

Rubik's Cube Solver

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This project focuses on the design and development of a 3×3×3 Rubik's Cube solver application that enables users to scan the cube's faces and receive an optimized, step-by-step solution. The application integrates image-based input for capturing the cube's edge and face colors, followed by computational analysis to determine the cube's current state. The primary problem addressed in this project is the complexity involved in accurately interpreting cube configurations and generating an efficient solution sequence within a reasonable time frame. Solving a Rubik's Cube optimally requires handling a large number of possible permutations while maintaining accuracy and performance.

To address this problem, the application implements the **Kociemba Two-Phase Algorithm**, which reduces the solution space by dividing the solving process into two structured phases. This approach enables faster computation of near-optimal solutions while ensuring correctness. The system processes scanned data, maps it to a valid cube representation, and applies the algorithm to generate clear, executable solving steps. The expected outcome of this project is a reliable, user-friendly solver that demonstrates effective use of algorithms, image processing, and problem-solving techniques, while showcasing strong skills in software development and algorithmic optimization.

References

[1] <https://kociemba.org/>