of TSP taking as number of cities 20 using total distance short 38.8048 time elapsed 5.460 seconds.

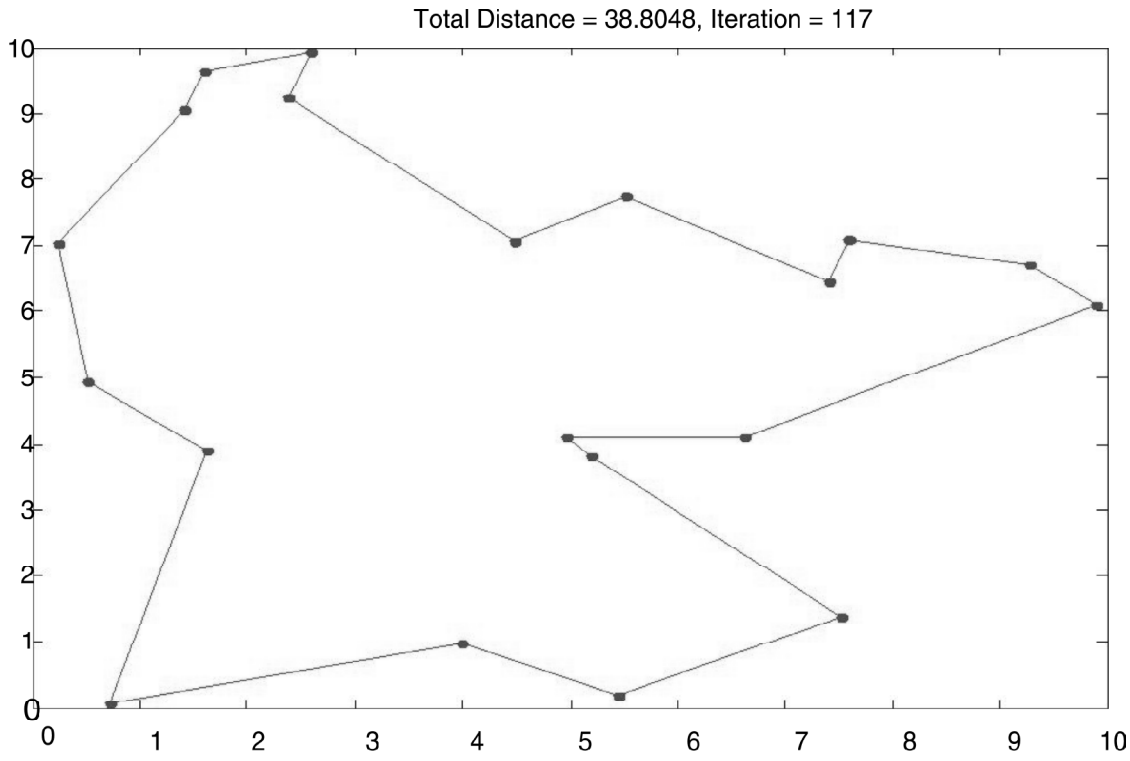


Figure 8: Shortest Distance Path Find Out Using 20 City Using Genetic Algorithm

Figure 9: Elapsed Time 20 City Using Genetic Algorithm

Elapsed time 20 city using genetic algorithm apply Elapsed time is 5.4606637seconds.iteration apply 117 find out the 20 city shortest distance. No. of cites 20 no of salesman 1 using find out the total distance 38.8048 elapsed time is taken 5.4606637 seconds.

Table 6
Output of TSP taking as number of Cities 30

	No of cites	*No. of Salesman*	*No. of Iteration*	*Total Distance*	*Time taken*
30	1	422	50.6932	Elapsed time is 6.311080 seconds.	

No. of cites 30 no of salesman 1 using find out the total distance 50.6932 elapsed time is taken 6.311080 seconds. no of iterations total 422.output of TSP taking as number of cities 30 using total distance short 50.6932 time elapsed 6.311080 seconds.

