Jafar -Intelligent Othello Agent

Joshua Nelson, Tim Cosgrove, **Andrew Haigh**

Feature Weight

The EloArena

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COMP3130 Research Project

May 27, 2012

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Joshua Nelson, Tim Cosgrove, Andrew Haigh

Outline

Problem Overview

Solution

Static Evaluation

Jeacic Evaluation

Algorithms TD- λ

Feature Weight Graphs

Future Improvements

Design

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Solution Structure

Static Evaluation

- 4 Learning Algorithms
 - TD-λ
 - Feature Weight Graphs
 - The EloArena
 - Future Improvements
- Design Methodology



Problem Overview

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Outline

Problem Overview

Solution

Structure

Static Evaluati

Algorithms

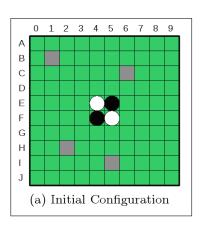
Feature Weight

Graphs
The EloArena

Future Improvements

Improvement

esign Methodology • The Game — 10x10 Modified Othello



Problem Overview

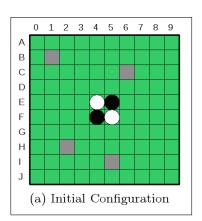
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Problem Overview

Feature Weight The EloArena

- The Game 10x10 Modified Othello
- The Problem Intelligent Al player



Problem Overview

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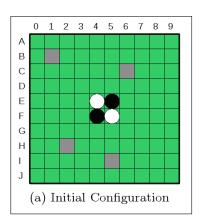
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Problem Overview

Feature Weight

The EloArena

- The Game 10x10 Modified Othello
- The Problem Intelligent Al player
- Solution basis



Solution Structure

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Future Improvements

Design

 The MetaPlayer class — Utilises knowledge of the game state and creates instances of other players accordingly

Solution Structure

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Solution Structure

Feature Weight The EloArena

- The MetaPlayer class Utilises knowledge of the game state and creates instances of other players accordingly
- NegamaxPlayer (varying depth argument)
- OpeningPlayer
- GreedyPlayer

Static Evaluation

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Static Evaluation

Feature Weight The EloArena

• The FeatureSet class — Maintains a list of *features*; functions which evaluate a game state based on some criteria of strength

Static Evaluation

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Outline

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The EloArena Future

Improvements

- The FeatureSet class Maintains a list of features; functions which evaluate a game state based on some criteria of strength
- LegalMoves
- Visibility
- StoneCount
- BlockedAdjacent, CornerPieces, SidePieces

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Outline

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The EloArena

Improvements

- Remaining challenge: decide how important each feature is (the feature 'weights')
- Negative weights not considered (for simplicity)

Feature Weight Graphs

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Outline

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Improvements



The Elo Rankings Arena

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Improvement

- Custom made genetic algorithm
- Pits a group of randomly generated agents against each other for Elo style ranking points
- Creates new agents from those who perform best

The Elo Rankings Arena

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Future Improvements

- Custom made genetic algorithm
- Pits a group of randomly generated agents against each other for Elo style ranking points
- Creates new agents from those who perform best
- Used more as a demonstration of the learning process
- ullet Interesting to see it come to the same conclusions as TD- λ

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Future Improvements

Design Methodology More attention to blocked squares

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Outline

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Graphs
The EloArena

Improvements

Future

- More attention to blocked squares
- Negamax optimisations (better transposition tables, ... etc.)

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Feature Weight Graphs The EloArena

Future Improvements

- More attention to blocked squares
- Negamax optimisations (better transposition tables, ... etc.)
- Better use of pre-computed data

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Future
Improvements

- More attention to blocked squares
- Negamax optimisations (better transposition tables, ... etc.)
- Better use of pre-computed data
- More board features (locked squares, open squares, etc.)

Design Methodology

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Improvement

