Rodent II UCI

Introduction

There are different kinds of chess engines. Some are programmed for strength. Komodo by Mark Lefer, Larry Kaufman and late Don Dailey has been able to beat human grandmasters giving them small material odds. Some, like Stockfish, merge strength and software engineering principles. Some are programmed to prove a research hypothesis. Giraffe by Matthew Lai plays strong chess using neural networks for evaluation and highly unusual search algorithm. Some are programmed for style, like legendary Chess System Tal by Chris Whittington.

Rodent II has been programmed for tunability. You can turn it into a crazy attacker, an old-fashioned positional player, or a sparring partner for Your kids. Its tuning options are both intuitive and relevant from the chess point of view, making it a perfect free replacement of commercial programs.

Facts and numbers

Rodent II is an open source chess engine by Pawel Koziol, licensed under GPL 3.0. It is based on a much weaker engine Sungorus 1.4 by Pablo Vazquez (https://sites.google.com/site/sungorus/). This makes it a derivative work.

Rodent II is just a chess engine, so in order to enjoy it you will need a graphical user interface (GUI). Some of possible choices are: Winboard, Arena, TarraschGUI, ChessGUI. If You are using another GUI, You should be fine as long as it understands UCI protocol (which is usually the case, since top engines like Stockfish and Komodo use it).

Rodent's strength is probably about 2875 Elo on the CCRL scale. Previous version hovered slightly below the 50th place on CCRL and CEGT rating lists. You can conclude that Rodent II is a decent engine, albeit far from the top dogs.

Origins

Rodent II is a derivative of much weaker, yet very cleanly written engine Sungorus by Pablo Vazquez (https://sites.google.com/site/sungorus/). Its concise and logical code served as a base to add further enhancements.

Throughout the developement cycle, a lot of knowledge from other open-source programs has been added. These inspirations include:

Stockfish – late move reduction depths, the way of initializing king safety table.

Fruit (via Toga log user manual) – many evaluation weights, including piece square tables. Fruit values served as reasonable first guesses and some of them were subsequently retuned.

Gambit Fruit – king tropism weights.

DiscoCheck – evaluation of hanging pieces.

Senpai – the way of implementing aspiration windows and late move pruning

Rodent II is a complete rewrite, done because version 1.7 had some untraceable bugs. Not all features of the previous versions have been reimplemented though – some failed the tests, whereas others will be added in the course of developement later on.

basic.ini

As it has been stated before, Rodent allows its users to modify several options influencing its playing style. The way of accessing all of them may seem a little clumsy. It is a result of an attempt to have the best of both worlds: instantly accessible predefined styles for a casual user and a possibility to tweak the engine for those who like it.

The choice between these scenarios must be made in **basic.ini** file. That file does not initialize the engine itself, but drastically changes the way how it talks to the GUI. There are two setups: "**SHOW_OPTIONS**" and "**HIDE_OPTIONS**". The first lets the user play with predefined personalities, the second – to set them manually via UCI options.

UCI options for "HIDE_OPTIONS" mode

In "HIDE_OPTIONS" mode Rodent is always initialized by a personality file.

Personality files use the same syntax as UCI parser (except "setoption" keyword). They also have interesting property that one can invoke the other (which should be useful if You want to change just one or two parameters). A sample personality file may look like that:

```
; Fighter personality for Rodent II.
; Author: Pawel Koziol
; Sacrificial player that likes to restrict opponents movement
;
setoption name BookFilter value 20
```

```
setoption name UseBook value true
setoption name Contempt value 0
setoption name EvalBlur value 0
setoption name NpsLimit value 0
setoption name Outposts value 100
setoption name Lines value 100
setoption name PawnStructure value 100
setoption name PassedPawns value 100
setoption name PiecePressure value 100
setoption name KingTropism value 50
setoption name OppMobility value 110
setoption name OwnMobility value 100
setoption name OppAttack value 150
setoption name OwnAttack value 110
setoption name RookLikesOpen value 3
setoption name KnightLikesClosed value 6
setoption name PiecePlacement value 100
setoption name Material value 90
setoption name QueenValue value 975
setoption name RookValue value 500
setoption name BishopValue value 335
setoption name KnightValue value 325
setoption name PawnValue value 90
```

Available styles

GM personalities

These settings use full strength of Rodent II, so be warned! They should fall within 2800-2900 range, depending on the position and how biased their evaluation is.

Attacker – emphasizes own attacking chances and own mobility, at the expense of being a bit careless about pawn structure

Barbarian – ferocious attacker, disregards positional factors.

Constrictor – restricts enemy mobility, likes blocked positions, undervalues major pieces. Not averse to draws, but can build up a strong attack in the right circumstances. Your pocket Petrosian!

Default – the most versatile, mildly asymmetric setting.

Escapologist – disregards enemy attack, emphasises own positional advantages, especially mobility.

Fighter – sacrificial player that strongly likes restricting opponent's movement.

Grumpy – old contemptous master, blocks you and then attacks.

Hedgehog – errs on the safe side, likes blocked positions and cares for pawn structure.

Pawnsacker – a player fond of pawn sacrifices, both in attack and in defense.

Robot – symmetric setting with no style gimmicks.

Stalker – gives substantial bonus for pieces approaching to enemy king, regardless of their true attack potential.

