Argument Blogging

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Abstract

Argument Blogging is the process of harvesting textual resources from the web and structuring them into distributed argumentative dialogues. This paper introduces a prototype software system for performing argument blogging and storing the resultant dialogues so that they can be analysed and reused.

1 Introduction

Online argumentation is the process of engaging in and making use of arguments on the web and the online community has spontaneously demonstrated great interest in argument. This may have been spurred in part by the highly visible arguments with strong and explicit argumentative structure such as those found in the Iraq Study Group Report [1]. This interest has occured in a range of communities, from the non-expert communities such as users who wish to engage with a domain and find that arguing is a natural and intuitive interaction mechanism, and the developers who are building argumentation tools because they recognise that argumentation can be an engaging interaction mechanism, to the expert communities, mainly working in academia, who develop tools to support the capture, analysis, and sharing of argumentative data.

Various online systems have been deployed to exploit this interest such as *convinceme.net*[2] and *debatepedia.com*[3]. These systems have enabled members of the public to engage with each other and to express their opinions using web-based interaction mechanisms. In convinceme.net the aim is competitive. The users attempt to accumulate votes, which equate to points, with the aim of accumulating the most points and thereby becoming *King of the Hill* within a single debate. However, Debatepedia uses a Wikipedia style interface to collate large evidence sets to support a user in exploring and understanding a complex debate topic. What both of these systems have in common is that they both provide high quality Web 2.0 based interfaces and environments to support user interaction. The interfaces arguably contribute to

the construction of the broad userbases which underpin these systems but the underlying argumentation theory is often impoverished, having small sets of moves which the users can make and limited tools for interacting with the argumentative content. Even where systems have not been designed to explicitly support the dialectical nature of argumentative dialogue, users will try to fit in a rudimentary yet intuitive argumentative structure. This occurs often in blog comments and in the BBC's *Have Your Say* webpage[4] in which users will often manually copy and paste earlier posts into their own response to specify the exact point to which they are responding. Users obviously want a way to structure their interactions and responses so that they can explore the arguments of others whilst making their own arguments explicit in relation. Such capabilities are not however explicitly supported by the current crop of weblog commenting or fora software. There has also been broad interest in the underlying formal representations that support the widespread sharing and interchange of argumentative resources in online systems. This is useful, not only to support the development and deployment of persuasive argumentation-based interfaces, but also to support more advanced online argumentation processing. Work towards this end has culminated in the Argument Interchange Format (AIF) [Chesnevar *et al.*, 2006] used to record and share argument resources and a foundational element of the proposed World Wide Argument Web (WWAW) [Rahwan *et al.*, 2007]. The juxtaposition of these two situations, end-users desiring more structured interaction mechanisms with explicit support for argumentation, and the academic move towards an online network for sharing argumentation resources, suggests an opportunity for new software tools that can support both approaches. It is this opportunity that is addressed in this paper, the provision of an engaging new end-user interface that enables existing text-based online resources to be reused, structured and analysed in terms of their argumentative structure.

2 Argument Blogging & the WWAW

Much as the world wide web (WWW) has provided a mechanism for sharing information online between humans, and the semantic web seeks to enable machines to understand and share information, the WWAW [Rahwan *et al.*, 2007]

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[1] http://www.usip.org/isg/iraq_study_group_report/report/1206/
[2] http://www.convinceme.net
[3] http://debatepedia.com
[4] http://news.bbc.co.uk/1/hi/talking_point/default.stm

seeks to provide a similar mechanism for argumentation enabling information to be stored on the Internet according to its underlying argumentative structure, and subsequently reused within a plethora of software applications. One way of interpreting the WWAW is therefore as a network of argumentation-centered software tools that share a common format for exchange of information between them. Argument Blogging is so called because it takes the idea of web-blogging, posting insightful comments online in a user-driven, participatory fashion, and overlays a dialogue game to guide user interaction and make explicit the argumentative relationships between posts, comments, web sites and other online textual data. The aim is to produce a system that supports the harvesting of existing text posted on the web and the restructuring of those texts into argumentative dialogue structures. The rationale for this pursuit is that there is a lot of argumentative interaction occuring on the web but there are very few tools to enable these arguments to be captured and resused.