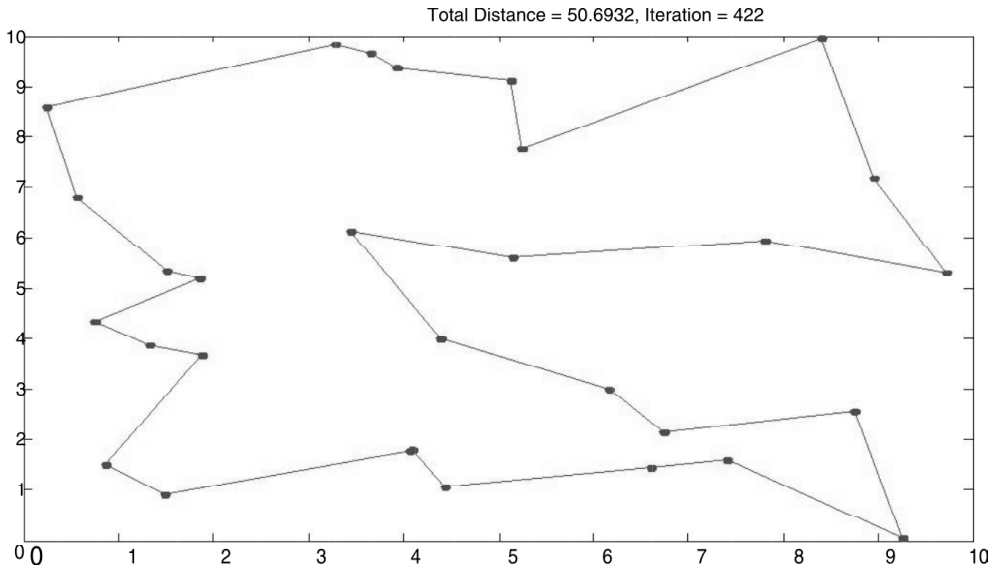


Figure 10: Shortest Distance Path Find Out Using 30 City Using Genetic Algorithm

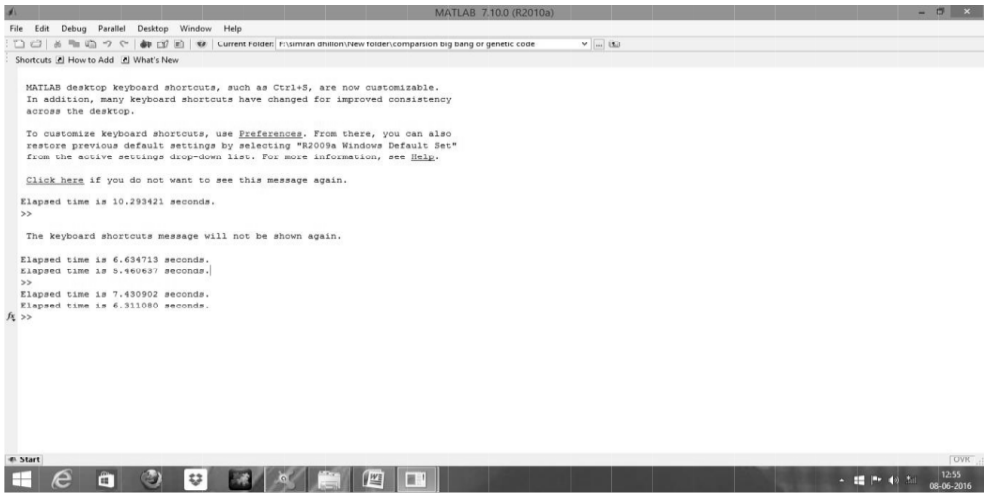


Figure 11: Elapsed Time 30 City Using Genetic Algorithm

No. of cites 30 no of salesman 1 using find out the total distance 50.6932 elapsed time is taken 6.311080 seconds. no of iterations total 422.output of TSP taking as number of cities 30 using total distance short 50.6932 time elapsed 6.311080 seconds.

Table 7
Output Of TSP Taking as Number Of Cities 50

No of cites	*No. of Salesman*	*No. of Iteration*	*Total distance*	*Time taken*
50	1	1068	61.4960	Elapsed time is 6.805088 seconds..

No. of cites 50 no of salesman 1 using find out the total distance 61.4960 elapsed time is taken 6.805088 seconds. no of iterations total 1068.output of TSP taking as number of cities 50 using total distance short 6.805088 time elapsed 6.805088 seconds.

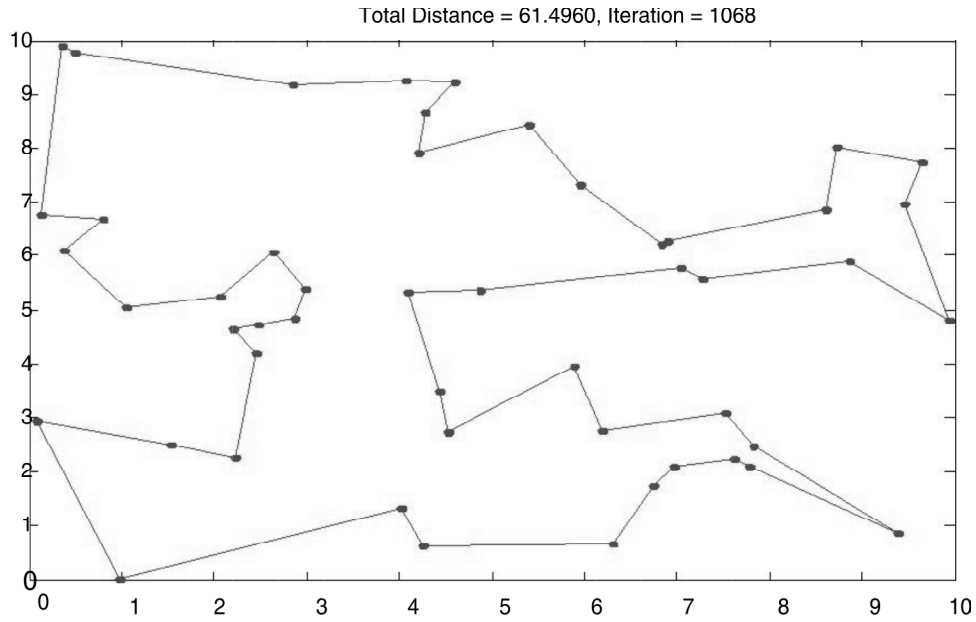


Figure 12: Shortest Distance Path Find Out Using 50 City Using Genetic Algorithm

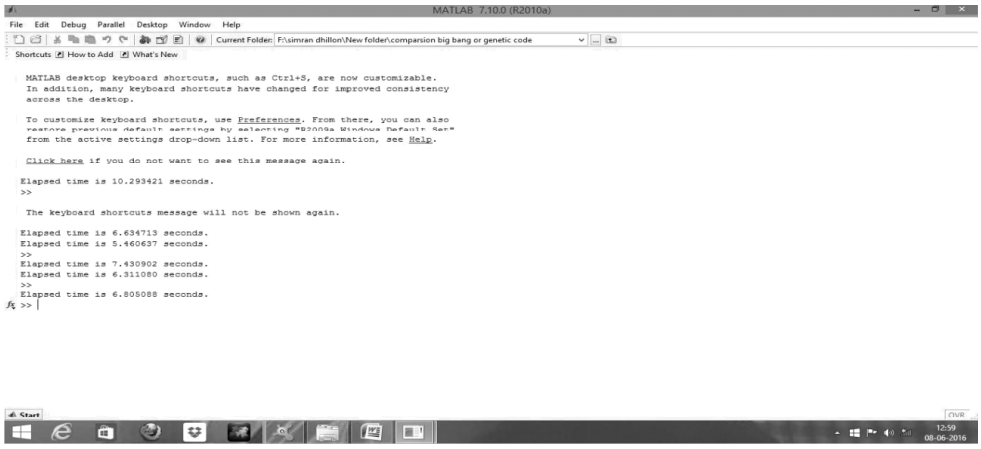


Figure 13: Elapsed Time 50 City Using Genetic Algorithm

No. of cites 50 no of salesman 1 using find out the total distance 61.4960 elapsed time is taken 6.805088 seconds. no of iterations total 1068.output of TSP taking as number of cities 50 using total distance short6.805088 time elapsed 6.805088 seconds. 8 Table : Output of TSP taking as number of Cities 100,200,300,400,500

