IT Services

Case Study

BlueBEAR provides a substantial computing resource that properly supports the research work of research staff and students at Birmingham. It provides a cost effective facility that optimises the effectiveness of research and ensures the University continues to be a world-class academic learning and research environment.

Chunk Learning and Move Prompting Making Moves in Chess

Challenges

Can a computer be programmed to 'think' like a human? Consider the game of chess: computers work out a move by systematically examining every possible move and counter-move many ply ahead, evaluating millions of resulting chessboards, however when observing human players it seems that expert players recognise groups of chess pieces and in doing so, focus their attention on a few possible moves. The process, known as 'chunking' is claimed to attribute the expert player with knowledge of chunk patters which direct attention to just a few salient moves. Is it possible to model human behaviour in a computer program, and if so, does the recognition of chunks in a computer chess program effectively reduce the search to the right moves?

Background

A large number of transcripts from Grandmaster games were downloaded from the Internet to provide example chessboard configurations, and their resulting move. From each board all pieces were combined to make 'chunks', and the chunks were associated with the resulting move. When presented with a new chessboard the program also combines the chess pieces to build chunks and by comparing these with the reference chunks, a list of associations can be made. A list of moves can therefore be compiled and sorted in to order of the number of chunk associations found.

Results

The top four moves suggested by the chunking analysis included the best move on average 17% of the time. Although small, this is a significant result as the selection of moves is made without any knowledge of the rules of chess or properties of the pieces. Furthermore, applying the 'chunk-ordered' list of moves to an alpha-beta search gave on average a 50% decrease in the number of nodes searched, compared with a random ordered search.

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GNU C Compiler
MPI

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