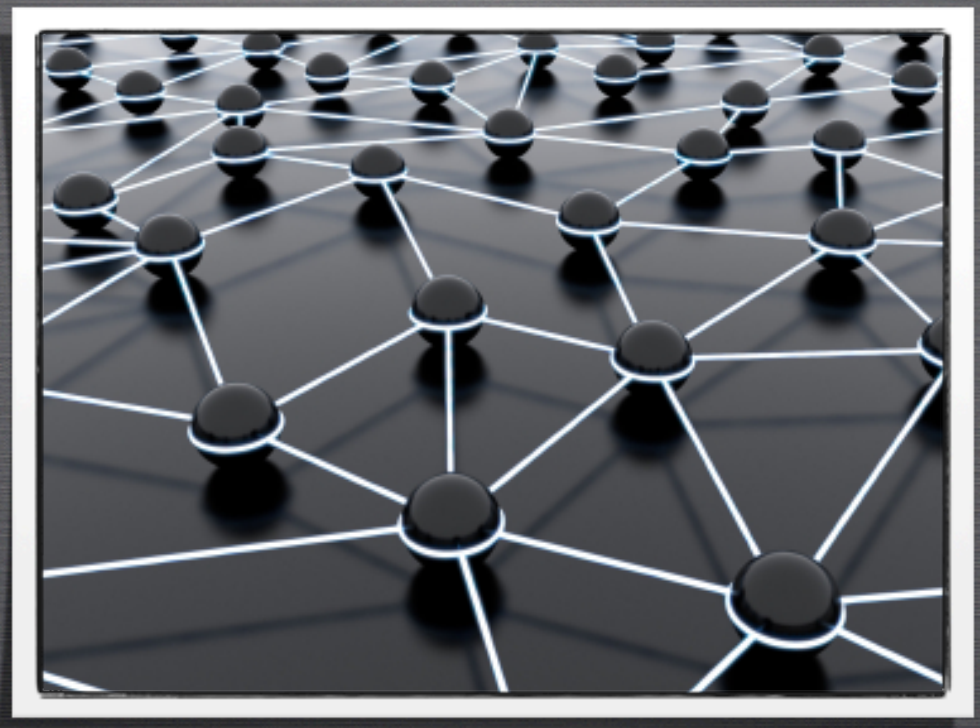
“Searching for the principles of computational intelligence”

