

Argumentation Schemes for Critical Thinking on Current Events

Nancy L. Green

University of North Carolina Greensboro, Greensboro, NC, USA

nlgreen@uncg.edu

Abstract

We have been examining a class of arguments used in sophisticated analyses of current events, with the goal of developing a visualization tool that would assist users in understanding or producing those kinds of arguments. While some current tools make argumentation scheme sets available, they do not describe an important class of arguments. This paper describes work in progress to identify those argumentation schemes.

1 Introduction

Critical thinking on current events often involves reasoning about the beliefs, goals, plans, and actions of actors such as countries, governments, politicians, etc. We have been examining a class of arguments used in sophisticated analyses of current events, with the goal of developing a tool that would assist users in understanding or producing those kinds of arguments. Such a tool could be of use in on-line environments for citizen engagement [Bex et al., 2013] or in educational settings [Scheuer et al., 2010; Pinkwart and McLaren, 2012]. To scaffold the user's task, our tool will support the visualization of arguments and provide a set of argumentation schemes, abstract descriptions of acceptable forms of argument. While some current tools make argument scheme sets available, e.g., subsets of the schemes listed in [Walton et al., 2008], they do not describe an important class of arguments found in the analyses of interest to us. This paper describes work in progress to identify those argumentation schemes.

2 Background

The arguments of interest in this paper are closely related to the field of research on *plan recognition* in artificial intelligence and natural language processing [Carberry, 1990]. The earliest work in that field used heuristic rules describing the relationships among an agent's beliefs, goals, actions, and plans. Due to its computational complexity that approach to plan recognition has been supplanted with probabilistic approaches. However, the heuristic rules for plan

recognition resemble aspects of six argumentation schemes we have identified.

In the field of argumentation studies, the most closely related schemes are Practical Reasoning and Argument from Positive/Negative Consequences, e.g. as described in [Walton et al., 2008]. The conclusions of those schemes assert what an agent should do. Thus, those schemes share the perspective of the field of automated planning in artificial intelligence. In contrast, the arguments of interest here involve reasoning about what an actor's plan must be (or must have been), i.e., the perspective of plan recognition. In computational studies of argumentation, Bex et al. [2009] present a scheme for abductive practical reasoning, which can be used to explain an agent's motivation for taking an action.

3 Argumentation Schemes

The argumentation schemes were abstracted from arguments about plans of the Russian government (R) in an article on Russia's involvement in the Syrian conflict [Weinberger, 2016] and in another article on Russia's alleged attempt to influence the outcome of the 2016 U.S. presidential election [Office of the Director of National Intelligence, 2017]. The following scheme was used, for example, to argue that R acted to help the U.S. presidential candidate Donald Trump (T) to defeat Hillary Clinton (HC). The premise is that R's actions (disclosing unfavorable information about HC through Wikileaks, promoting anti-HC propaganda, etc.) were consistent with a plan to help T to defeat HC.

Argument-from-Inferred-Plan

Premises:

1. Actor is doing/did Act(s) consistent with a Plan for achieving Goal(s). (Note: some acts of Plan may not have been done yet.)

Conclusion: Act(s) are/were part of Plan for achieving Goal(s).

Critical Questions:

- a. In Actor's view, is benefit/cost of Plan high enough to justify doing Acts of Plan? For example, is it likely to Actor that this Plan will have undesirable side effects?
- b. In Actor's view, is there a plausible alternative preferable plan for Goal(s)? For example, is the

likelihood of the success of this Plan lower than success of an alternative plan in the view of Actor?

The critical questions of the scheme are related to the critical questions of Practical Reasoning, except that instead of challenging a planner's argument, they challenge a plan recognizer's argument. (Critical questions are provided with the schemes to help users understand/generate counter-arguments.)

The next scheme was used, for example, in an argument for R's attempt to influence the election based on R's pattern of behavior of attempting to influence elections in other countries. To describe the actor's behavior in terms of planning algorithms, it resembles creating a plan using case-based-reasoning (CBR) [Kolodner, 1993]. Thus, critical question (a) involves the notion from CBR of adapting old plans.

Argument-from-Behavior-Pattern

Premises:

1. Actor has/had Goal(s), which is/are similar to Past-goal(s).
2. Actor is doing/did Act(s), which is/are similar to Past-act(s) that were part of a plan that was successful in achieving Past-goal(s).

Conclusion: Act(s) are/were part of Plan for achieving Goal(s).

Critical Questions:

- a. In Actor's view, can the old plan be successfully adapted?
- b. In Actor's view, is benefit/cost of Plan high enough to justify doing Acts of Plan? For example, is it likely that this Plan will have undesirable side effects?
- c. In Actor's view, is there a plausible alternative preferable plan for Goal(s)? For example, is the likelihood of the success of this Plan lower than success of an alternative plan?

