“Searching for the principles of computational intelligence”

Simon Wells
Artificial Intelligence
MultiAgent Systems
Argumentation
Dialogue Systems
# Research Overview

- **System Characteristics:**
  - Large-Scale
  - Secure
  - Robust
  - Distributed
  - Complex
  - Intelligent

- **Applied To/Exploited within:**
  - Education & Critical Literacy
  - Entertainment
  - Security
  - Democratic Representation
  - Industrial Automation
  - Commercial Trading
  - Law
Web-Scale Argumentation, Persuasive & Scaffolding Technologies
Web-Scale Argumentation

MultiAgent Argument Logic & Opinion (MAgtALO) software to support large-scale online interaction within specific complex domains & debates.
ArguBlogging + FireBack software to support argumentation distributed across the web, integrating and argument web within the existing WWW to facilitate greater critical online interaction.
Parley Software to support small-group tutorial work in complex domains
The Arguing Agent Competition

A competitively oriented testbed for benchmarking the performance of automated argumentation systems modelled on the TAC & CAT competitions- Joint work with Akureyri, Toulouse, Vietnam, Warsaw & Dundee
Supporting Infrastructure

- DGDL for describing dialogue game rule sets
- AIF - Part of the working group on dialogical extensions
- Online Visualisation of Argument (OVA) flash widget to render visualisations of arguments (& dialogues)
- AIF-DB to store arguments online
DGDL - Pronounced “Digidal”
A DSL for describing dialogue games
Formally underpinned by an EBNF grammar
  • Verify syntactic correctness
Syntactically correct (verifiable) description of a wide variety of dialogue games

- Including many extant games
  - Hamblin, Mackenzie, Woods & Walton, Walton & Krabbe, Girle, McBurney & Parsons, Bench-Capon

- & a whole world of new games:
  - MAgtALO protocol
  - Argument Blogging protocol
Composition:
- Game Components, e.g.
  - participants,
  - commitment stores,
  - &c.

Rules:
- Regulations that *indirectly* manipulate components

Interactions:
- Regulations for direct (*by players*) manipulation of components
A (very) simple example

Simple{
  {turns,magnitude:single,ordering:strict}
  {players,min:2,max:2}
  {player,id:Player1}
  {player,id:Player2}
  {store,id:CStore,owner:Player1}
  {store,id:CStore,owner:Player2}
  {Assert,{p},"I assert that",{
    store(add, {p}, CStore, Speaker),
    store(add, {p}, CStore, Listener)
  }}
}
Software

- Parser & Tools
  - Verifier
  - Game Engine
  - Game Library (Currently GitHub)
- available *real-soon-now™ ;)*
Applications

- Foundational Argumentation Technologies:
  - AIF2 [co-author on submission to Argument & Computation (Chris?)]
  - OVA & AIFDB [ongoing projects @ Dundee - now part of DAM Project]
  - DGDL [Journal of Applied Logic]
- Web-Scale Argumentation
  - MAgtALO [IEEE Intelligent Systems]
  - ArguBlogging [to be submitted to Journal of Web Semantics]
- Persuasive Technologies
  - Parley [to be submitted to British Journal of Educational Tech.]
- Strategic Argumentation (current/immediate future research)
  - Combinatorial Dialogue [to be submitted to AI + 2 Proposals]
Thank you for your attention