1. Introduction

1.1 Background

Tourism is an important sector in supporting the development of a country [12]. Tourism provides an opportunity for many people to do activities outside the home that are aimed at having fun and also learning new knowledge [1]. Yogyakarta is a popular destination for tourists due in part to the abundance of cultural attractions in the region. Tourists typically visit Yogyakarta for 2 to 3 days [14]. Along with the development of digital information, information about tourist destinations can be easily accessed through various application platforms such as blogs, video maps, or other information applications [8]. However, many tourists still rely on information from friends or relatives to be used as a reference in determining tourist attractions [14]. Therefore, we propose an interactive system that can provide travel information and schedule travel optimally for *N*-Day with needs tailored to the user's preferences, such as rating, cost, and time.

Several travel scheduling systems have been developed to solve this problem. Uwaisy et al. [13] created a recommendation for scheduling tourist routes using the *Tabu Search* method in the city of Bandung, Indonesia. Baizal et al. [3] proposed scheduling tourist routes using the *Simulate Annealing* based on user preferences.

Travel scheduling and *Traveling Salesman Problem* (TSP) have the same problem in optimizing the search for the nearest route on a series of predetermined locations. Each location is visited exactly once and returned to the starting location [3]. Some algorithms that can be implemented for solving TSP include *Cat Swarm Optimization* (CSO) [2], *Particle Swarm Optimization* (PSO) [15], *Genetic Algorithm* (GA) [9], *Cuckoo Search Algorithm* (CSA) [6], *Tabu Search* [13], *Simulated Annealing* (SA) [3], *Ant Colony Optimization* (ACO) [5], *Firefly Algorithm* (FA) [10], and several other algorithms.

CSO is one of the *Swarm Intelligence* (SI) algorithms inspired by the behavior of cats [7]. Chu and Tsai [2] conducted six test cases on CSO that produced the *Global Best Solution*. CSO is chosen to find the optimal result in scheduling tourist routes. Further, to accommodate the needs of tourists, the CSO algorithm is combined with the *Multi-Attribute Utility Theory* (MAUT) concept. MAUT is a method for solving problems with several interrelated criteria considerations [11]. In travel scheduling, criteria include tourist rates, tourist popularity, and the time required to travel to each selected tourist destination. The combination of the CSO algorithm and the MAUT concept aims to produce optimal results in the travel scheduling system. In this study, we propose a recommendation system for *N*-day travel plan using CSO algorithm to find optimal routes and MAUT to consider various criteria, including ratings, cost, and time, in order to meet the needs and preferences of users.

1.2 Topic and Limitations

The topic of this research is the application of the combination of Cat Swarm Optimization (CSO) Algorithm and Multi-Attribute Utility Theory (MAUT) to optimize the recommendation of tourist route scheduling for N days. The limitations in this research are that the data used is only obtained from SerpAPI and Google Map API, the tourist visit time is limited to 8 a.m. to 8 p.m. in one day, and the restriction on the type of vehicle used is limited to cars only. Therefore, the solution applied by the CSO algorithm must consider both limitations in order to produce an optimal recommendation for tourist route scheduling.

1.3 Purpose

This research aims to implement the Cat Swarm Optimization (CSO) Algorithm in the tourist route scheduling system. In addition, another objective is to measure the performance of the Cat Swarm Optimization (CSO) Algorithm, considering the level of optimization produced. This aims to ensure that the Cat Swarm Optimization (CSO) Algorithm can provide an optimal solution in the process of tourist route scheduling. Therefore, in this research, the researcher will focus on implementing and evaluating the Cat Swarm Optimization (CSO) Algorithm in the tourist route scheduling system.