

Collusion

- imperfect information games
 - infer the hidden information
 - outwit the opponents
- collusion = two or more players play together without informing the other participants
- how to detect collusion in online game?
 - players can communicate through other media
 - one player can have several avatars

Co-operation and collusion

- Forms of co-operation
 - soft play
 - alliancing, ganging
 - expert help, scouting
 - self-sacrificing support
- If co-operation is not allowed by the rules of the game, it is collusion
 - collusion = covert co-operation



Example: Co-operation in Age of Empires

- Forming alliances
- Sharing knowledge
- Donating resources
- Sharing control
- Providing intelligence



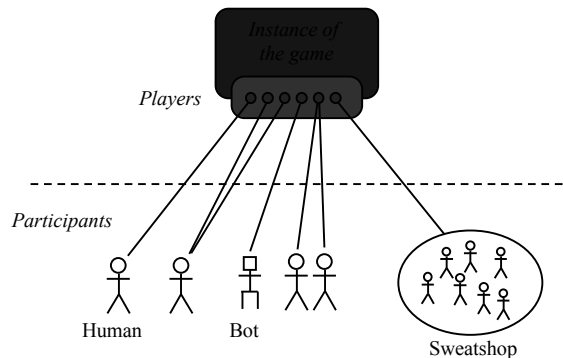
Key questions about collusion

- What are the different types of collusion?
 - different types seem to be lumped together in the literature
- How to detect collusion reliably?
 - finding algorithms that recognize intentional behaviour from unintentional
- How to detect collusion as early as possible?
 - to minimize the harm done by colluders
- How to prevent collusion?
 - the co-operation between the maintenance and collusion detection mechanism

Roles in collusion

- We must discern the roles of partakers in a game
 - player ≠ participant
- Two types of collusion
 - (i) collusion among the players
 - collusion happens inside the game
 - analyse whether the players' behaviour diverges from what is reasonably expectable
 - (ii) collusion among the participants
 - collusion happens outside the game
 - analyse the participants behind the players to detect whether they are colluding

Players and participants



Level of agreement



- Express collusion
 - explicit hidden agreement
- Tacit collusion
 - no agreement but common interests
 - example: attacking the strongest/weakest opponent
- Semi-collusion
 - collusion on certain areas, competition on other areas
 - example: sharing a resource site, battling elsewhere

Content of agreement



- Concealed stance
 - different play method against a co-colluder than against other players
- Knowledge sharing
 - colluder gets more information than peers
- Information sharing
 - colluders exchange in-game information
- Resource sharing
 - colluders exchange in-game resources

Classification

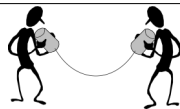
- There are limitations in the previous classifications
 - aim at capturing the motive of collusion
 - problem: motive depends on the context and the player's mindset → often subjective: how can you see inside the colluder's mind?
- We classify collusion based on *how it works*
 - participant identity collusion
 - inter-player collusion
 - game instance collusion

Participant identity collusion



- How a single player is perceived to participate in a game?
 - (i) Player controller collusion
 - the player is not controlled by a single human participant
 - example: bot, sweatshop, boosters, analysers
 - (ii) Self-collusion
 - a single participant controls multiple players
 - example: throw-away characters, double-playing in poker

Inter-player collusion



- How the participants are affecting the game?
 - (i) Spectator collusion
 - co-colluder provides a different type of information
 - example: ghost scouting, post-game information
 - (ii) Assistant collusion
 - co-colluder plays (sacrificingly) to assist the other to win
 - example: sidekick, passive scout, spy
 - (iii) Association collusion
 - co-colluders achieve individual goals through co-operation
 - example: specialization to complement each other

Game instance collusion



- How factors outside the game instance affect the game?
 - (i) Multigame collusion
 - players of different game instances collude
 - example: studying the game properties, finding suitable server, fixing tournament match results
 - (ii) Insider collusion
 - co-colluder is an administrator or game developer
 - example: slips from the helpdesk

Classifying the methods used in collusion detection

- Participant identity collusion
 - sweatshop » intrusion monitoring
 - illicit use of bots » CAPTCHA, public steganography
 - automatized tools » detecting repetitive and monotonic action chains (hidden Markov models)
- Inter-player collusion
 - spectator collusion » delayed feed
 - assistant collusion » sting operations, game-playing traps
 - association collusion » varying game content, player profiles
- Game instance collusion
 - multigame collusion » controlling player accounts

Future of Collusion Prevention

- Situation is not as pessimistic as one would think reading the literature
 - our classification clarifies the focal points
- Still, there is a lot of work to be done
 - developing mathematical models
 - designing collusion detection methods
 - testing the methods in real-time environments
- Online multiplayer games need a third-party organization (like WADA) that grants and manages player-licences



Offending other players

- acting against the 'spirit' of the game
 - problematic: is camping in a first-person shooter cheating or just a good tactic?
 - some rules are 'gentlemen's agreements'
- examples
 - killing and stealing from inexperienced and ill-equipped players
 - gangs and ghettoization of the game world
 - blocking exits, interfering fights, verbal abuse



Upholding justice

- players handle the policing themselves
 - theory: players take the law into their own hands (e.g., militia)
 - reality: gangs shall inherit the game world
- systems records misconducts and brands offenders as criminals
 - theory: bounties and penalties prevent crimes
 - reality: throw-away avatars commit the crimes
- players decide whether they can offend/be offended
 - theory: players know what kind of game world they want
 - reality: how to offend you? let me count the ways...



Recapitulation: Outline of the course

- | | |
|---|--|
| <ul style="list-style-type: none"> 8. Communication layers <ul style="list-style-type: none"> ◆ physical platform ◆ logical platform ◆ networked application 9. Compensating resource limitations <ul style="list-style-type: none"> ◆ aspects of compensation ◆ protocol optimization | <ul style="list-style-type: none"> ◆ dead reckoning ◆ local perception filters ◆ synchronized simulation ◆ area-of-interest filtering 10. Cheating prevention <ul style="list-style-type: none"> ◆ technical exploitations ◆ rule violations |
|---|--|

Examinations 1 (2)

- examination dates
 1. December 4, 2007
 2. January 14, 2008
 3. February 11, 2008
- check the exact times and places at <http://www.it.utu.fi/opiskelu/tentit/>
- if you are a student of Åbo Akademi University, you must register to University of Turku to receive the credits
 - further instructions are available at <http://www.tucs.fi>

Examinations 2 (2)

- questions
 - based on both lectures and lecture notes
 - two questions, à 5 points
 - to pass the examination, at least 5 points (50%) are required
 - grade: $g = \lceil p - 5 \rceil$
 - questions are in English, but you can answer in English or in Finnish
- remember to enrol in time!



www.turkugames.org

Pelei tält ja tois puolt.

