

Chapter 1

Experimental Study

1.1 Experiments

In this chapter, we validate the performance of our main approach to evaluate Spatial Alarm queries in Obstructed, and compare it with the naive approach. We run all experiments using a computer with Intel Core i5 2.30 GHz CPU and 4GB RAM.

We have used both real and synthetic datasets to evaluate our solution. In case of real datasets, we have used obstacles and point of interests (POIs) of Germany. The obstacle set has 30674 minimum bounded rectangles (MBRs) of railway lines (rrlines). In our experiment we assume obstacles to be presented by MBRs, but our algorithm can handle any type of obstacles. The POI set has 76999 MBRs of hypsography data (hypsogr). We assume datapoints to be endpoints of the hypsography data. In this way the POIs and obstacles are in the same plane which allows us to simulate a real-life scenario. We do not allow intersections between POIs and obstacles, neither do we allow duplicate POIs or obstacles. In case of synthetic datasets we generate the obstacles and POIs from the real datasets using a uniform distribution. We normalize both real and synthetic dataset in a $10,000 * 10000$ grid.

In our algorithm, we assume only one type of POIs. However our algorithm can handle multiple type of POIs also. Two separate R-trees have been used to store the POIs and Obstacles in the memory. We simulate the movement of the client in the runtime. Each movement of the client is generated with a 2 second interval, the direction and velocity of the client is randomly generated.

The velocity of the client is assumed to be in the range 0 to 40 m/s. We do not allow intersection between a client’s movement and an obstacle MBR. We also do not allow the client to move outside the normalized grid.

In our experiments, we vary the following query parameters: (i) the length of path travelled by the client, (ii) the query range r (iv) the size of data sets (synthetic data set). Table 1.1 summarizes the parameter values used in our experiments. In all experiments, we estimate I/O accesses and the query processing time to measure the efficiency of our algorithms. In each set of experiments, we run the experiment for 100 queries and present the average result.

Parameter	Values	Default
Length of Clients Movement	100,200,300, 400	500
Alarm Range r	50, 100, 150, 200	250
Synthetic data set size	5K, 10K, 15K, 20K	-

Table 1.1: Values of different query parameters used in our experiments

We first present our experiment results for processing spatial alarm queries for naive approach in Section 1.1.1, then we present experimental results for our main approach (Section 1.1.2). Finally, in Section ??, we compare the results of two approaches.

1.1.1 Naive approach

1.1.2 Our approach