The next argument scheme is related to inferring actions that might have resulted from an actor's use of Argument from Positive/Negative Consequences. For an example related to positive consequences, the argument that R wanted to help T defeat HC in the election was supported by the premise that R believed that President T would partner with R in counter-terrorism activities, a positive consequence in R's view.

Argument-from-Inferred-Appraisal-Based-Actions

Premises:

1. In Actor's view, Act(s) has/have likelihood of Consequence(s).
2. In Actor's view, Consequence(s) is/are desirable, or is/are not desirable.

Conclusion: Actor did (or intends to do) Act(s) to lead to positively appraised Consequences, or respectively, did not (or intends to not) do Act(s) to avoid negatively appraised Consequences.

Critical Questions:

- a. In actor's view, is there a good way to do Act(s) while mitigating or avoiding negatively appraised consequences?
- b. In actor's view is the benefit/cost of doing Act(s) leading to positively appraised Consequences worthwhile?

As far as we know, the field of AI planning does not address the creation of duplicitous plans. However, there is a need for such a scheme in analyzing world events. The following scheme was abstracted from an argument that R has built up its military in Syria to limit U.S. operations in the Middle East. The premises were that R built up its military there for the alleged goal of fighting terrorism, but the buildup was inconsistent with that goal. However, the buildup was consistent with the suspected true goal of limiting U.S. operations in the Middle East, a goal that the U.S. would oppose.

Argument-from-Plan-Deception

Premises:

1. Actor did (or intends to do) Act(s) with Alleged-goal(s).
2. Effect(s) of Act(s) is/are inconsistent with Alleged-goal(s)
3. Effect(s) of Act(s) is/are consistent with suspected True-goal(s) of Actor.
4. Effect(s) of Act(s) is/are (or would be) negatively appraised and/or met with opposition by Protagonist

Conclusion: Actor did (or intends to do) Act(s) as (part of) a plan to achieve True-goal(s).

Critical Questions:

- a. In actor's view, is benefit/cost of plan high enough to justify doing Act(s)?
- b. Is it possible that actor does not realize that effects of acts are inconsistent with alleged-goals?

Some modern AI planning systems incorporate affective reasoning into planning, e.g. [Gratch, 2000]. The next scheme involves not only reasoning about an actor's plan, but also the actor's beliefs about the

protagonist's response to the plan. An example is the argument that since the U.S. has not resisted R's military buildup in the Middle East, R believes that the U.S. will not intervene to prevent R's future military buildup in the Far East.

Argument-of-Increasing-Boldness

Premises:

1. Actor did Act(s) to achieve Goal(s).
2. Act(s) was/were not resisted by Protagonist.
3. Actor wants to do Similar-act(s) to achieve Similar-Goal(s).

Conclusion: Actor believes that Protagonist will not intervene to prevent Similar-Act(s).

Critical Questions:

- a. In actor's view, is benefit/cost high enough to justify doing Similar-act(s)?
- b. In actor's view, is it likely that Protagonist will not resist Similar-act(s)?

The following two schemes were used together. The first was used in an argument that R is attempting to coerce the U.S. into not resisting R expansion by the threat of conventional war or a nuclear response. The second was used to argue for resisting the attempted coercion by providing evidence that R would be incapable of acting on those threats.

Argument-of-Coercion

Premises:

1. Actor threatens doing Act(s) that Actor believes are negatively appraised by Protagonist.
2. Actor suggests that Actor will not do Act(s) if Protagonist does Coerced-act(s).
3. Coerced-act(s) are consistent with Actor's Goal(s).

Conclusion: Actor is attempting to coerce Protagonist to do Coerced-act(s).

Critical Questions:

- a. In actor's view, is protagonist likely to believe that actor could or would carry out threats?

Argument-for-Resisting-Coercion

Premises:

1. Actor is attempting to coerce Protagonist to do Coerced-act(s), via threat of doing Act(s) that Actor believes are negatively appraised by Protagonist.
2. In actuality, Actor is incapable of doing the Act(s).
3. If Protagonist does Coerced-Act(s) it may have negative consequences for Protagonist.

Conclusion: Protagonist need not do Coerced-Act(s).

For an example of how the schemes may be combined, see Figures 1 and 2.

4 Discussion

Arguments about the inferred plans of other actors are important for critical thinking about world events, yet have not been recognized as an important class of argumentation schemes. Real-world actors and their plans are more complex than the robot worlds modeled in the early days of artificial intelligence planning research. However, the early heuristics proposed for plan recognition in AI can provide insight into the specification of argumentation schemes for this class of arguments.

Acknowledgments

We appreciate the assistance of graduate student Michael Branon. This material is based upon work supported in whole or in part with funding from the Laboratory for Analytic Sciences (LAS). Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the LAS and/or any agency or entity of the United States Government.