No of cites	*No. of Salesman*	*No. of Iteration*	*Total distance*	*Time taken*
100	1	1224	85.8477	9.408960 seconds
200	1	1296	186.0166	12.769240 seconds
300	1	1295	309.9197	35.127811 seconds
400	1	1300	483.0746	20.275165 seconds
500	1	1299	719.9084	24.071629 seconds

No of cities 100,200,300,400,500 different-different.and number of salesman only one.100 number of cities and number of salesman 1 no of iteration 1224 but total distance 85.8477.but time elapsed is 9.408960 seconds. 200 number of cities and number of salesman 1 no of iteration 1296 but total distance 186.0166 but time elapsed is 12.769240 seconds. 300 number of cities and number of salesman 1 no of iteration 1295 but total distance 309.9197 but time elapsed is 35.127811 seconds. 400 number of cities and number of salesman 1 no of iteration 1300 but total distance483.0746but time elapsed is 20.275165seconds. 500 number of cities and number of salesman 1 no of iteration 1299 but total distance 719.9084 but time elapsed is 24.071629 seconds. 100 number of cities and number of salesman 1 no of iteration 1224, 200 number of cities and number of salesman 1 no of iteration 1296, 400 number of cities and number of salesman 1 no of iteration 1300, 500 number of cities and number of salesman 1 no of iteration 1299.

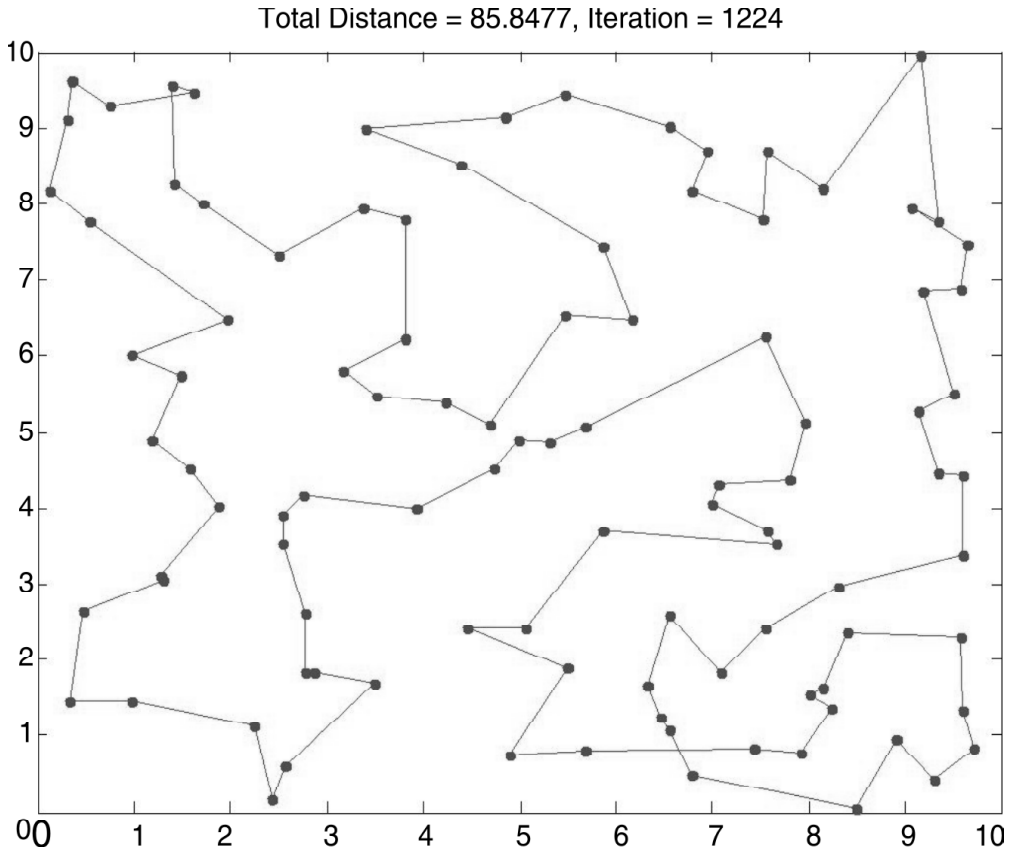


Figure 14: Shortest Distance Path Find Out Using 100 City Using Genetic Algorithm

100 number of cities and number of salesman 1 no of iteration 1224 but total distance 85.8477.but time elapsed is 9.408960 seconds.

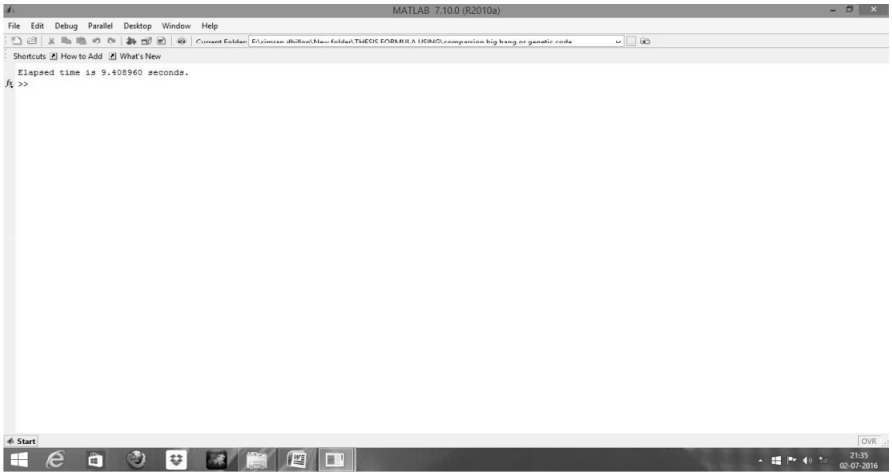


Figure 15: Elapsed Time 100 City Using Genetic Algorithm

100 number of cities and number of salesman 1 no of iteration 1224 but total distance 85.8477.but time elapsed is 9.408960 seconds. 100 number of cities and number of salesman 1 no of iteration 1224 but total distance 85.8477.but time elapsed is 9.408960 seconds.

