Contents

Game Commentary

MDA: A Formal Approach to Game Design and Game Research / 1
Robin Hunicke, Marc LeBlanc, and Robert Zubek

Intelligent Interfaces for Digital Games / 6
Daniel Livingstone and Darryl Charles

Step One: Document the Problem / 11 Baylor Wetzel

Strategy and Planning

Game Over: You Have Been Beaten by a GRUE / 16

Elizabeth Gordon and Brian Logan

Strategic Planning for Unreal Tournament© Bots / 22 Héctor Muñoz-Avila and Todd Fisher

Symbolic Representation of Game World State: Toward Real-Time Planning in Games / 26 Jeff Orkin

A Tactical and Strategic AI Interface for Real-Time Strategy Games / 31 Michael van Lent, Paul Carpenter, Ryan McAlinden, and Poey Guan Tan

Path Planning and Tactics

State Estimation for Game AI Using Particle Filters / 36

Curt Bererton

Dynamic Path Planning and Terrain Analysis for Games / 41

Paul Brobst, Ramesh Saran, and Michael van Lent

Efficient and Dynamic Response to Fire / 44 Christian J. Darken, David J. Morgan, and Gregory Paull

Learning

Integrating Learning in Interactive Gaming Simulators / 49

David W. Aha and Matthew Molineaux

Integrated Machine Learning for Behavior Modeling in Video Games / 54

Ben Geisler

Knowledge-Gathering Agents in Adventure Games / 63 Brian Hlubocky and Eyal Amir

Hierarchical Judgement Composition: Revisiting the Structural Credit Assignment Problem / 67 Joshua Jones and Ashok Goel

Bootstrapping the Learning Process for the Semi-automated
Design of a Challenging Game AI / 72
Charles Madeira, Vincent Corruble, Geber Ramalho, and Bohdana Ratitch

Utilizing Case-Based Reasoning and Automatic Case Elicitation to Develop a Self-Taught Knowledgeable Agent / 77 Jay H. Powell, Brandon M. Hauff, and John D. Hastings

Augmenting Wargame AI with Data Mining Technology / 82 John Rushing, John Tiller, Steve Tanner, and Drew McDowell

Reflection in Action: Model-Based Self-Adaptation in Game Playing Agents / 86

Patrick Ulam, Ashok Goel, and Joshua Jones.

Challenge Adjustment and Adaptation

AI for Dynamic Difficulty Adjustment in Games / 91 Robin Hunicke and Vernell Chapman

> Semi-Automated Gameplay Analysis / 97 Finnegan Southey and Robert C. Holte

Narrative

Search-Based Drama Management / 103 Ari Lamstein and Michael Mateas

Mediating the Tension between Plot and Interaction / 108

Brian Magerko and John E. Laird

Light AI / 113 Magy Seif El-Nasr

Character Participation in Social Interaction / 118 *Robert Zubek*

AI Tools for Scripting and Control

Rules versus Scripts in Games Artificial Intelligence / 123
Nathan Combs and Jean-Louis Ardoint

Code Generation for AI Scripting in Computer Role-Playing Games / 129 Matthew McNaughton, Jonathan Schaeffer, Duane Szafron, Dominique Parker, and James Redford

Case Studies

The Suffering: A Game AI Case Study / 134 *Greg Alt*

Call for AI Research in RTS Games / 139 Michael Buro