

I. INTRODUCTION

Semarang is one of the largest cities in Indonesia, located in the province of Central Java. Semarang City has a variety of tourist attractions, historical places, culinary, and natural destinations that are favored by domestic and international tourists. Based on data from the Semarang city government's semarsata web in 2020, Semarang City has 35 (thirty-five) cultural attractions, 27 (twenty-seven) natural attractions, and 58 (fifty-eight) artificial attractions visited by domestic tourists as many as 2 million visitors [1].

With the variety of tourist attractions, visitors need a long time to find a tourist location that suits their needs, especially if visitors are not familiar with the intended tourist city, it will make it difficult for visitors to determine the route to the tourist location [2]. If the optimal route can be generated in a short time, it can improve the visitor experience and benefit more on the object of the location visited [2].

The problem is included in the TSP (Travel Salesman Problem) category. TSP is a shortest route finding problem where salesmen must visit a city exactly once and return at the starting city by minimizing distance and cost [3]. This research aims to solve the problem by implementing genetic algorithm.

Several previous studies have successfully utilized genetic algorithms to solve route optimization problems or TSP. Agrawal, Anil Kumar, et al. [3] applied GA to help the distribution of perishable goods based on a certain time so that the quality of the goods is maintained. It was found that the algorithm used could help solve route optimization problems with satisfactory results, but it was mentioned that there were other problems that arose, i.e. the absence of other indicator information in the form of travel time and estimated fuel needed to increase contextual awareness during the process. Lech, N., & Nikonczuk, P. [4] using genetic algorithms examined route optimization for finding the nearest electric car fueling station. From this research, it was found that the results of the algorithm used were verified to be able to solve the TSP, but it was mentioned that there were shortcomings in the algorithm used, i.e. the absence of information or other indicators in the form of electric fuel that had been used. This has an impact on the contextual awareness of users in using the system. It is mentioned that the use of such information can affect the route optimization results. Research [5] proves that the genetic algorithm is able to solve the problem of optimizing tourist location search routes in Cirebon City. The results obtained from the computation of the algorithm used are able to produce optimal routes based on minimum cost, as well as research [4] in the absence of other indicator information that provides more services for users, such as travel time, road terrain, and congestion load on the resulting route. Research [6] used genetic algorithm to solve the TSP problem of distributing goods of PT Pos Indonesia in Bandar Lampung City. In this study, it was found that the algorithm used proved to be able to solve TSP with satisfactory fitness results and optimal routes. In this study, problems arise as in the previous research mentioned earlier, i.e. the absence of indicator information in the form of fuel estimates, and allowable operating time.

It can be concluded that genetic algorithms have good competence in solving the TSP (Travel Salesman Problem). This has been proven by previous research that the algorithm is able to produce optimal routes with satisfactory fitness values. Therefore, this research will use genetic algorithms in building an optimal route search system in the case study of tourist sites in the city of Semarang. From these previous studies, a new problem arises, i.e., the absence of utilization of contextual information to increase user context awareness, because these studies only focus on developing algorithm models without considering contextual aspects that can affect user experience. Therefore, this research will solve the scope of the problem of optimizing tourist location routes in the city of Semarang using Genetic algorithms by carrying the novelty of "Context Awareness" in the form of contextual information on travel time adjusted to the conditions of lunch and dinner hours in producing recommendations for culinary locations in the city of Semarang.