ChessEngine.AI.Guy

1.0.0

Generated by Doxygen 1.9.5

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Chapter 1

Namespace Index

1.1 Package List

Here are the packages with brief descriptions (if available):

ChessEngine 7
ChessEngine.AI 7
ChessEngine.AI.Guy 7
ChessEngine.AI.Guy.Utility 7

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

ChessAI
    ChessEngine.AI.Guy.GuyChessAI 9
ChessEngine.AI.Guy.GuyChessAI.ScoredValidMove 13
ChessEngine.AI.Guy.GuyChessAI.SubmoveEntry 13
ChessEngine.AI.Guy.GuyChessAI.ValidMoveEntry 14

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

ChessEngine.AI.Guy.GuyChessAI
: Guy chess AI 9

ChessEngine.AI.Guy.GuyChessAI.ScoredValidMove
: A scored valid move. 13

ChessEngine.AI.Guy.GuyChessAI.SubmoveEntry
: Holds information about submoves at any depth. 13

ChessEngine.AI.Guy.GuyChessAI.ValidMoveEntry
: Holds information about valid moves and attacks that may be made this turn. 14

Chapter 4

Namespace Documentation

4.1 ChessEngine Namespace Reference

4.2 ChessEngine.AI Namespace Reference

4.3 ChessEngine.AI.Guy Namespace Reference

Classes

- class GuyChessAI

  Guy chess AI.

4.4 ChessEngine.AI.Guy.Utility Namespace Reference

Classes

- class **GuyMoveEvaluation**

  A public static class that contains values for different chess moves and pieces.

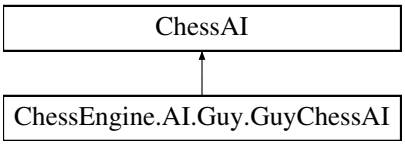
Chapter 5

Class Documentation

5.1 ChessEngine.AI.Guy.GuyChessAI Class Reference

Guy chess AI.

Inheritance diagram for ChessEngine.AI.Guy.GuyChessAI:



Classes

- class ScoredValidMove

  A scored valid move.
- class SubmoveEntry

  Holds information about submoves at any depth.
- class ValidMoveEntry

  Holds information about valid moves and attacks that may be made this turn.

Public Member Functions

- GuyChessAI (ChessColor pTeam)

  The constructor for GuyChessAI.
- float CalculateMoveScore (Instance pInstance, MoveData pMoveData, ref CancellationTokenSource p↩ CancellationToken)

  Gets the single-move score if the move described by pMoveData if played on the chess engine Instance, pInstance.
- override void **OnBestMoveRequestUpdate** ()

  Invoked after every 'OnUpdate' in any frame where 'IsBestMovePending == true' and 'IsBestMoveDelayed == false'. Logic to determine best moves should not be executed in this loop as a submission delay causes it to not be executed. It is best practice to submit ready best moves in this callback unless they were demanded, this will prevent any non-demanded submissions while there is a best move submission delay set.
- override void OnBestMoveRequested (int pMaxDepth, float pMaxTime)

Invoked when a best move is requested.

- override void **OnUpdate** ()

  Invoked every frame that the AI is updated.
- override void **OnBestMoveDemanded** ()

  Invoked after the AI demands a best move be submitted immediately.
- override void OnBestMoveSubmitted (TileIndex pFrom, TileIndex pTo)

  Invoked after the AI submits a best move.

Protected Member Functions

- void **StopThinking** ()

  Forces the AI to stop thinking about a move.
- void **SubmitBestMove** ()

  Determines and submits a 'best move' instantly.
- void SubmitBestMove (MoveData pMoveData)

  Submits a 'best move' with the given move data.
- void Thread_ScoreMoves (MoveData[ ] pMoves, SerializedChessInstance pPreMoveState, CancellationTokenSource pCancellationToken)

  Invoked on a thread. Given an array of moves to score.

Protected Attributes

- object **m_LockObject**

  The thread synchronization object.
- CancellationTokenSource **m_CancellationToken**

  The current cancellation token for the main thread.
- List< MoveData > **m_ValidMoves**

  The valid moves for the AI on the current turn.
- Thread[ ] **m_Threads**

  An array of threads used by the AI to calculate and submit moves.
- ConcurrentDictionary< int, ScoredValidMove > **m_ScoredMoveLookup** = new ConcurrentDictionary<int, ScoredValidMove>()

  A concurrent queue where threads submit their scored moves. Key: int - The this-turn 'move index' the score is for (the index in the threaded list, not the main threads move list). Value: ScoredValidMove - The score of the move and the move data itself.