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

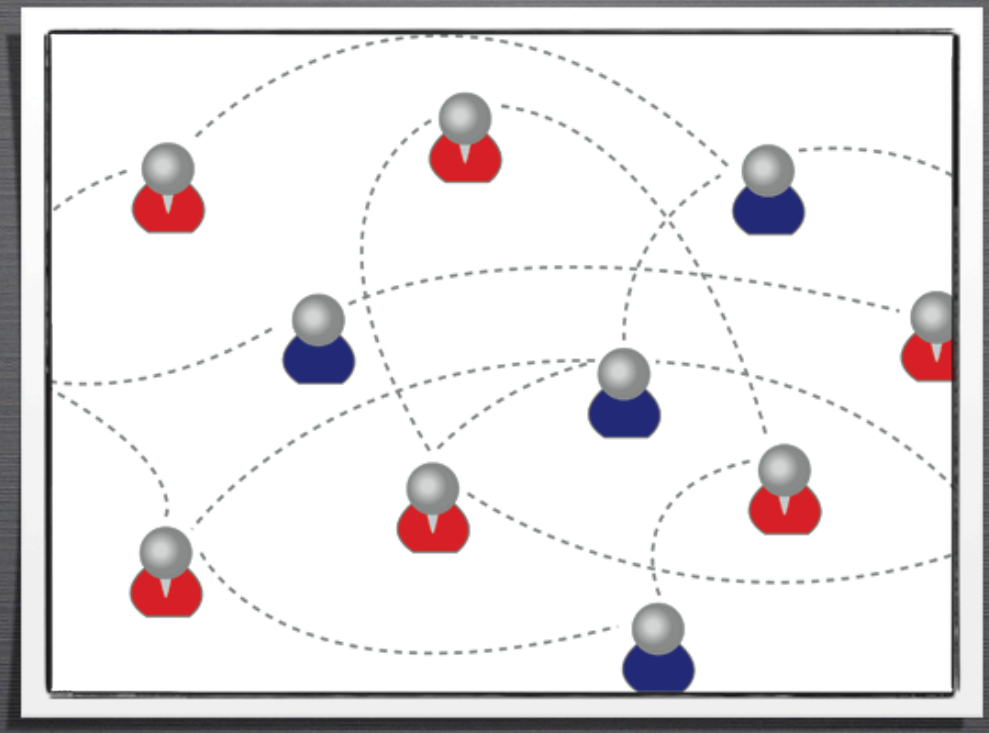
Security

Democratic Representation

Industrial Automation

Commercial Trading

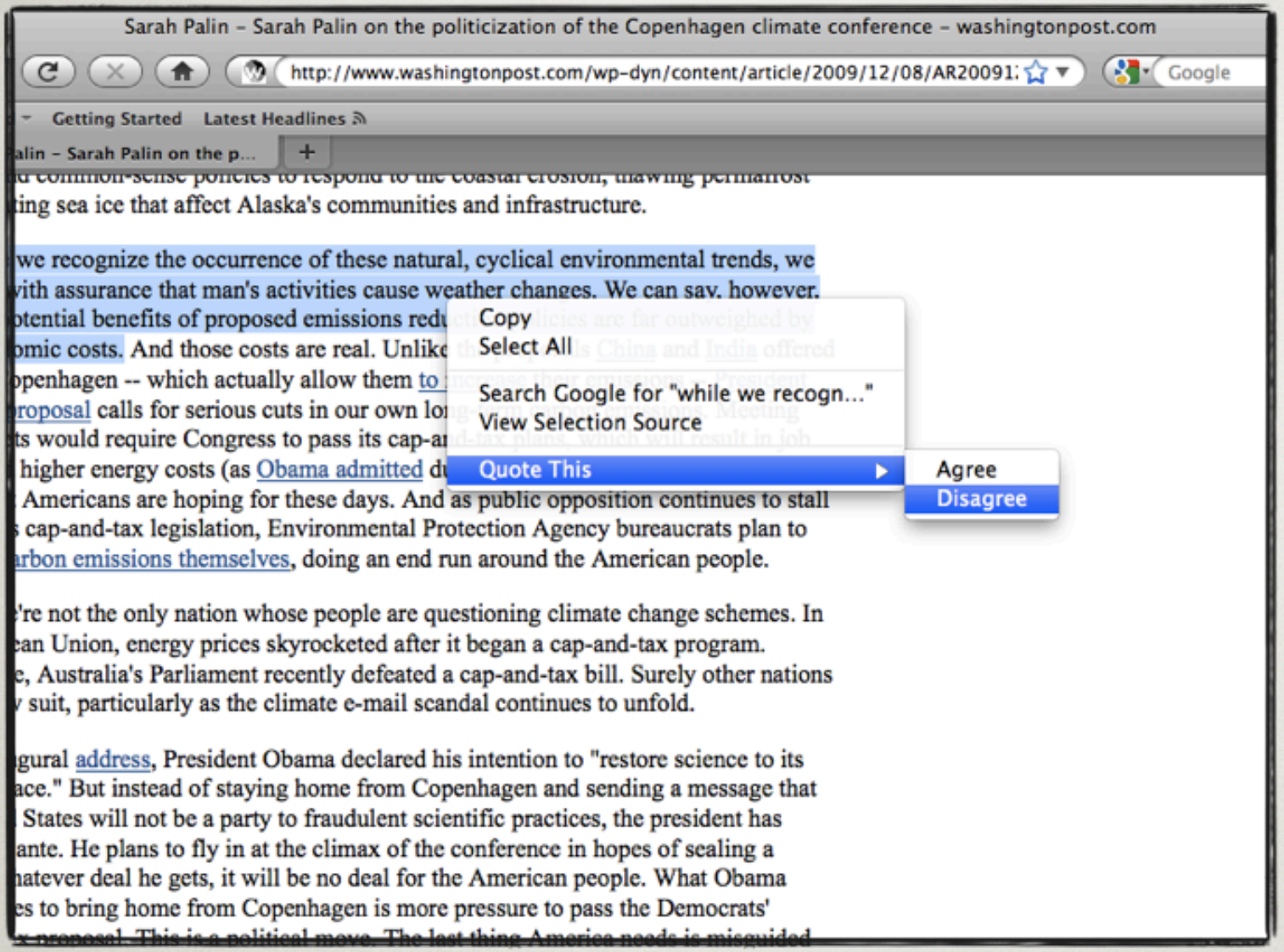
Law



