

MODERN GAME AI ALGORITHMS

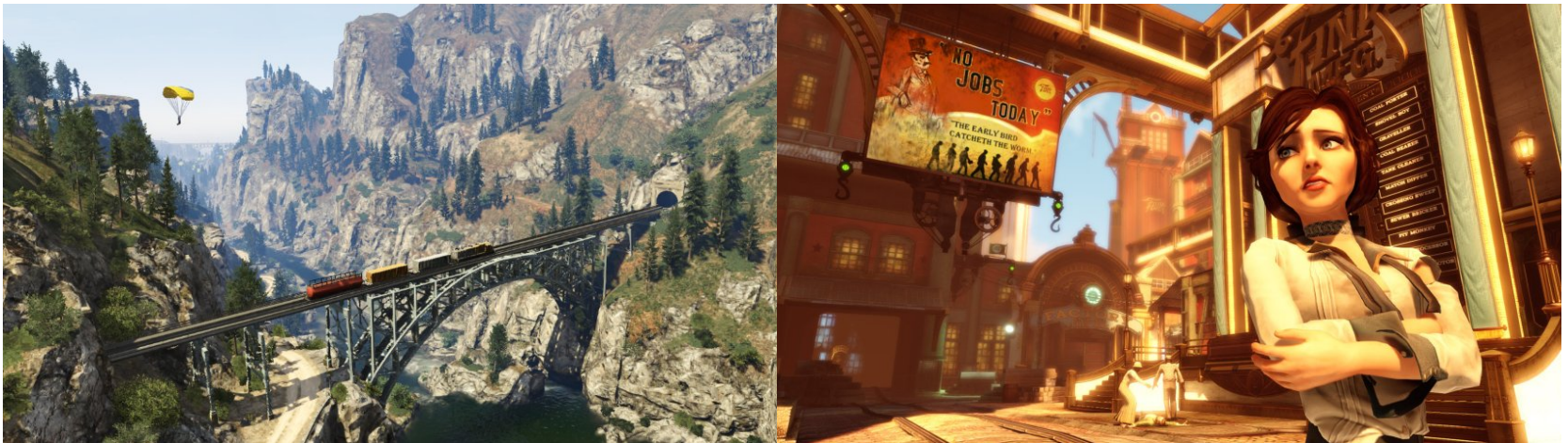
*SELECTED CHAPTER IN INFORMATION SYSTEMS
WINTER SEMESTER 2016/2017*

MIKE PREUSS

GAME AI IS EVERYWHERE



- very large open game worlds (e.g. GTA V): create, populate
- complex character AI (e.g. Bioshock infinite)