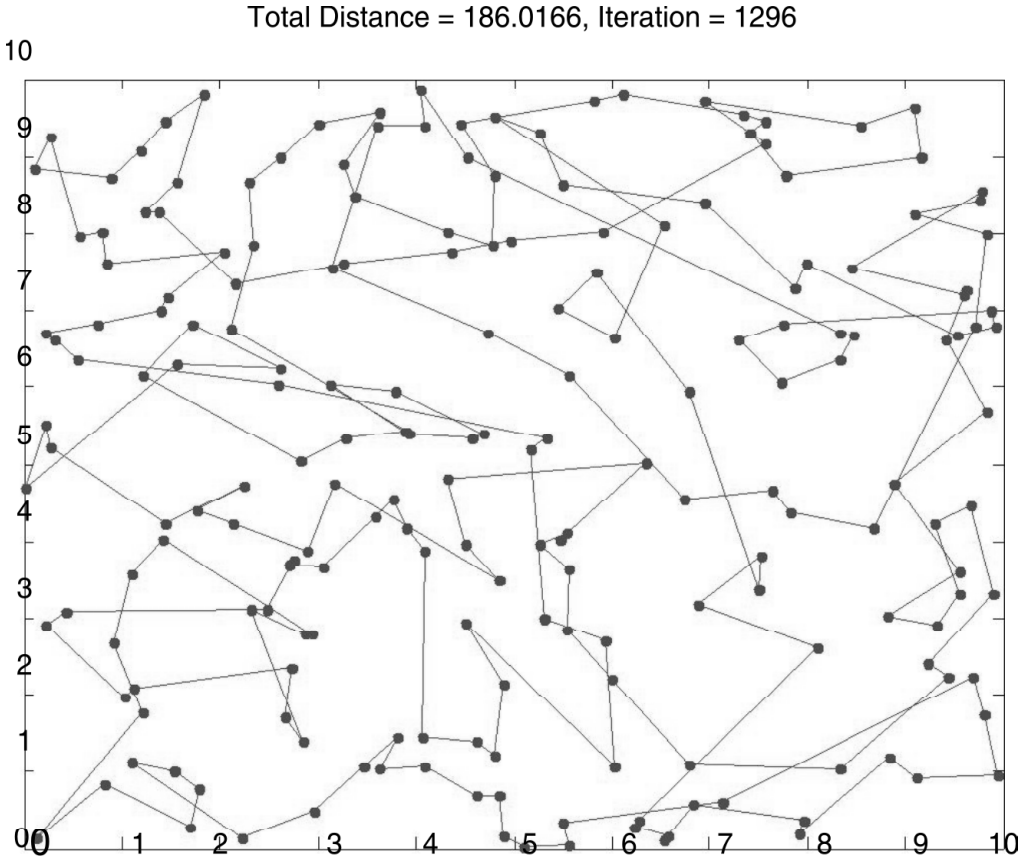


Figure 16: Shortest Distance Path Find Out Using 200 City Using Genetic Algorithm

200 number of cities and number of salesman 1 no of iteration 1296 but total distance 186.0166 but time elapsed is 12.769240 seconds.

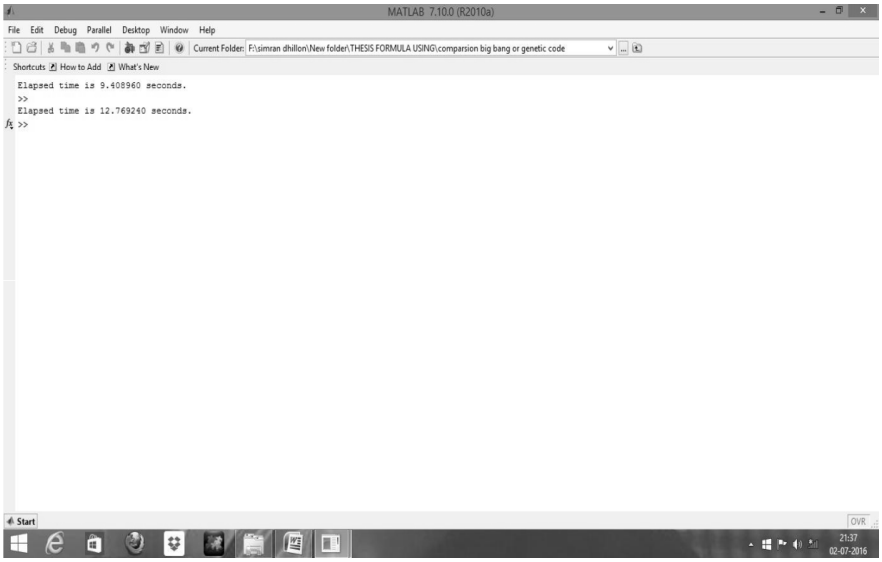


Figure 17: Elapsed Time 100 City Using Genetic Algorithm

200 number of cities and number of salesman 1 no of iteration 1296 but total distance 186.0166 but time elapsed is 12.769240 seconds.