3 Underlying Technologies

Argument blogging is built upon a number of existing underlying technologies. These include standard web technologies such as Apache HTTP web server[5], Javascript[6], JQuery[7], Python[8] and Django[9], as well as argumentation-specific technologies like the Argument Interchange Format (AIF), the AIF Database (AIFDB) and the Dialogue Game Description Language (DGDL)[10].

Argument Interchange Format (AIF) The Argument Interchange Format (AIF) [Chesnevar *et al.*, 2006] is a core ontology of argument-related concepts which has been formulated to provide flexibility in capturing a variety of argumentation formalisms and schemes. The core ontology is a directed graph containing two types of nodes, *Information nodes* (I-nodes) that represent passive information and *scheme nodes* (S-Nodes) that capture the application of schemes representing patterns of reasoning and inferential relationships between sets of I-Nodes. By providing a flexible language which supports a wide range of formalisms and can be used to share structured analyses of arguments between a wide range of end-user and back-end software tools, the AIF is thus a core tool that underpins the emerging WWAW.

AIF Database (AIFDB) The AIF Database (AIFDB) is a MySQL database that supports the storage of and subsequent access to AIF resources. The AIFDB has been developed to enable AIF documents, serialised in RDF, to be parsed, split into their constituent elements, stored, and subsequently reused by argumentation software. The interface

to the AIFDB is either through a regular bridge from a programming lanuage, such as Java, to the underlying MySQL database, or via a RESTful web services interface that supports the import and export of AIF document resources. The AIFDB was developed separately to the argument blogging system with the aim of creating a software tool that can be used to implement the WWAW, by supporting storage and reuse of AIF resources regardless of end-user and developer requirements.

Dialogue Game Description Language (DGDL) Dialectical games [Hamblin, 1970] are a type of multi-player argumentative dialogue game that provide a mechanism for structured communicative interaction whilst incorporating argumentative behaviours. However there have been very few tools for working with these games and little agreement over how they should best be described, shared, and reused. The Dialogue Game Description Language (DGDL) [Wells *et al.*, 2009] is a domain specific language, in the sense of SQL for database queries or LaTeXfor typesetting, but in this case for describing the rules of dialectical and other dialogue games and provides a grammar for determining whether a game description is syntactically correct and thus provides a foundation for new tools to support the future development and wider exploitation of dialogue games. The argument blogging system adopts the DGDL as an underlying technology that supports the sharing of verifiable, syntactically correct interaction protocols between online software tools.

4 Argument Blogging: Architecture

The argument blogging system uses a distributed client-server architecture in which users can arbitrarily select sections of argumentative text, published on the web, and link that into a distributed dialogue stored on the WWAW. The overall architecture of the argument blogging system is illustrated in Figure 1 which shows two modes of interaction with the system, one as a resource gatherer, linking new argument resources into the WWAW via a JavaScript bookmarklet, and the other as a transcript explorer, interacting with existing dialogues formed from previously gathered resources. Both modes of interaction are mediated by the argument blogging server which collates the argument resources and assembles them into cohesive dialogues which are then stored, as AIF, within the AIFDB, or visualised using the AIF argument visualiser.