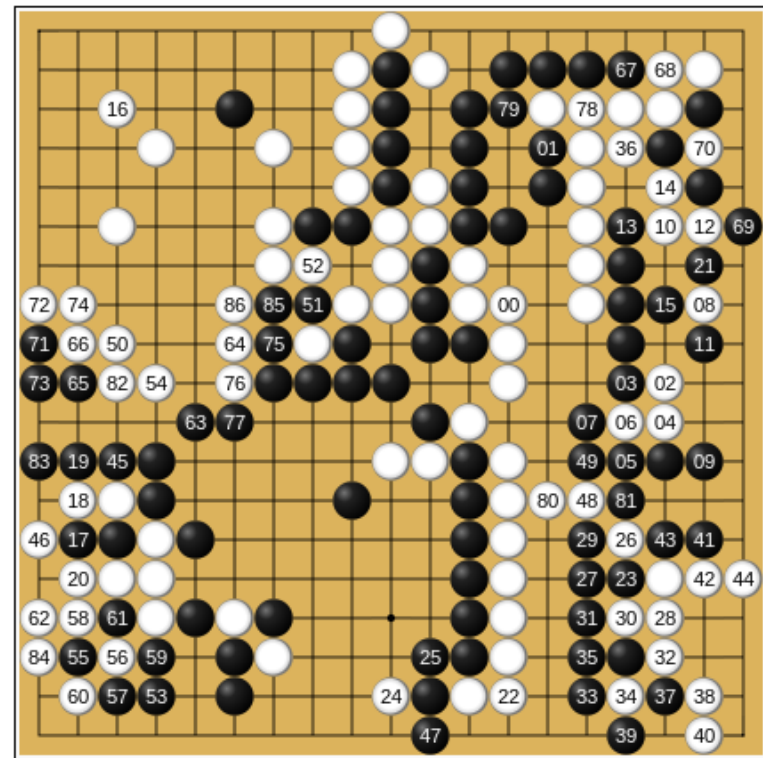
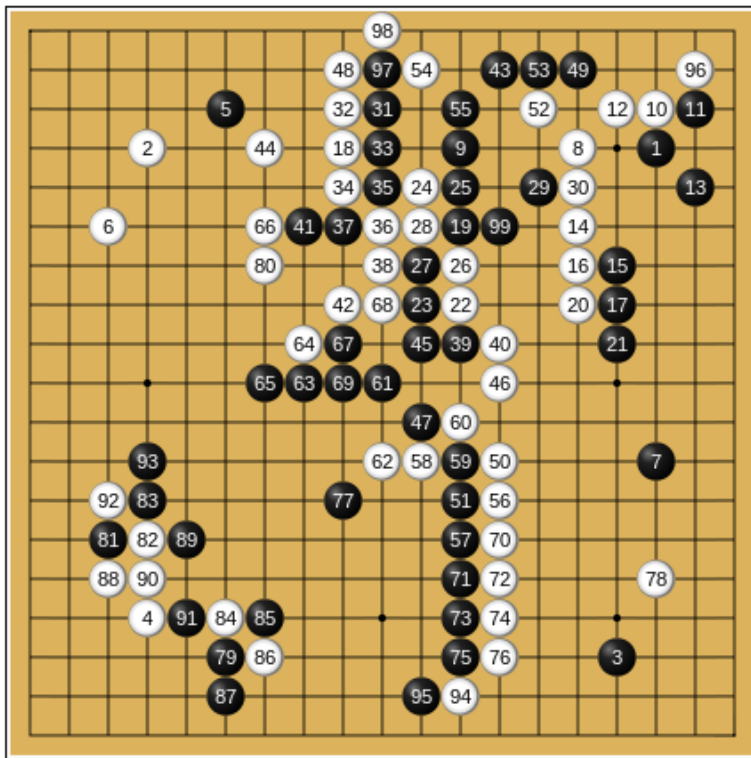
the term Game AI now means:

- support game design (e.g. balancing)
- do a lot of “realistic looking stuff” at runtime

DEEP LEARNING AND MONTE-CARLO TREE SEARCH



how to beat World Go Champion Lee Sedol with 1.920 CPUs / 280 GPUs



REALTIME STRATEGY AI CHALLENGES



- much too complex to solve, time pressure!
- best available bots have no chance against average human players
- no perfect knowledge
- difficult to appear as playing well while cheating



COURSE PLAN (SIMILAR TO WS 2015/16)



- introduction: computational intelligence and games
- learning: general video game AI
- optimization and learning
- Monte Carlo tree search
- procedural content generation
- artificial neural networks / deep learning
- believable behavior
- team and mass behavior
- realtime strategy AI

but open to suggestions

GENERAL VIDEO GAME AI COMPETITION



- based on the General Videogame Description Language (GVDL)
- targeted at the development of general game controllers
- game controllers can be trained on 10 games and are evaluated on 10 others
- guess what games are depicted below:



ORGANIZATIONAL DETAILS



- weekly 2-hour lecture (preferably interactive)
- weekly 2-hour practice (definitively interactive, last 3-4 weeks as free group project)

„examination“:

- 50% free group project presentation
- 50% oral exam (individual)

prerequisites:

- basic knowledge of algorithms and data structures
- basic programming skills (Java/R/Unity)
- basic statistics



ABOUT ME



- PhD 2013 in optimization by means of Evolutionary Algorithms (TU Dortmund)
- Since 2007 research and teaching in “Computational Intelligence in Games”
- General Chair of the CIG 2014 conference in Dortmund, with Günter Rudolph



SUMMARY



- STATE OF THE ART GAME AI METHODS
- VIEW ONTO A VERY DYNAMIC AREA OF COMPUTER SCIENCE
- TRY YOUR OWN APPROACHES

- AND FUN!

THE IS RESEARCH NETWORK

www.ercis.org