Extracting and Understanding Arguments about Motives from Stories

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Abstract

In this paper, we discuss how Value-based Argumentation can be used as a tool in human and computer *story understanding*, especially where understanding the story requires understanding of the motives of its characters. It is shown how arguments about motives can be extracted from stories, and how dialogues about these arguments can aid in story understanding.

1 Introduction

In this paper, a short version of which was published as (Bex and Bench-Capon, 2014), we discuss the important connections between narratives, or stories, and argumentation. We often persuade not by imparting facts and rules, but by providing an interesting narrative, particularly when trying to convince others to adopt particular values and attitudes. Presentation of an argument as a story engages our natural reaction to a story, to attempt to understand it. Thus, the story form fosters engagement, encouraging the right choices by appealing to common values rather than by imposing a rule that is to be followed.

A central concept in the research on story understanding is that of *scripts* (Schank and Abelson, 1977), coherent scenarios about common situations such as visiting a restaurant. Despite the apparent failure of scripts to deliver the promised advances in computational linguistics, they still play an important part in computational and cognitive approaches of story understanding (Mueller, 2004), and they are widely applied in, for example, case-based reasoning (Gentner and Forbus, 2011), scenario-based evidence analysis (Vlek et al., 2013) and narrative generation (Gervas et al., 2005).

In our opinion, purely script-based approaches to story interpretation are not suited to understanding persuasive stories concerning values, such as parables. Scripts represent the way in which we expect typical situations to play out: the more a story adheres to a familiar script, the more plausible a story is considered to be. However, many memorable stories such as parables depend on a twist in the story, something which is out of the ordinary and which challenges conventional attitudes (Govier and Ayers, 2012). For example, no-one expects a father to organise a feast for a son who has spent all of his money on wild living (*The Prodigal Son*[1]). Furthermore, the most interesting stories are often those with conflicting attitudes (Wilensky, 1982). For example, in the *Prodigal Son*, the son's older brother wants to turn away his sibling: why welcome a sinner? The father, however, forgives and welcomes his son. In models based on scripts, in which stories are rendered only as causal sequences, these conflicts between characters' values remain largely implicit and unexplained.

For a computational model of story understanding, we need to add a more fine-grained psychological dimension to the causal narrative, in which conflicts between characters' attitudes and challenges to common attitudes can be modelled. This gives us an internal perspective that allows us to represent the deliberations of the characters involved, which allows for a much more subtle analysis of character motive and attitude than we can perform with the external causal perspective. This in turn allows us to show how the relevant stories can influence the audience's attitudes or, in other words, how these stories can persuade an audience to adopt a different attitude.

Recently, we have proposed a model for story understanding (Bex et al., 2014a)(Bex and Bench-Capon, 2014), which draws from value-based practical reasoning (Atkinson and Bench-Capon, 2007). Stories can be represented as (causal)

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[1] Luke 15:11-32. We use the World English Bible translation available at `http://www.ebible.org/`

state transition diagrams, where the transitions represent possible actions by the characters in the story. Character motives are represented by indicating which values are promoted or demoted by the actions in the story. We can then extract practical reasoning arguments of the form *I should perform Action because it promotes Value* and *I should not perform Action because it demotes Value* from the diagram. If we also have separate arguments denoting the characters' attitudes (value orderings), we can construct an Extended Argumentation Framework (EAF) with values (Modgil, 2009), a set of (possibly conflicting) arguments representing character choices and attitudes. Given an EAF, we can then infer attitudes given the choices made in the story. In section 4.1 we show how a particular story interpreted by means of an EAF can be used as an argument in a particular dialogical context, using (Modgil and Bench-Capon, 2008)'s extended TPI-protocol for argumentative dialogue to argue for a change in value preferences in a dialogical setting.

2 Motivating example: The Good Samaritan

Stories can be a powerful vehicle of persuasion. A story does not persuade by imparting explicit rules, but by exposing a coherent narrative aimed at changing or reinforcing attitudes, so that the stories exemplify various group cultural norms. Many folktales are of this type, as are parables, both secular and biblical. As an example of a well-known parable, we will consider *The Good Samaritan*. Since we will be discussing this parable throughout the paper, we will quote it in full. The context is established in Luke 10:25-27:

> Behold, a certain lawyer stood up and tested him, saying, "Teacher, what shall I do to inherit eternal life?"
>
> He said to him, "What is written in the law? How do you read it?"
>
> He answered, "You shall love the Lord your God with all your heart, with all your soul, with all your strength, with all your mind, [Deuteronomy 6:5]; and your neighbour as yourself [Leviticus 19:18]."
>
> He said to him, "You have answered correctly. Do this, and you will live."

