

# **Bidirectional Search That Is Guaranteed to Meet in the Middle**

**By:**

**Aman Peshin** - 1225476655 - apeshin@asu.edu

**Vishal Jaimin Vakil** - 1225551353 - vvakil1@asu.edu

**Sandeep Kallepalli** - 1225463655 - skallep2@asu.edu

**Appari Lalith** - 1225493945 - alalith@asu.edu

## **Meeting 2:**

Scribe: Vishal Jaimin Vakil

Meeting Date: 3rd November 2022

Meeting Attendance: Aman, Vishal, Sandeep, Appari were present

Expectation from each team member: To have done a thorough literature survey about the topic and expected to have gained thorough understanding of the paper and topic.

Inputs from each team member:

- Vishal - Came up with the following details and explained it during the meeting:  
In a 1975 paper, "Bidirectional Search" by Richard E. Korf, the author proposed a search algorithm that could be used to solve path problems in the shortest amount of time. The algorithm starts by searching forward to find a path from the start to the goal, and then searches backward from the goal to the start. The two searches meet in the middle if a solution is found. The algorithm also keeps track of the best solution found so far, and uses this information to prune the search tree as much as possible. Korf's algorithm is still one of the most commonly used bidirectional search algorithms.
- Aman - Came up with the following details and explained it during the meeting:  
In a 1988 paper, "Bidirectional Heuristic Search" by Larsen and Tsatsi, the authors proposed an extension of Korf's algorithm that uses heuristic information to guide the search. The algorithm starts by searching forward and backward from the initial and goal states until a solution is found. The heuristic is used to prune the search tree and to guide the search towards the goal state. The algorithm also keeps track of the best solution found so far, and uses this to prune the search tree further.
- Appari - Came up with the following details and explained it during the meeting:  
In a 1999 paper, "Bidirectional Search with Limited Memory" by de Laat and de Weerd, the authors proposed an algorithm that uses limited memory to limit the search space. The algorithm starts by searching in both directions from the initial and goal states. The search is limited to a certain size of the search tree, and the search space is pruned by removing nodes that do not lead to the goal state. The algorithm also keeps track of the best solution found so far, and uses this information to prune the search space even further.
- Sandeep - Came up with the following details and explained it during the meeting:  
In a 2005 paper, "Bidirectional Search with Weighted Paths" by Chen and Chen, the authors proposed an extension of the previous algorithm that uses weighted paths to guide the search. The algorithm starts by searching in both directions from the initial and goal states. The search is guided by a weight function which assigns different weights to different paths in the search tree. The weight function is used to prune the search space and to guide the search towards the goal state. The algorithm also keeps track of the

best solution found so far, and uses this information to prune the search tree even further.

Agenda of the meeting: To explain the paper contents and share the literature survey efforts by each individual.

**Task progress:**

Milestone 1: Getting started with the Project (Understanding of the topic and project requirements.) - 100% complete.

Milestone 2: Literature Survey (Gaining deeper knowledge about the tasks that needs to be done in this project.) - 100%

Milestone 3: Developing the code for Bidirectional search implementation - 0% complete.

Milestone 4: T-testing - 0% complete.

Next meeting date: 10th November 2022

Next Meeting agenda: Literature survey and discussion.