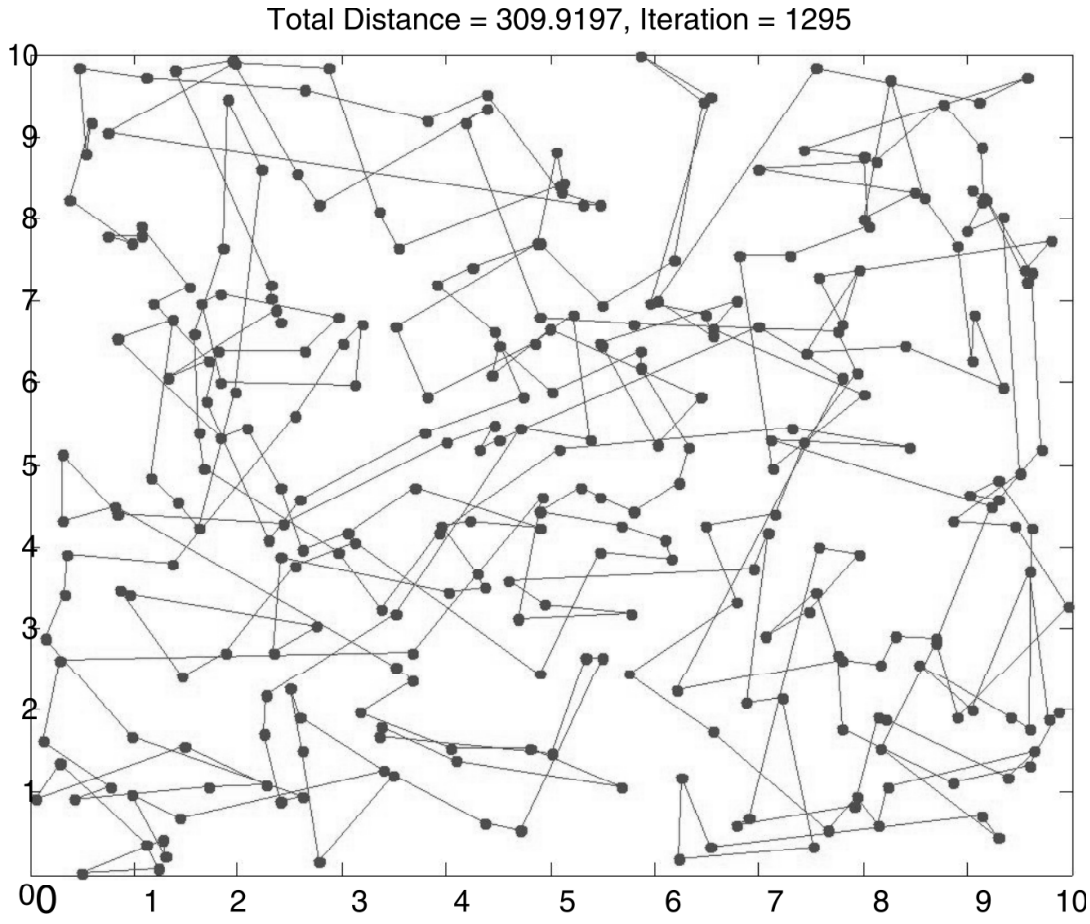


Figure 18: Shortest Distance Path Find Out Using 300 City Using Genetic Algorithm

300 number of cities and number of salesman 1 no of iteration 1295 but total distance 309.9197 but time elapsed is 35.127811 seconds

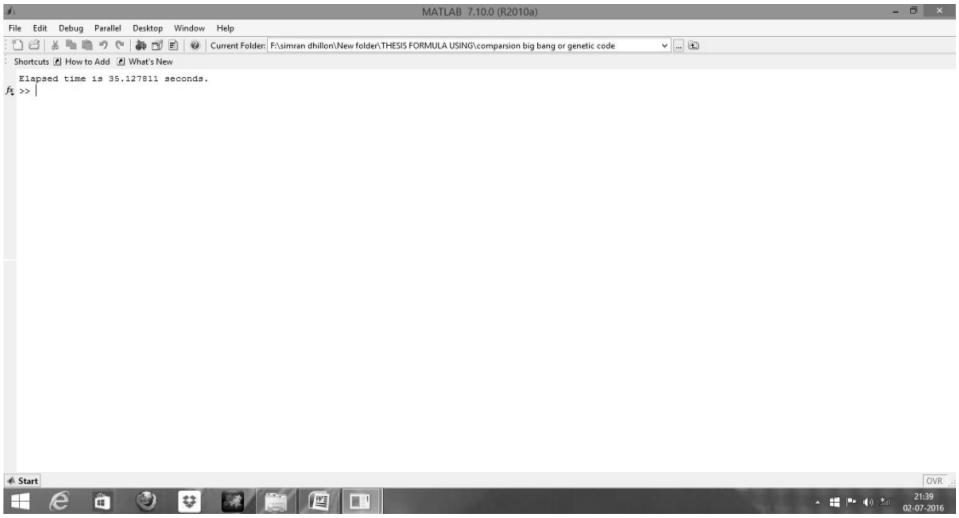


Figure 19: Elapsed time 300 city Using Genetic Algorithm

300 number of cities and number of salesman 1 no of iteration 1295 but total distance 309.9197 but time elapsed is 35.127811 seconds.