A disadvantage of this approach is that the server provides a point of failure for the sytem. However, whilst much of this functionality could be implemented using a combination of the end user's browser, and the argument resources in the web, and the argument blogging system distributed across all of its users, the adoption of a centralised server has a key advantage. The web is inherently dynamic and it is likely that many of the argument resources used to create distributed dialogues using the argument blogging system will disappear over time which would lead to breaks in the chain of argument if the user were to follow the dialogue from site to site. The alternative, using a central server, means that once resources are linked into a dialogue, the selected resource is

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[5]http://httpd.apache.org/

[6]http://www.ecma-international.org/publications/standards/Ecma-262.htm

[7]http://jquery.com/

[8]http://www.python.org/

[9]http://www.djangoproject.com/

[10]http://www.arg.computing.dundee.ac.uk/?page_id=147
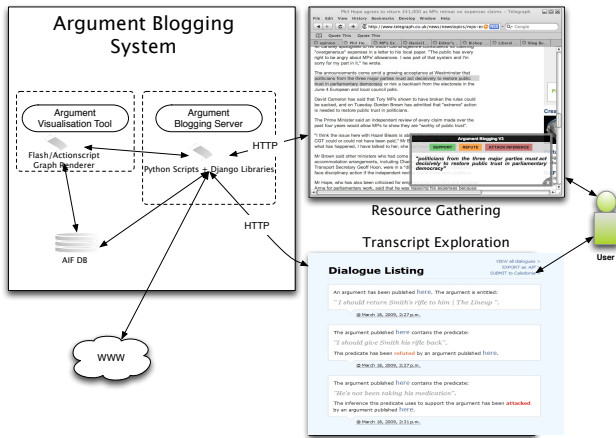
Figure 1: The Argument Blogging System Architecture

Figure 2: The Argument Blogging Bookmarklet.

stored within the AIFDB and is thus available so long as the AIFDB is available. This avoids the problems that could arise if the integrity of a chain of arguments distributed across the web had to be maintained for the dialogue to be followed. It also means that there is a repository from which argumentation resources, consisting of distributed online arguments, can be retrieved and analysed.

5   Argument Blogging: Usage

The interface to the argument blogging system has been made simple and straightforward, to reduce possible barriers to participation, without compromising functionality. Currently there are two end-user modes of interaction; *resource gathering* and *transcript exploration*. Resource gathering is performed on text contained within any web page on the web. The process is simple, resource gatherers select a portion of text within their web browser, then click upon a Javascript Bookmarklet, either stored in their toolbar or bookmarks menu, which causes a dialogue box to be displayed as shown in Figure 2. The dialogue box offers the user a number of choices as to how they wish to respond with respect to their selection. These choices constitute moves in a simple dialogue game, specified using the DGDL, enabling the user to either support, or refute a statement, or to attack an inference between statements. The use of DGDL resources means that the interaction protocol describing the structure of the dialogue between blogs can easily be altered to support different argumentative behaviours.

Once a user has selected their response a dialogue is displayed that contains a fragment of embeddable javascript. For example:

