Foundations of AI Project Proposal

Sudoku Vision

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Aim

To develop an application that solves Sudoku puzzles from images using the most optimal method for different difficulty levels (by adjusting the proportion of the problem that will be solved by Constraint satisfaction and Backtracking).

Expected Procedure

1. Sudoku Image to Array: Contour Analysis of the Sudoku Grid Image and Optical Character Recognition to convert the Sudoku image into an array of integers.

2. Difficulty Classification: Defining metrics for classifying given Sudoku into Easy, Medium and Hard, simplifying the process to design optimal algorithms.

3. Optimal Algorithm Design: Analysis of the algorithms (by varying proportion of the problem to be solved by Constraint Satisfaction and Backtracking) for optimising the time taken and the space required to solve the Sudokus of different difficulty levels (Easy, Medium, Hard).

4. Application Development: Development of Web/Desktop/Android application to provide a suitable user interface (capture the image and get the answer).

Expected Outcome

Web/Desktop/Android application to provide a suitable interface to the user to effortlessly solve the Sudokus from images (allowing the user to capture the image of the Sudoku board, convert the Sudoku image to Sudoku array, classify the Sudoku into its respective difficulty level and use the respective algorithm to solve the sudoku optimally and display the corresponding results).

Required Tools and Softwares

Algorithms: Backtracking, Constraint Satisfaction

Python: OpenCV, Scikit Image, TensorFlow, Matplotlib

Application Development: HTML+CSS+JS+Flask / Streamlit / PyGame / Kivy Python

Future Prospects

Exploring the possibility of using Reinforcement Learning to solve Sudokus.