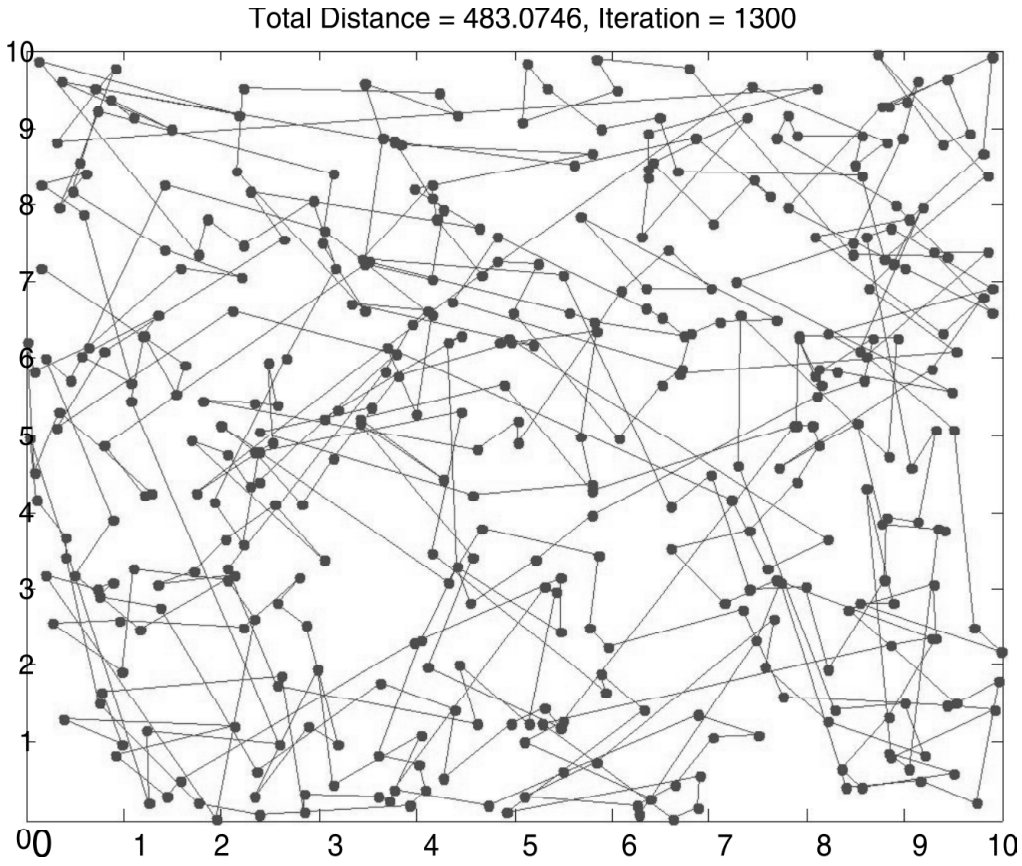


Figure 20: Shortest Distance Path Find Out Using 400 City Using Genetic Algorithm

400 number of cities and number of salesman 1 no of iteration 1300 but total distance483.0746but time elapsed is 20.275165seconds.

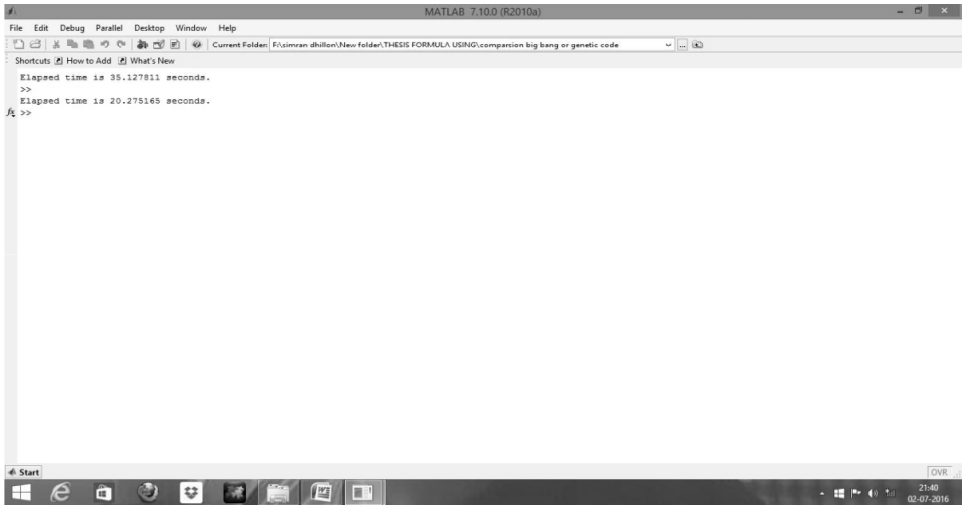


Figure 21: Elapsed Time 400 City Using Genetic Algorithm

400 number of cities and number of salesman 1 no of iteration 1300 but total distance483.0746but time elapsed is 20.275165seconds.

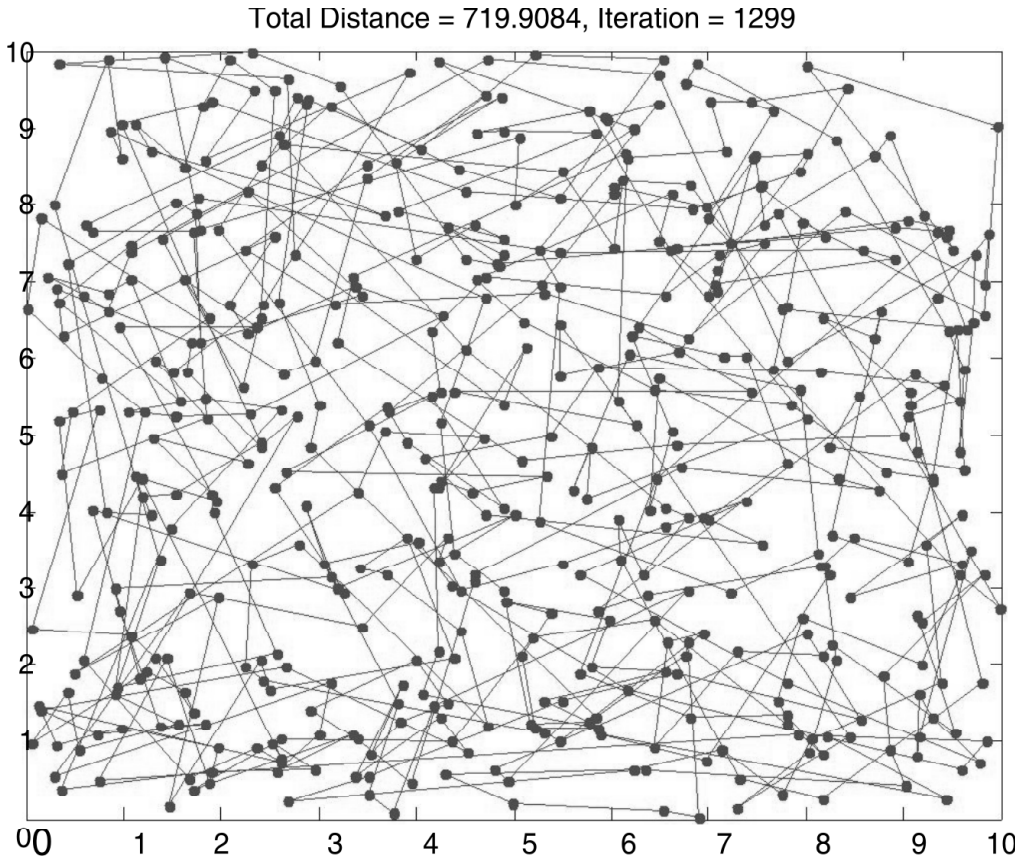


Figure 22: Shortest Distance Path Find Out Using 500 City Using Genetic Algorithm

500 number of cities and number of salesman 1 no of iteration 1299 but total distance 719.9084 but time elapsed is 24.071629 seconds.