Web-Scale Argumentation, Persuasive & Scaffolding Technologies

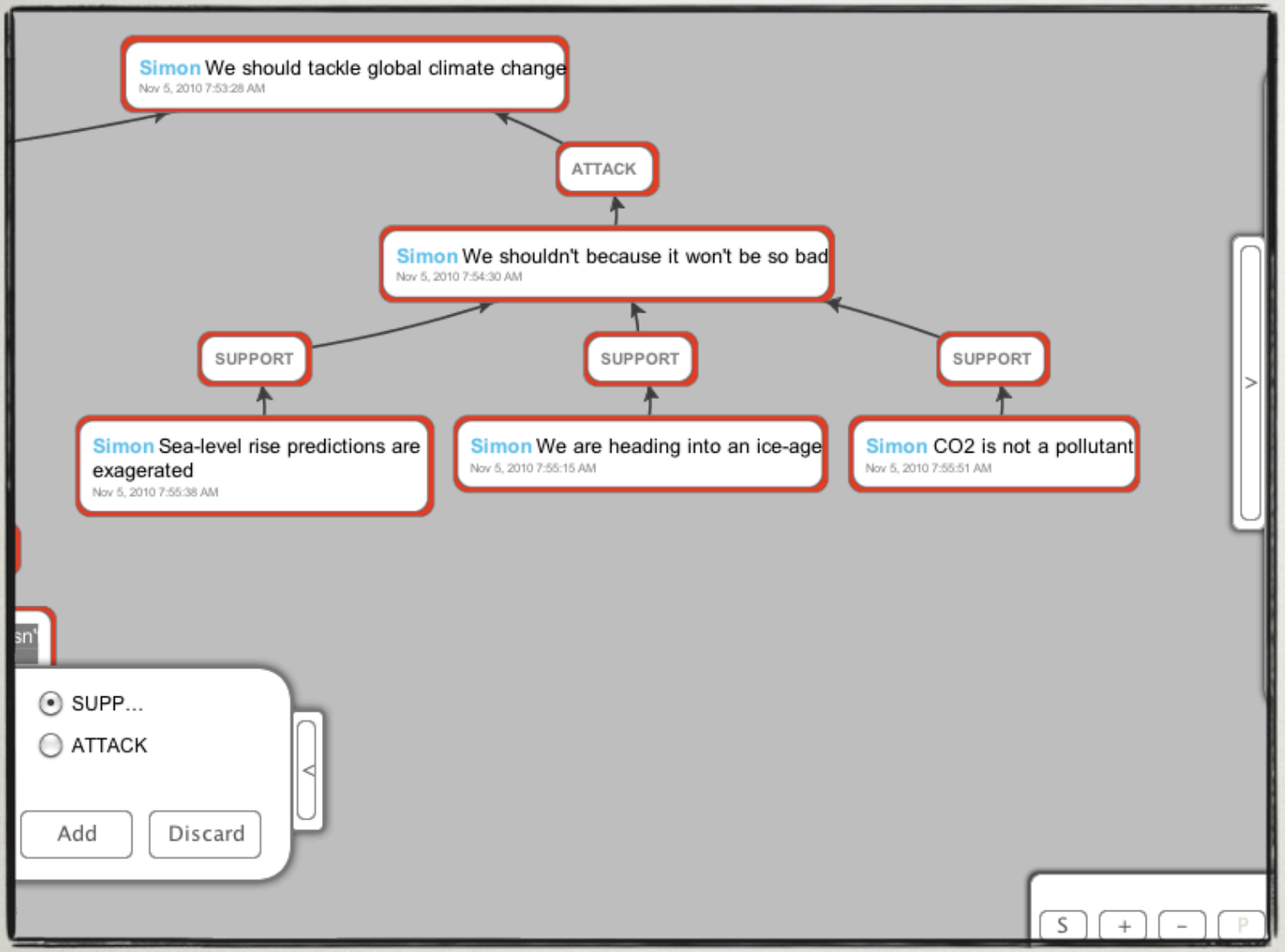
Web-Scale Argumentation

MultiAgent Argument Logic & Opinion (MAgtALO) software to support large-scale online interaction within specific complex domains & debates



