Analysis of Rubik’s Cube Solving Algorithms

Project Diary

# Meeting 1: September 4, 2021

## Objective of meeting

* Is the project idea feasible?
* What are the prior research works?
* What are the basic requirements?

## Outcome of the meeting

* Project idea is feasible
* Prior works by – Richard E. Korf, Tomas Rokicki, Thistlewaite, Kociemba.
* Understanding of advanced C++, Graph theory, Branch and bound algorithms.

## Next Step

* Gather related works.
* Study all the algorithms thoroughly.
* Find out necessary technical requirements like data structures and algorithms.

# Meeting 2: September 12, 2021

## Objective of meeting

* Gather related works.
* Discussion of all the algorithms thoroughly.
* Discussion of technical requirements like data structures and algorithms.

## Outcome of the meeting

* There are very little to none research papers regarding these algorithms.
* It is very hard to find explanation or implementations of the algorithms except for their original papers.
* Thistlewaite was the first to implement the idea.
* Kociemba's algorithm was improvement over Thistlewaite’s algorithm.
* Rokicki's algorithm was improvement over Kociemba’s algorithm.
* Korf's algorithm works on 3 laws of Rubik’s cube along with pattern databases for heuristics.
* All algorithms work on graph data structures.
* All algorithms work on IDA\* algorithm.

## Next Step

* Study IDDFS algorithm.
* Study A\* algorithm.
* Try to implement IDDFS algorithm over a square of 2x2.

# Meeting 3: September 16, 2021

## Objective of meeting

* Discuss IDA\*
* Discuss Data Structure of the cube.

## Outcome of the meeting

* Algorithm of IDA\* figured out.
* Expected data structure => 2 separate datastructure => 1-Corners, 2-Edges ()

## Next Step

* Study Data Structure.
* Study Thistlewaite’s algorithm.
* Figure out heuristic function for thistlewaite’s algorithm.

# Meeting 4: September 21, 2021

## Objective of meeting

* Discuss Pattern database.
* Discuss data structure of pattern database.

## Outcome of the meeting

* Collected few resources regarding pattern databases.
* Because of very few resources available for thistlewaite’s algorithm, it is better to do korf’s algorithm first.

## Next Step

* Figure out pattern database.

# Meeting 2:

## Objective of meeting

## Outcome of the meeting

## Next Step