References

- [Bex et al., 2009] Bex, F., Bench-Capon, T., and Atkinson, K. Did he jump or was he pushed? Abductive Practical Reasoning. *Artificial Intelligence and Law* 17, 2009, p. 79-99.
- [Bex et al., 2013] Bex, F., Lawrence, J., Snaith, M. & Reed, C. Implementing the Argument Web. *Communications of the ACM*. 56(10), 2013, p. 66-73
- [Carberry, 1990] Carberry, S. *Plan Recognition in Natural Language Dialogue*. MIT Press, 1990.
- [Gratch, 2000]. Gratch, J. Emile: Marshalling Passions in Training and Education. In *Proceedings of 4th International Conference on Autonomous Agents*, June 2000.
- [Kolodner, 1993] Kolodner, J.. *Case-Based Reasoning*. San Mateo: Morgan Kaufmann, 1993.
- [Office of the Director of National Intelligence, 2017] Office of the Director of National Intelligence. *Assessing Russian Activities and Intentions in Recent US Elections*. National Intelligence Council, 2017, ICA 2017-01D.

[Pinkwart and McLaren, 2012] Pinkwart, N. and McLaren, B.M. (Eds.) (2012). *Educational Technologies for Teaching Argumentation Skills*. Sharjah: Bentham Science Publishers.

[Scheuer et al., 2010] Scheuer, O., Loll, F., Pinkwart, N., and McLaren, B.M. Computer-Supported Argumentation: A Review of the State of the Art. *Computer-Supported Collaborative Learning* 2010, 5(1): 43-102.

[Walton et al., 2008] D. Walton, C. Reed, and F. Macagno. *Argumentation Schemes*. Cambridge University Press, 2008.

[Weinberger, 2016] Weinberger, K. *Putin sets the stage for the incoming U.S. administration*. Institute for the Study of War, 2016. (Downloaded from <www.understandingwar.org>)

Figure 1. Example of argumentation schemes in combination

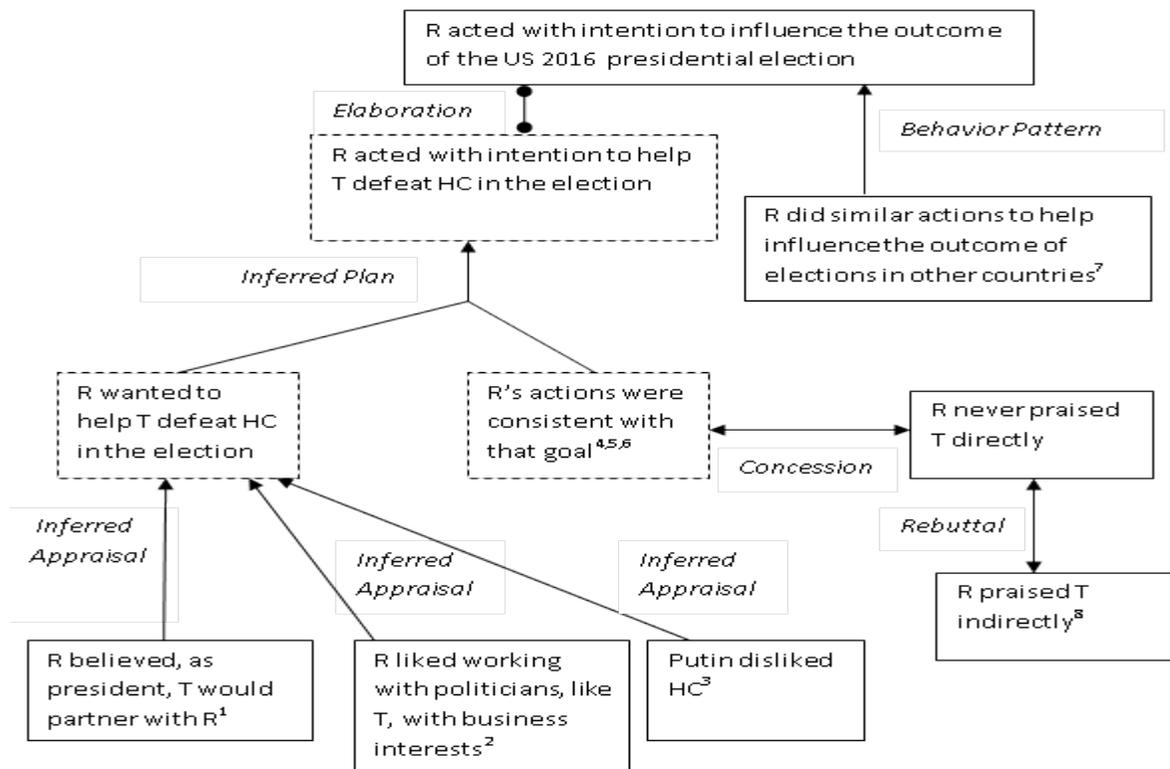


Figure 2. Example of argumentation schemes in combination

