Solving Sudoku with Consistency: A Visual and Interactive Approach

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Goals
An interactive Sudoku solver to support
• Research: Solve a Sudoku without search
• Education: Illustrate basic, advanced techniques of Constraint Processing
• Outreach: Demystify AI to the public

Features
• Two constraint models: binary, nonbinary
• Five consistency properties (one new) and ten algorithms
• Five algorithms for maintaining consistency after user input
• History (tracking, navigation) of user’s actions
• Database storing puzzles along with the number of clues in a puzzle and the weakest consistency property that solves it
• Puzzle recognition from uploaded images
• 375 hardest known puzzles, all of which solved by consistency algorithms alone

Interface
Highlights scope of active constraint
Shows current domain, also reflected in history
Chooses to enforce a given consistency property

Consistency Algorithms
AC
SGAC
POGAC
BISGAC
SSGAC

Open Question
SSGAC can solve every 9x9 Sudoku puzzle in our Database including the 375 hardest known instances. However, determining the weakest level of consistency sufficient to solve any 9x9 Sudoku puzzle remains an open question.