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<script type="text/javascript"
src="http://134.36.36.189/core/quotes/55/badge.js">
</script>
```

Users can select and copy this text and can paste it to wherever their response will be located using an interaction mechanism similar to that used by mainstream websites like YouTube[11]. Often the destination for this code is to either
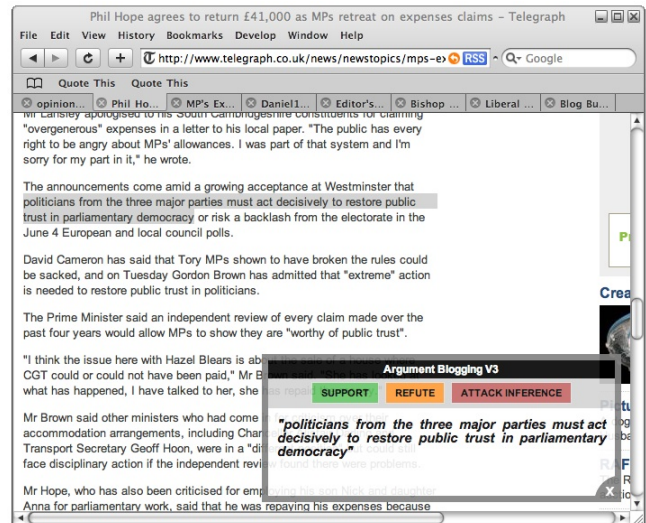
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[11]http://www.youtube.com

a post or comment box within existing blog software, but it can be pasted directly into the HTML of a users website or any other publically accessible site that allows and supports outbound links.

The root of a dialogue, the initial text that is selected and linked into a dialogue via the bookmarklet, thus spurring a discussion, cannot be altered directly because the author has not necessarily agreed to be part of the WWAW so is only connected to the dialogue via a standard web link, however all subsequent responses are as a result of users explicitly opting into the system. Where users have opted into the argument blogging system by publishing a script, a badge is displayed on the upper left corner of the page, shown in Figure 3, that indicates that the page is a part of the WWAW. The WWAW badge links back to the specific dialogue that the current page is a part of hosted on the argument blogging server. The badge is, therefore, the first explicit, navigable link into the WWAW from an arbitrary web page hosting source content.

In addition to the resource gathering interaction there is also the transcript exploration interaction. Following the badge link leads the user to the transcript of the extended, distributed dialogue that the initial page is a part of. An example transcript is illustrated in Figure 5 which shows three web resources. The first resource, at the top of the page, is the root of the dialogue and contains a link back to the original post where more context can be gained. For each response to the initial resource, there is a link back to the previous resource and a link to the original context of the current resource. Each resource also indicates how it is related to the earlier resources in the dialogue, using the default game this is restricted to supporting, refuting, or attacking the inferential relationship between resources.

At the top of each transcript page is a link to enable a dialogue to be exported in plain text format. This means that dialogues can be reused in different contexts, for example, the following is a short dialogue transcript containing the three resources from Figure 5 that have been extracted from the
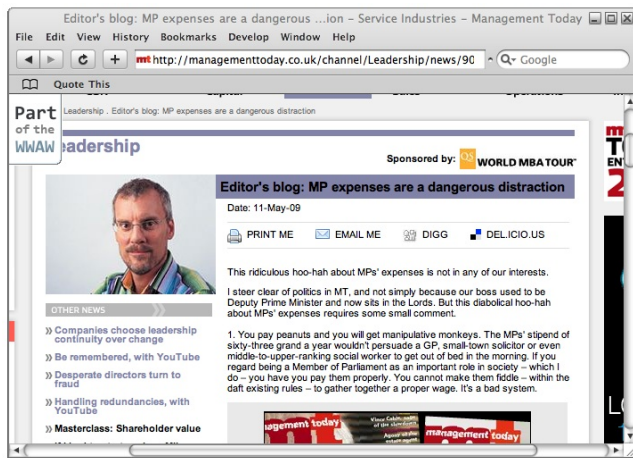
Figure 3: WWAW system "opt-in" via website badge. This is displayed automatically once the javascript code is embedded into the webpage.
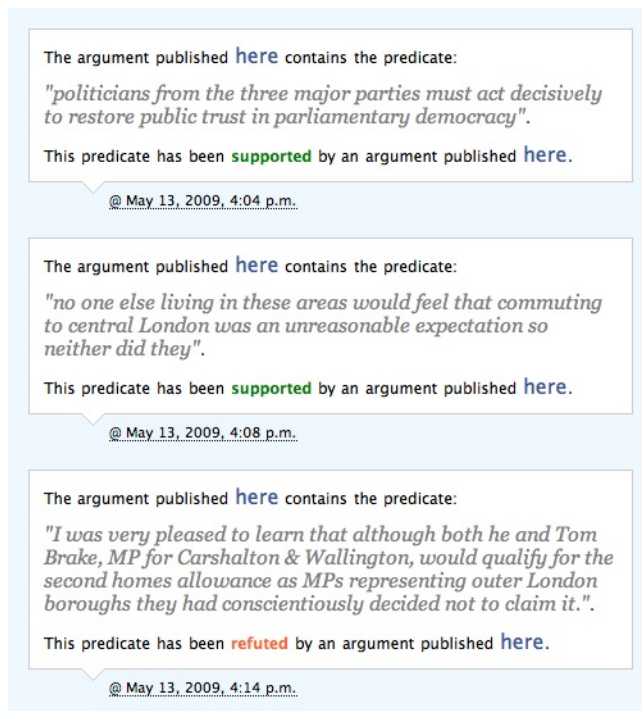

Figure 4: The transcript of a single distributed dialogue using an "instant message" style visualisation of the sequence of utterances in the dialogue.

system using the plaintext export mechanism:

In addition to plain text export, any given dialogue transcript can also be exported as AIF through a web link from the top of the dialogue page, a process that is illustrated in Figure 5. This means that argument resources gathered using the argument blogging interface can subsequently be consumed by other argumentation tools that understand AIF such as Araucaria [Reed and Rowe, 2001], ArgDF [Rahwan *et al.*,