Figure 23: Elapsed Time 500 City Using Genetic Algorithm

500 number of cities and number of salesman 1 no of iteration 1299 but total distance 719.9084 but time elapsed is 24.071629 seconds.

Table 9
Output of TSP taking as number of Cities 50

No of cites	*No. of Salesman*	*No. of iteration*	*Total distance*	*Time taken*
50	10	996	74.7897	Elapsed time is 31.486082 seconds.
	15	996	71.8624	Elapsed time is 31.486082 seconds.
	20	989	65.0558	Elapsed time is 27.285622 seconds.

Number of cities 50 but number of salesman 10,15,20.number of salesman 10 number of iteration 996 but total distance 74.7897 time taken elapsed 31.486082 seconds.15 number of city iteration used 996 total distance find using this iteration 71.8624 elapsed time is 31.486082 seconds. but 20 number of salesman using total iteration 989 time elapsed27.285622 seconds.

Table 10
Output of TSP taking as number of Cities 500

No of cities	*No. of Salesman*	*No. of iteration*	*Total distance*	*Time taken*
500	10	998	1333.7763	Elapsed time is 64.285049 seconds.
	15	993	1397.8994	Elapsed time is 81.999712 seconds.
	20	1000	1353.4148	Elapsed time is 104.156603 sec.

Table 5.2.3 or table 5.2.4 different- different result provide.5.2.3 table 50 city no of salesman 10 ,15, 20 or no of iteration 989 low time or distance time elapsed 27.285622 seconds. short distance 65. 500 city 998 iteration 1333.7763 or elapsed time taken 64.285049 seconds.or 500 city no of salesman 20 used no of iterations 1000. Produced total distance 1353.4148 in time taken which Elapsed time is 104.156603 seconds.

Table 11
Output of TSP taking as number of Cities 50 iteration fixed 1300

No of cities	*No. of salesman*	*No. of iteration*	*Total distance*	*Time taken*
800	10	1300	2303.7291	Elapsed time is 47.863643seconds.
	15	1299	2272.5615	Elapsed time is 108.227144seconds.
	20	995	2372.8019	Elapsed time is 86.416914seconds.

Number of cities 800 but different- different number of salesman 10,15,20 10 using number of iteration 1300 total distance 2303.7291.but number of salesman 20 provide total distance 2372.8019 elapsed time using 86.416914 seconds.

Table 12
Output of TSP taking as number of Cities 50 iteration fixed 1300

No of cities	*No. of salesman*	*No. of iteration*	*Total distance*	*Time taken*
900	10	1299	2614.4309	Elapsed time is 68.091921 seconds.
	15	1296	2619.3356	Elapsed time is 88.822765 seconds.
	20	1295	2571.3701	Elapsed time is 71.629435 seconds.

Number of cities 900 but different- different number of salesman 10,15,20 10 using number of iteration 1299 total distance2614.4309.but number of salesman 20 provide total distance 2571.3701 elapsed time using 71.629435 seconds.

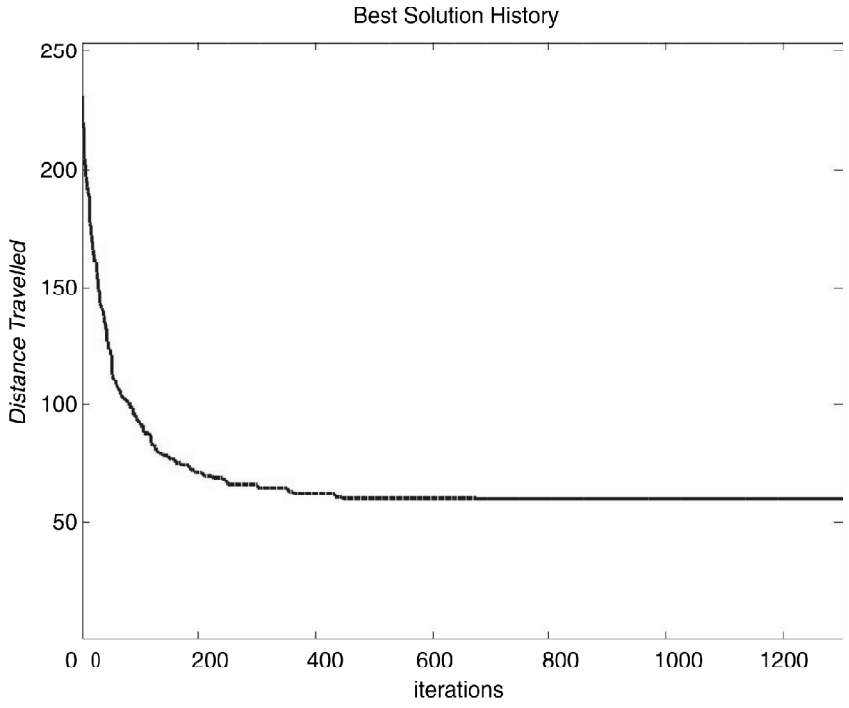


Figure 24: Shortest Path Or Best Solution Using Genetic Algorithm

Shortest Path total distance 53 in x and y location. Additional improvements were later given to GA provide best solution, transform in it to the optimal algorithm. Some parameter values higher performance best result. best solution provide iteration. iteration provide only path travelled in 1300 not extra path travelled.

Figure 25: Elapsed Time 50 City Or Number Of Salesman 20 Using Genetic Algorithm.

Time Elapsed in genetic algorithm 17.482883 seconds.50 city of location or no of salesman 20.or iteration fixed 1300.so elapsed time produced 17.482883.