Properties

- bool **IsThinking** `[get, protected set]`

  Returns true if the AI is currently thinking about its move, otherwise false if not making a move or finished thinking.
- int **MaxThreads** = 4 `[get, protected set]`

  The maximum # of threads the AI may use to calculate its next move.

5.1.1 Detailed Description

Guy chess AI.

Guy is a well balanced chess AI that takes as much time as he is allowed to carefully consider each move and it's consequences further in the game. Guys difficulty scales with allowed think time and allowed think depth. Guy may think on up to the hardware limit of threads or 'MaxThreads' threads at a time.

5.1.2 Constructor & Destructor Documentation

5.1.2.1 GuyChessAI()

```
ChessEngine.AI.Guy.GuyChessAI.GuyChessAI (
            ChessColor pTeam )
```

The constructor for GuyChessAI.

Parameters

pTeam	The team the AI is playing as.

5.1.3 Member Function Documentation

5.1.3.1 CalculateMoveScore()

```
float ChessEngine.AI.Guy.GuyChessAI.CalculateMoveScore (
            Instance pInstance,
            MoveData pMoveData,
            ref CancellationTokenSource pCancellationToken )
```

Gets the single-move score if the move described by pMoveData if played on the chess engine Instance, pInstance.

Parameters

pInstance	
pMoveData	
pCancellationToken	A reference to a cancellation token that tracks whether or not move score calculation should be cancelled.

Returns

The score of the move pMoveData if played in the chess instance pInstance.

5.1.3.2 OnBestMoveRequested()

```
override void ChessEngine.AI.Guy.GuyChessAI.OnBestMoveRequested (
            int pMaxDepth,
            float pMaxTime )
```

Invoked when a best move is requested.

Parameters

pMaxDepth	
pMaxTime	

5.1.3.3 OnBestMoveSubmitted()

```
override void ChessEngine.AI.Guy.GuyChessAI.OnBestMoveSubmitted (
            TileIndex pFrom,
            TileIndex pTo )
```

Invoked after the AI submits a best move.

Parameters

pFrom	
pTo	

5.1.3.4 SubmitBestMove()

```
void ChessEngine.AI.Guy.GuyChessAI.SubmitBestMove (
            MoveData pMoveData )  [protected]
```

Submits a 'best move' with the given move data.

Parameters

pMoveData	

5.1.3.5 Thread_ScoreMoves()

```
void ChessEngine.AI.Guy.GuyChessAI.Thread_ScoreMoves (
            MoveData[] pMoves,
            SerializedChessInstance pPreMoveState,
            CancellationTokenSource pCancellationToken )  [protected]
```

Invoked on a thread. Given an array of moves to score.

Parameters

pMoves	
pPreMoveState	
pCancellationToken	

The documentation for this class was generated from the following file:

- GuyChessAI.cs

5.2 ChessEngine.AI.Guy.GuyChessAI.ScoredValidMove Class Reference

A scored valid move.

Public Attributes

- float **score**

  The score for the move.
- MoveData **moveData**

  The data that describes the move.

5.2.1 Detailed Description

A scored valid move.

The documentation for this class was generated from the following file:

- GuyChessAI.cs

5.3 ChessEngine.AI.Guy.GuyChessAI.SubmoveEntry Class Reference

Holds information about submoves at any depth.

Public Attributes

- int **validMoveIndex**

  The index of the move that is valid this turn for the AI in the 'valid moves' array.
- float **cumulativeScore**

  The cumulative score from 'valid moves' entry at 'validMoveIndex' to and including this move.
- SerializedChessInstance **postMoveState**

  The state of the board after the move.

5.3.1 Detailed Description

Holds information about submoves at any depth.

The documentation for this class was generated from the following file:

- GuyChessAI.cs

5.4 ChessEngine.AI.Guy.GuyChessAI.ValidMoveEntry Class Reference

Holds information about valid moves and attacks that may be made this turn.

Public Attributes

- SerializedChessInstance **preMoveState**

  The state of the board before the move.
- MoveData **moveData**

  The data for the valid move.
- List< SubmoveEntry > **submoveEntries**

  A list of SubMoveEntrys that are overridden every frame while a best move is being considered. This ensures that only the most recent scoring data is considered

5.4.1 Detailed Description

Holds information about valid moves and attacks that may be made this turn.

The documentation for this class was generated from the following file:

- GuyChessAI.cs

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