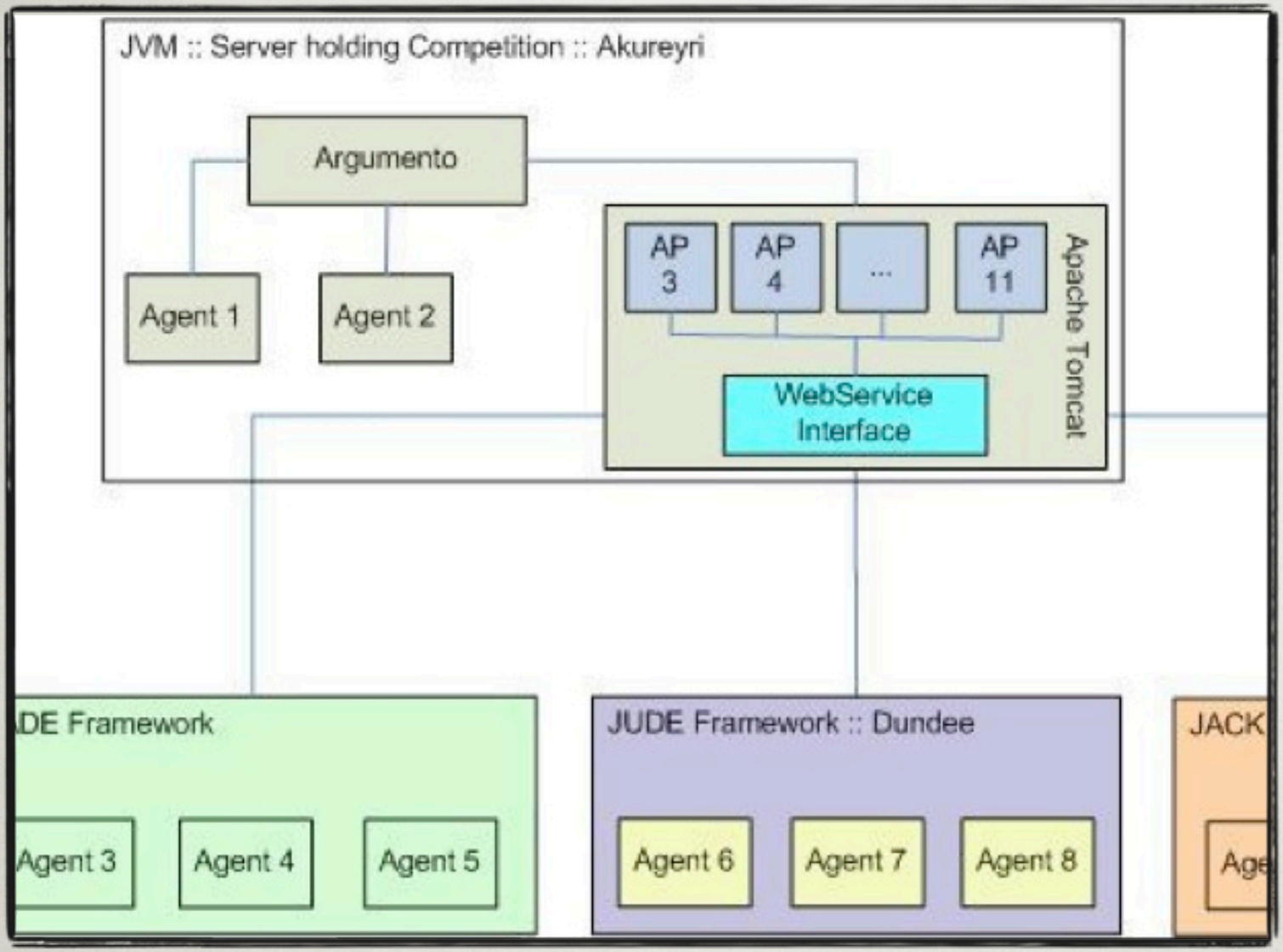
Web-Scale Argumentation

ArguBlogging + FireBack software to support argumentation distributed across the web, integrating and *argument web* within the existing WWW to facilitate greater critical online interaction.