> But he, desiring to justify himself, asked Jesus, "Who is my neighbour?"

Thus the lawyer asks two questions. The first, "what shall I do to inherit eternal life?", receives an answer justified by scriptural authority. But the second, "Who is my neighbour?", is met simply by a story.

> Jesus answered, "A certain man was going down from Jerusalem to Jericho, and he fell among robbers, who both stripped him and beat him, and departed, leaving him half dead. By chance a certain priest was going down that way. When he saw him, he passed by on the other side. In the same way a Levite also, when he came to the place, and saw him, passed by on the other side. But a certain Samaritan, as he travelled, came where he was. When he saw him, he was moved with compassion, came to him, and bound up his wounds, pouring on oil and wine. He set him on his own animal, and brought him to an inn, and took care of him. On the next day, when he departed, he took out two denarii, and gave them to the host, and said to him, 'Take care of him. Whatever you spend beyond that, I will repay you when I return.' Now which of these three do you think seemed to be a neighbour to him who fell among the robbers?"

> He said, "He who showed mercy on him."

> Then Jesus said to him, "Go and do likewise."

This provides a very clear example of a story being used as an argument to justify a particular answer to a question, "Who is my neighbour?". However, it is not meant as a theoretical argument: the aim is not that the lawyer should believe that the Samaritan is his neighbour (nor, since the one in the story is a fictional character, that all Samaritans are his neighbour). Nor is the lawyer intended to set out to assist wounded travellers on the road from Jerusalem to Jericho. Unlike practical reasoning proper, there is no specific situation, with a specific choice of actions to resolve. Rather the argument is intended to convince the lawyer (and

ultimately of course the reader) to *become* a different person, the sort of person who will enjoy eternal life.

So how exactly does the story convince its audience to change their ways? Govier and Ayers (Govier and Ayers, 2012) have recently explored this question in detail. They specifically address the relation between parables and argument using the *Good Samaritan* as one of their examples. They reconstruct the *Good Samaritan* as the following argument (italicised statements are said in (Govier and Ayers, 2012) to be implicit):

1. *If supposedly holy people (the priest and the Levite) were to ignore an unknown and needy person on a road, they would not treat that person as a neighbour.*

2. If a person who was of no special status and did not know an unknown and needy person on a road were to treat him with mercy and kindness, that person would treat the needy person as a neighbour.
   So

3. What matters about being a neighbour is not one's status or one's prior knowledge of a person.

4. What matters about being a neighbour is treating another with mercy and kindness when that person is needy and one encounters him.

5. *It is good to treat a needy stranger as a neighbour if one encounters him.*
   Therefore

6. *One should treat other people, when they are in need and one encounters them, as one's neighbours with mercy and kindness.*

Statements 1 and 2, which both can be said to follow from the story in some way[2], lead to conclusions 3 and 4. These two conclusions together with the value judgement contained in 5 then lead to the final conclusion 6. The addition of 5 and 6 is, in our opinion, somewhat contentious because it transforms the argument into an argument with a normative conclusion, advocating particular behaviour. This is perhaps justified by the comment 'Go and do likewise' made by Jesus, since this

shows that the intention in telling the parable is to affect future actions. However, we would contend that the intention of the parable should not be of the form *in certain situations you should do this* - a norm, but rather an invitation to adopt different attitudes, to be like the Samaritan and recognise that duties between people arise from their common humanity rather than any social or religious ties (statements 3 and 4). To enable a story to have this effect we need a detailed account of the reasoning of the Samaritan, the Priest and the Levite, since otherwise we cannot articulate the differences in attitude between the three characters, and so cannot identify the attitudes we are being urged to abandon and adopt.

3 Understanding stories using value-based argumentation

The computational model for story understanding we propose is based on (Atkinson and Bench-Capon, 2007)'s framework for value-based practical reasoning. We previously used this model to capture abductive reasoning in which stories served as explanations for particular evidence (Bex et al., 2009). The model contains three main elements: (i) *Action-Based Alternating Transition Systems with Values* (AATS+V) for encapsulating stories; (ii) arguments based on the *Practical Reasoning Argumentation Scheme* (PRAS), to generate arguments concerning the individual choices a story character can make; and (iii) Value-based Argumentation Frameworks (VAF), representing the set of arguments and counterarguments a story character uses to make his individual choices on the basis of his preferences and attitudes. Because we want to be able to explicitly reason about characters' value orderings, we use (Modgil, 2009)'s Extended Argumentation Frameworks (EAF) instead of the original VAFs. Below, we will discuss each of these elements by means of our example.