BIG BANG RESULT

Figure 26: City Location Using big bang

Hubble : hubble.txt linear regression to estimate age of the universe according to big bang theory. hobble. txt file provide of a city location in different –different.

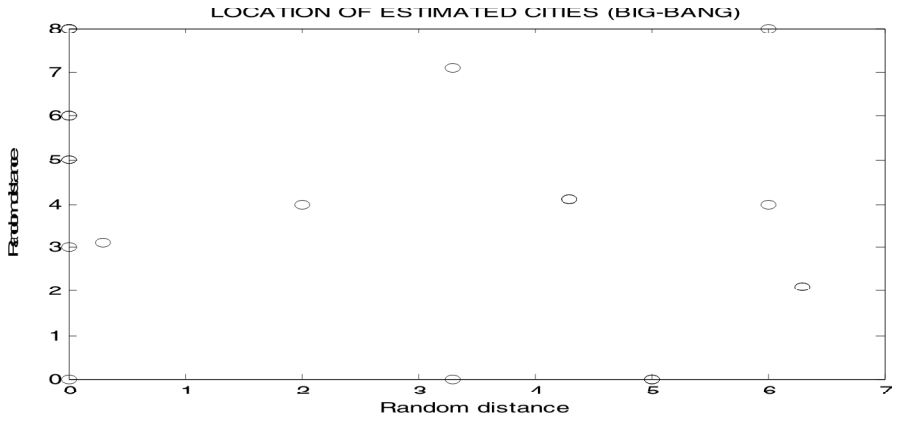


Figure 27: Location of City Using big bang

Total city of 6 location of estimated city (big bang).distance are randomly generated. city 6 location is 6*6 matrix in hubble.txt file. X or Y are randomly distance. title of location estimated cities using in big bang theory. city location travelled in single person man .big bang theory randomly city location are generates. x is a randomly distance or y axis randomly distance.

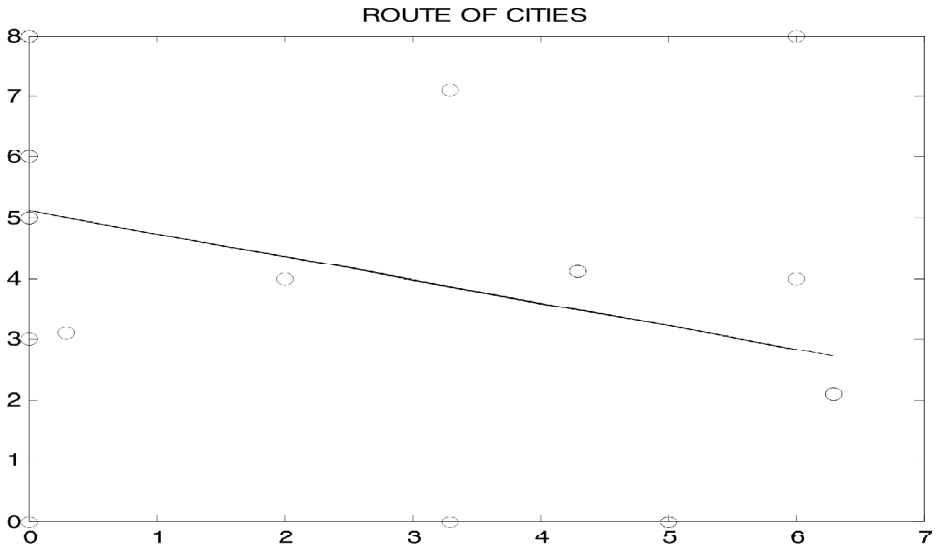
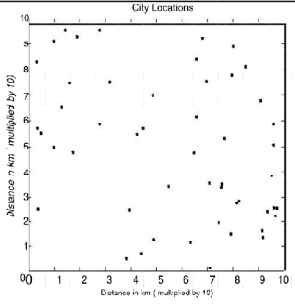


Figure 28: Shortest Path Or Best Solution Using big bang

Table 13
Comparison Between GA BIG BANG

Diiferance	GA	BIG BANG
Time	 Elapsed time is 23.872949 seconds. Time more required	 xi – (search space) 5 fi =(fitness) 19 ni =(number of population) 12 value for xc is 2.631579e-001 value for xnew is 2.762390e-001 Elapsed time is 0.291766 seconds. minimum time required.
City		 hubble.txt file of city location provide

y is represent distance travelled in km but y is randomly distances generates.4.5 total distance are travelled but in case of big bang theory 4.5 distance move in single routes and path follow in this case 4.5 distance decreases in 3.5.so total distance 3.5.big bang theory decreases distance. x or y distance randomly generates or title represents routes of city. total distance 4.5 but in big bang theory case distance decreases 3.5 so best solution or optimize solution in big bang theoy.

CONCLUSION

Genetic algorithms appear to find good solutions or best solution near to solution for the travelling salesman problem, however it depends very much on the way operators changes the city one city changed next city or second city changed in first city. It seems that the biggest problem or largest problem with the genetic algorithms devised for the traveling salesman problem very difficult problem is that it is difficult to maintain structure from the parent chromosomes means child produced many so difficult process of travelling salesman problem which is a permutation problem find out best or low cost in which goal is to find the shortest path between cities traversing means starting city to start tour find returns come back to start city each city at least once time used then find nearest solution. This paper gives a solution to find an optimum route for travelling salesman problem using Genetic algorithm technique only used, in which cities are selected only randomly used randomly as initial population. The new generations are then created repeatedly process complete until the proper path is reached upon reaching the stopping criteria otherwise.

FUTURE SCOPE

Future scope that will become efficient for finding out the short path among a number. of nodes in this project work. I took 98 number of nodes and available number of salesman problem. One could use the same technique to implement same design using more nodes with less execution time some when can also and some GUI for more implement one came used some other algorithm to implement the same design. genetic algorithm works for travelling salesman problem we observe how it creates solution without any problems it uses natural techniques like crossover mutation and selection to make computations time and many faster times. Then used big bang method future large scale optimization in this thesis project work only 500 city but in future 50,000 or 20,000 city find out the shortest distance in few mints and cost low or very fast speed method

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