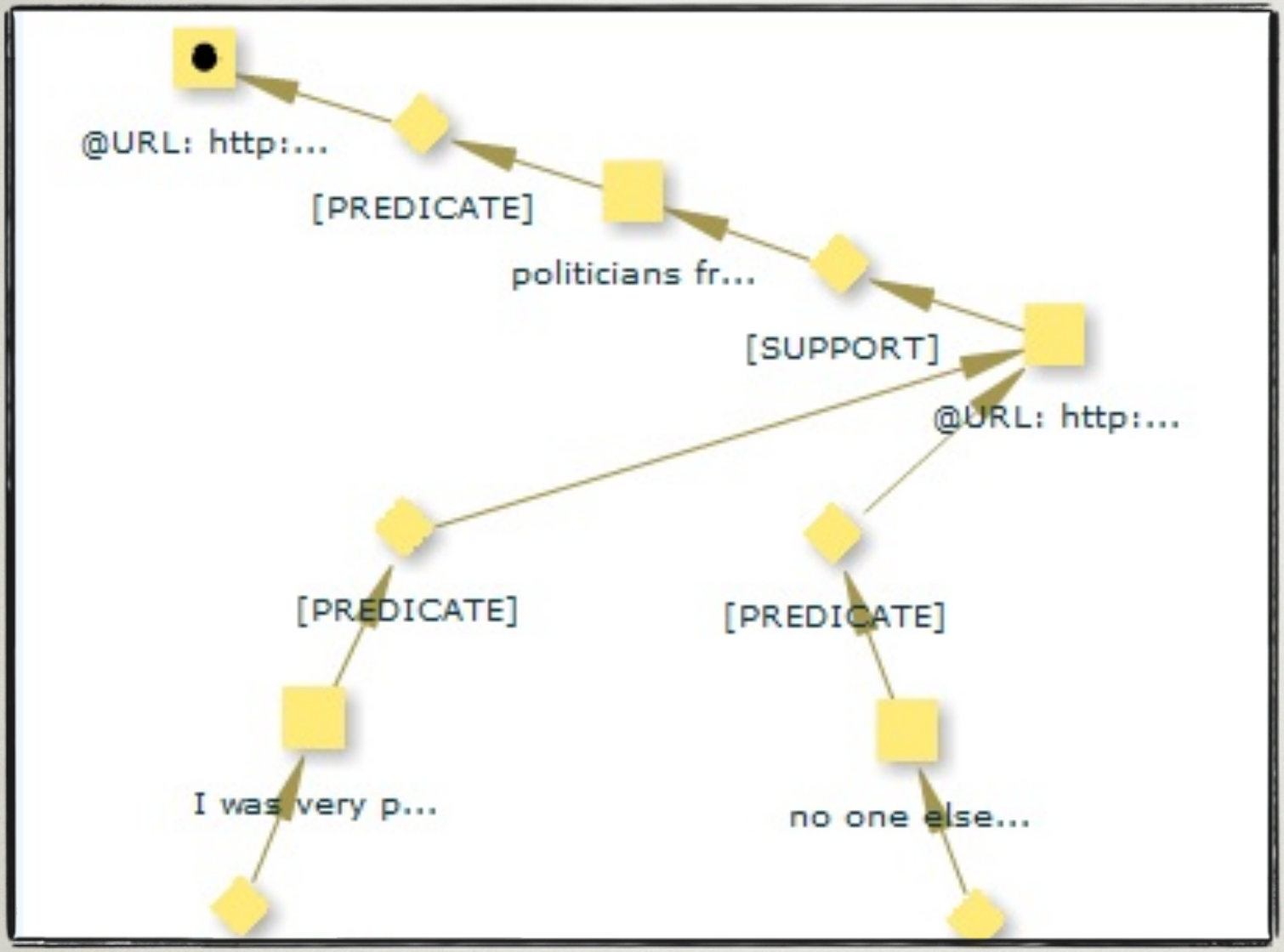
Persuasive Tech

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 rulesets
- 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

- DGDL - Pronounced "*Digidal*"
- A DSL for describing dialogue games
- Formally underpinned by an EBNF grammar
  - Verify syntactic correctness

Aim

- 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

Broad Overview

- 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