Held-Karp Algorithm to Approximate Solutions to the Traveling Salesperson Problem

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Abstract

The Traveling Salesperson Problem has long been one of the most visibile NP-Complete problems in the fields of computer science and mathematics. What follows is an examination and implementation of a Held-Karp algorithm for quickly approximating solutions to this problem. This dynamic programming algorithm will be compared to a greedy approximation, random path, and a branch-and-bound algorithm. Our intention is to show that the dynamic Held-Karp algorithm’s relative optimization in terms of accuracy and time/space complexity.

1. Introduction

The Traveling Salesperson Problem is especially confounding to scientists, because of the cognative gap between understanding the problem and being able to efficiently find the true solution. Included in this report will be a explination of the greedy algorithm for approximating a solution to the traveling salesperson problem, and a further exploration into the Held-Karp dynamic programming algorithm which attempts a more accurate approximation. We will be comparing the time and space complexity of these implementations of these two algorithms, as well as providing empiracal evidence supporting

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