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Minimizing move-counts in Rubik's Cube speedsolving. Preliminary report.

Speed-solving is the most popular category of Rubik's Cube competitions today, with 15-second solutions becoming increasingly common. Many devotees are equally interested in solving for fewest moves, and can typically save, at the expense of about one hour, at least 20 moves from the roughly 60 moves required by speedsolvers. This talk concerns the use of Monte Carlo techniques and permutation group algorithms in an automated search for solution systems with the properties (1) they average under 40 moves, (2) they require only a "reasonable" number of memorized move sequences (unlike existent optimal solvers). We discuss some candidate systems recently found, of interest to both speed- and fewest-moves-solvers alike, which suggest an affirmative answer to the question: is there an algorithm by which a human solver may average under 40 moves and within 40 seconds? (Received January 23, 2007)