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# May 13, 2009, 4:04 p.m..
An argument has been published at
[http://www.telegraph.co.uk/news/newstopics/mps-
expenses/5317104/Phil-Hope-agrees-to-return-41000-as-MPs-retreat-
on-expenses-claims.html].
The argument is entitled: "Phil Hope agrees to return
&pound;41,000 as MPs retreat on expenses claims - Telegraph".

# May 13, 2009, 4:04 p.m..
The argument published at
[http://www.telegraph.co.uk/news/newstopics/mps-
expenses/5317104/Phil-Hope-agrees-to-return-41000-as-MPs-retreat-
on-expenses-claims.html] contains the predicate: "politicians
from the three major parties must act decisively to restore
public trust in parliamentary democracy".
This predicate has been supported by an argument published at
[http://jaynemccoysblog.wordpress.com/2009/04/30/].

# May 13, 2009, 4:08 p.m..
The argument published at
[http://jaynemccoysblog.wordpress.com/2009/04/30/] contains the
predicate: "no one else living in these areas would feel that
commuting to central London was an unreasonable expectation so
neither did they".
This predicate has been supported by an argument published at
[http://daniel1979blog.blogspot.com/2009/05/mp-expenses-once-
again.html].

# May 13, 2009, 4:14 p.m..
The argument published at
[http://jaynemccoysblog.wordpress.com/2009/04/30/] contains the
predicate: "I was very pleased to learn that although both he and
Tom Brake, MP for Carshalton & Wallington, would qualify for the
second homes allowance as MPs representing outer London boroughs
they had conscientiously decided not to claim it.".
This predicate has been refuted by an argument published at
[http://managementtoday.co.uk/channel/Leadership/news/905004/edit
ors-blog-mp-expenses-dangerous-distraction/].
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Figure 5: Text Export of a single dialogue.

2007], and Cohere [Buckingham Shum, 2008]. This means that the argument blogging software works as a new interface to the WWAW, enabling arbitrary text based resources to be gathered and structured in terms of their argumentative relations, and providing resources using a simple and naturalistic interface that can subsequently be analysed and reused using more appropriate task-specific tools. Also at the top of each transcript page is a link to submit the argument to an online argument visualisation tool so that a diagrammatic representation of the dialogue based upon the AIF file can be viewed. Whilst there are a number of tools that understand and use AIF, none have yet been developed to produce native visualisations of AIF resources, they have all, thus far, reused their own existing argument and dialogue diagramming techniques using the AIF merely as a conduit for sharing arguments. The argument blogging system utilises a new online argument visualisation tool[12], illustrated in Figure 6, that renders AIF resources into standard AIF diagrams. In these diagrams I-Nodes are represented by boxes and S-Nodes by diamonds. Directed edges between these nodes are used to indicate relationships between the nodes.

In addition to exploring an individual argument, users can follow the *view all dialogues* link from the top of the dialogue transcript. This leads to the full list of dialogues held in the argument blogging system as illustrated in Figure 7.

6 Conclusions & Further Work