Fun personalities

These extreme settings are not necessarily competitive, but fun to play against

Drunk – plays surprisingly normal chess, despite huge randomness of evaluation function.
Kinghunter – settings by Ferdinand Mosca, designed for playing against humans, insane sacrificial attacker.

Club personalities

Medium strength players (1600 to 2000?), some with built-in judgement defects.

Leader – likes attacks and sacrifices, overvalues bishops.
Materialist – relatively weak, likes having material advantage
Nerd – learned a bit too much about positional play. Undervalues rooks.
Passive – always a bit afraid of the opponent, despite relatively good tactical vision.

Kids personalities

Weak to medium strength personalities, intended as sparring partners for children.

Amy – weak, no particular strengths or ewaknesses

Ben – weak, enjoys piece activity but is afraid of opponent's attack

Chris – somewhat stronger, amasses pieces around enemy king

Helen – relatively good at tactics, likes to sacrifice

UCI options in SHOW_OPTIONS mode

SHOW_OPTIONS asks GUI to display a full set of UCI options. These are:

Material options:

QueenValue, RookValue, BishopValue, KnightValue, PawnValue = material values, expressed in

centipawns. Interesting effects can be obtained by slightly changing bishop, knight and rook value. It is even possible that default valuess are not perfect, and that someone might come up with a better set of parameters (if I were to guess, increasing bishop's value might help).

KnightLikesClosed = a bonus given for each pawn if a knight of the same side is present. Actually it is tuned in such a way that knight gains value with 5 or more pawns on the board, and loses otherwise. This sounds like a dry, technical option, but its effects are rather interesting: increasing it causes the engine to love and cherish its knights, and in case it ends with knight(s) against bishop(s) it urges Rodent II to keep as many pawns as possible, thus keeping position closed. Predefined "Hedgehog" personality makes use of this trick.

RookLikesOpen = rooks gain power with more open files available, and therefore with less pawns on the board. Both this and the previous option come from the classic article *Evaluation of material imbalances* by GM Larry Kaufman.

MaterialWeight = percentage of material value used in actual evaluation. This idea comes from Rhetoric chess engine. Use it with caution! 90% is enough to see a lot of pawn sacrifices without compromising playing strength.

Please note that they are not *all* parameters used by Rodent II in material evaluation. Engine uses a bishop pair bonus and a set of bad trade penalties (for being an exchange down, for having a rook vs two minor pieces and for having pawns for a piece). These, too, are scaled by MaterialWeight to ensure consistency.

Positional options

PiecePlacement = basic positional score from piece/square tables, kings not included. Explanation for non-programmers is that increasing this value leads to more classical playing style (i.e. to centralizsing pieces), whereas lowering it will force the engine to rely more on mobility evaluation.

OwnMobility = mobility value for engine side.

OppMobility = mobility value for non-engine side.

OwnAttack = value of engine's king attack

OppAttack = value of opponent's king attack

Mobility and attack options may be set independently to create asymmetric evaluation. This is the core of personality tuning mechanism. The engine can concentrate on carrying out own attacks, on preventing opponent's agression, on activating own pieces or on blocking enemy movements. Fiddling with mobility can also have an interesting side effect: if opponent's mobility weight is bigger, engine will be slightly more inclined to exchange pieces.

Outposts = weight of a bonus for occupying good squares immune from attacks by enemy pawns or defended by own pawns. This deals with positioning of minor pieces.

Lines = weight of a bonuses for open files, semi-open files and major pieces on the 7th rank.

PiecePressue = weight for a bonus for attacking enemy pieces.

PawnStructure = percentage of penalty for isolated, backward and doubled pawns, as well as for pawns supporting each other (defended or standing side by side). Increasing this option results in more tight game.

PassedPawns = percentage of bonus for passed and candidate passed pawns. Engine increases this bonus for connected passers, decreases it for blocked passers and makes a correction for control of a stop square.

Flavour options

KingTropism = percentage of value awarded for piece proximity to enemy king. Pieces that are far get a penalty, those that are near get a bonus, different weights are used for each piece (there ar two sets: for midgame and for endgame). Exact values are derived from GambitFruit. Initially I thought that it is only a "flavour" option, but tests have shown that low values tend to score slightly better than 0.

BookFilter = irrelevant for eval tuning, influences usage of Polyglot books by eliminating moves with the value lesser than a given percentage of best move's value. Read more in "Opening book" section.

Contempt = Repredraw score. sents the willingness to draw. For example, value "12" means that in the opening position Rodent will prefer to be 11 centipawns behind than to accept a draw by repetition.

NPS = nodes mer second. This option is meant to slow the engine down, and used to create weak personalities. This needs more testing, but NPS of about 5000 puts Rodent II somewhere within the 1600-1800 Elo range (FIDE scale).

EvalBlur = Random value added to evaluation function, used to create weak personalities.

Opening book

Rodent uses two Polyglot (*.bin) books in succession. The idea behind this design is that first book may be a narrow, handmade repertoire book, whereas the second one, usually bigger and more general, constitutes a fallback option.

Rodent has a unique feature allowing it to filter moves that would be used with the frequency lower than n% of best move frequency. Default settings use n = 10. If you set it to 100%, engine will pick only the book moves played with the greatest frequency. Most of the time it will be just one move, sometimes two or three. When using rodent.bin, 50% will give you a narrow book exploring only major alternatives.