3.1 Stories as AATS+V

Structuralist accounts of narrative argue that actions that represent transitions between states are the basic building blocks of stories. It is for this reason that we choose the mechanism of Action-based Alternating Transition Systems with Values (AATS+V) as our basic formalization method for stories. An AATS consists of a set of states and transitions between them, with the transitions labelled with joint actions, that is actions compris-

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[2] It is unclear why (Govier and Ayers, 2012) consider 1 to be implicit and 2 not.

ing an action of each of the agents concerned. In an AATS+V, the transitions are labelled with the values that motivate the characters in the story. A basic version of the parable of the Good Samaritan can be rendered as the AATS+V in Figure 1.

At the beginning of the story q_0, the condition of the traveller is *wounded*. In q_4, the traveller's wounds have been bandaged and he is in a stable condition. In addition to the actions taken by the characters in the story (j_1, j_3, j_6), we have also included the hypothetical actions the characters could have performed: for example, the Priest could also have helped the traveller (j_2). Action choice in parables is often more or less binary (*help* or *¬help*, *accept* or *¬accept* in the *Prodigal Son*), so modelling these extra actions does not require much extra information besides the original story text. The values that are promoted by each action are included in the AATS+V: Religious Duty (+RD), Religious Law (+RL), National Solidarity (+NS), Racial Solidarity (+RS), Compassion (+C), Prudence (+P), Convenience (+Cv) and Revenge (+R). Adding the values requires more background knowledge. For example, we need to know that the traveller and the Levite were of the same race, and that Samaritans were a common enemy for the Jewish people. Nowadays, this background information can be gained from Biblical texts, or from the many varied accounts on how parables should be interpreted, but it would have been well-known to the original audience. The values in figure 1 are a selection that the authors have heard from a variety of sources over the years.

3.2   Arguments based on the story

The idea of arguments based on stories is that we look for arguments that instantiate the Practical Reasoning Argumentation Scheme (PRAS). Such arguments are of the following form.

1. In the current circumstances R

2. We should perform action A

3. Which will result in new circumstances S

4. Which will promote some value V

Now, given an AATS+V, we can construct these arguments for the different characters. The basic idea expressed in (Atkinson and Bench-Capon, 2007) is that the AATS+V serves as a formal grounding for arguments that instantiate the Practical Reasoning Argumentation Scheme (PRAS), as follows (where the line numbers in the above PRAS scheme correspond to the line numbers in the formal rendering below).

1. In the initial state $q_0 = q_x \in Q$

2. Agent $i \in Ag$ should participate in joint action $j_n \in J_{Ag}$, where $j_n^i = \alpha_i$

3. Such that $\tau(q_x j_n)$ is q_y

4. Such that for some $v_u \in Av_i$, $\delta(q_x, q_y, v_u)$ is $+$

Here, Q is a finite, non-empty set of *states*, $Ag = \{1, \dots, n\}$ is a finite, non-empty set of *agents*, α_i defines the set of states from which action α may be executed by agent i, τ is a partial *system transition function*, which defines the state $\tau(q, j)$ that would result from the performance of action j in state q, Av_i is a finite, non-empty set of values for agent i and δ is a *valuation function* which defines the status (promoted (+), demoted (–) or neutral (=)) of a value ascribed to the transition between two states.

Given this mapping of PRAS on an AATS+V, we can generate the arguments from the AATS+V, noting that arguments for different actions attack each other because the actions are mutually exclusive, *i.e.*, one cannot help and not help someone at the same time. First, there are the two arguments that might apply to the priest.

- A_1: I should help the man because I have a religious duty to do so. This will promote Religious Duty (+RD)

- A_2: I should not help the man because I risk uncleanliness through contact with his blood. This will promote Religious Law (+RL).

The following apply to the Levite.

- A_3: I should help the man because he is a fellow countryman. This will promote National Solidarity (+NS).

- A_4: I should help the man because he is of my race. This will promote Racial Solidarity (+RS).