The work discussed here is only a prototype for an argument blogging system that supports that harvesting of existing ar-

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[12]http://www.arg.computing.dundee.ac.uk/?page_id=143

Argument Visualisation

Powered by Mark Snaith's Online Argument Visualisation

Argument Diagram

@URL: http:...

[PREDICATE]

politicians fr...

[SUPPORT]

@URL: http:...

[PREDICATE]

[PREDICATE]

I was very p...

no one else...

[REFUTATION]

[SUPPORT]
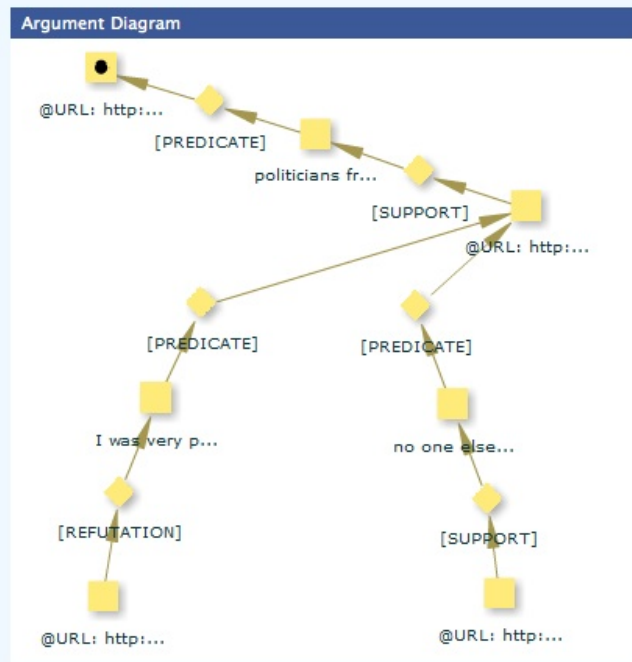
@URL: http:...

@URL: http:...

Figure 6: Visualisation of the AIF record for a distributed on-line dialogue captured using the argument blogging system.

All Dialogues

Dialogue Root (Title)	Start Date	URL
Phil Hope agrees to return £41,000 as ...	13 May 09	Link
I should return Smith's rifle to him ...	18 Mar 09	Link
Google	16 Mar 09	Link

Figure 7: A list of dialogues currently indexed by the argument blogging server.

gumentative resources from the web and their import into the WWAW. As a result there are a number of avenues for functional enhancement and further research. For example, the interface to the Dialogue List would benefit from additional functionality. Currently the dialogue list interface merely adds each new dialogue to the end of a list. This needs to be enhanced so that as well as getting the list of the latest dialogues, users can retrieve dialogues via a search interface. As the volume of users increases and the number of dialogue resources increases, it becomes imperative to provide flexible and efficient methods for accessing those resources. One design aim was to enable the lowest cost of entry to the WWAW without compromising functionailty and usability. This is why the initial prototype system uses a bookmarklet to gather resources, but relies heavily upon a server to collate the resources. Reliance on the server could constitute both

a bottleneck in the system during heavy load and a significant point of failure for the entire system. For this reason two strands of functional enhancements are planned. The first is primarily an architectural enhancement, and the second is a functional enhancement. Functionality can be increased by using plugins for popular blogging software such as wordpress[13], or browsers such as Firefox[14], and javascript applications to provide alternative methods for users to interact with the system at various levels of involvement. The wordpress plugin and javascript are designed to enable website owners to opt-into the WWAW system by including argument blogging functionality directly within their site. Increased ability to interact with and manage arguments can be introduced for end users through the adoption of a Firefox plugin. Further research is also required into the dialogue games used by the system. Whilst the adoption of the DGDL simplifies the job of switching to alternative interaction protocols, it is not clear which protocols would be most appropriate for this kind of interaction, for example more comprehensive protocols might lose some of the dialectical structure from the dialogue at the expense of usability and immediacy. Ultimately, the system described herein is but a first step on the road towards a web of argument that enhances the functionality of the web, whilst providing a valuable resource to argumentation researchers.

Acknowledgments

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[13]http://wordpress.org/

[14]http://www.mozilla.com/firefox/