None of the above arguments apply to the Samaritan. The following arguments apply to all three characters.
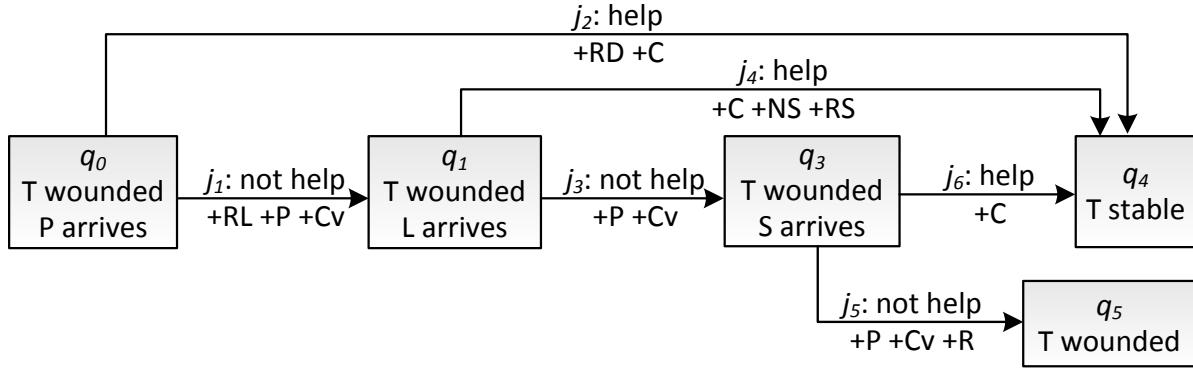
Figure 1: AATS+V for the Good Samaritan

- A_5: I should help the man because he is a fellow human being. This will promote Compassion (+C).

- A_6: I should not help the man because it may be trap and I may be robbed. This will promote Prudence (+P).

- A_7: I should not help the man because it will interrupt my journey. This will promote Convenience (+Cv).

Finally there is an argument that applies only to the Samaritan:

- A_8: I should not help this man, because his people have quarrelled with mine. This will promote Revenge (+R).

All of the arguments A_1-A_4 relate to duties of one sort or another, arising from religious law or duty, or one form or another of social relationship (nation, race). A_5-A_8 all arise from natural human instincts, unconnected with any social institution.

3.3 Constructing an Argumentation Framework

From these arguments, we can construct a Value-based Argumentation Framework (VAF). A VAF is based on (Dung, 1995)'s standard Argumentation Frameworks. An Argumentation Framework $AF = (Args, \mathcal{R})$, where $Args$ is a set of arguments, and $\mathcal{R} \subseteq (Args \times Args)$ is a binary attack relation between pair of arguments. The attack relations between arguments A_1-A_8 are straightforward: arguments concluding *help* attack and are attacked by those concluding *do not help*. A VAF also contains a set of values, and a mapping that

associates a value with each argument. Furthermore, a VAF has associated audiences, each of which represents a total ordering of these values.

The purpose of building a VAF is to find a subset of the arguments which is at once conflict free (i.e. no two arguments in the subset attack one another), and collectively able to defend itself (i.e. any attacker of an argument in the subset is itself attacked by an argument in the subset). The maximal such subset is called a preferred extension, and represents a maximal consistent position given the arguments presented. The key feature of VAFs is that they allow a distinction to be made between successful attacks (defeats) and unsuccessful attacks, on the basis of the values associated with the arguments: attacks succeed only if the value associated with the attacking argument is ranked by the audience as equal to, or higher than, the argument it attacks. The VAF thus accounts for elements of subjectivity in that the arguments that are acceptable are dependent upon the audience's ranking of the values involved in the scenario.

We now attempt to explain the actions of the three characters by considering different value orderings, different audiences. Suppose that the Priest puts religion before all else (*i.e.*, Religious Duty and Religious Law are preferred to Convenience, Compassion and Prudence). He then has a conflict between A_1, which argues he should help to promote RD, and A_2, which argues he should not help to promote RL. In the story, he chooses to observe of the law, which applies specifically to himself because of his special role, over the vaguer practical obligation to serve others. This ranking of strict observance of the law over more human concerns is criticised elsewhere in the Gospels, e.g. Mark 2:27 (Then Jesus said to them, "The

Sabbath was made to meet the needs of people, and not people to meet the requirements of the Sabbath.").

The Levite must be supposed to act on either A_6 or A_7, overriding the specific duties of A_3 and A_4 as well as A_5. But because we can assume to have a type of a morally respectable man, it must be assumed that we are being invited to conclude that these preferences are acceptable in the eyes of the current moral climate: that it is morally acceptable for prudence and/or personal convenience to override obligations arising from country or race, let alone from natural feelings of compassion.

The Samaritan, in contrast has no duties prompting him help the man, and must balance his compassion against the other natural human instincts. That he helps the man (A_5), can only be explained in terms of him putting compassion before all other values, individually and in combination, and this is what we are invited to conclude is what being a neighbour really is. The context supplied in the coda quoted above invites the hearer to adopt these value preferences, to become a person who places compassion above creed, country and convenience and to act in accordance with these priorities in future.

4 Stories as arguments in a dialogical context

In the previous section, we discussed how stories, the characters in them and these characters' motivations can be understood using VAFs. We can now use the story as an argument, using exactly this interpretation of the story. The conclusion the audience is invited to draw from the story depends on the context in which the story is told. In the case of *Good Samaritan*, this context is provided by the exchange between Jesus and the lawyer, and specifically the lawyer's question "Who is my neighbour?". As we have argued in section 2, the actual question is something like "what does it mean to love your neighbour like yourself?", and the answer is not the literal "The Samaritan is my neigbour" but rather an understanding of why the Samaritan acts as he does, which encourages one to adopt similar attitudes to the Samaritan.

4.1 Extended Argumentation about Values

In our model, the audience of the story should identify the value-based arguments in the story and then reason about which values will explain the behaviour of the Samaritan. In (Atkinson and Bench-Capon, 2007) the value orderings themselves cannot be reasoned with or about, as they are not represented in the object language. We therefore use the machinery of (Modgil, 2009) to represent statements about value orderings as arguments in an Extended Argumentation Framework (EAF). In addition to a set of arguments $Args$ and attacks between arguments $\mathcal{R}$, EAFs also contain a set $\mathcal{D} \subseteq (Args \times R)$ of *attacks on attacks*. The idea is that arguments about preferences attack some attack between arguments and thus influence the preferred extension. For example, if argument A attacks argument B and vice versa, there are normally two preferred extensions, $\{A\}$ and $\{B\}$. However, if we add the argument $A > B$ (expressing that A is preferred to B), which attacks and defeats the attack from B on A, there is only one preferred extension namely $\{A, A > B\}$.

In the EAF for the Samaritan there potentially two value-preference arguments for each pair of values, for example:

AV1 Prudence is preferred to Compassion ($P > C$).

AV2 Compassion is preferred to Prudence ($C > P$).

These pairs will mutually attack, but more importantly they will attack the attack from the argument motivated by the less preferred value on arguments motivated by the other value. The complete EAF for the parable will now contain all the base arguments A_1-A_8 and a value preference argument for each attack between these original arguments. Furthermore, we introduce arguments for the various characters: AC_1 (Character is a priest), AC_2 (Character is a Levite) and AC_3 (Character is a Samaritan). This will enable us to eliminate arguments which do not apply to particular characters from consideration: thus AC_1 will attack A_3, A_4 and A_8, AC_2 will attack A_1, A_2 and A_8, and AC_3 will attack A_1, A_2, A_3 and A_4. Adding AC_3 to the AF that contains all characters' arguments A_1 - A_8 then produces the EAF applicable to just the Samaritan, as shown in Figure 2. Similarly, we can introduce AC_2 to get the EAF applicable to the Levite and AC_1 to get the EAF applicable to the priest.
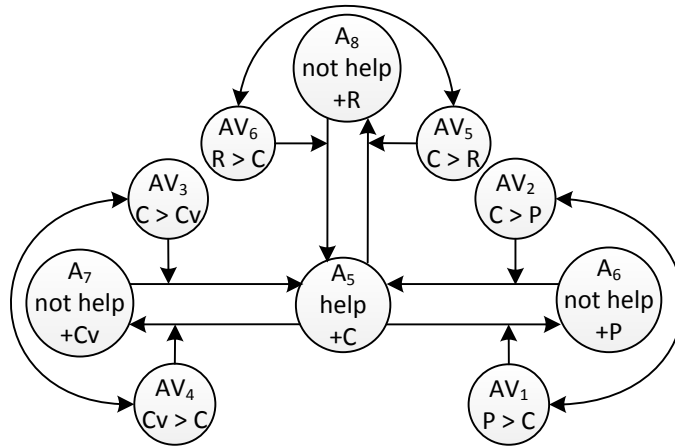
Figure 2: EAF for the Samaritan

4.2 The dialogical argument of the Good Samaritan

Now that we have established appropriate EAFs for the various characters, we need to evaluate them to explain the choices they make in the story. Thus, in the case of the Samaritan, we need to construct an admissible set containing an argument to justify helping the traveller, and then to consider what value preferences it contains. One method of constructing admissible sets from Dung style AFs is to use a dialogue game, such as the TPI (Two Party Immediate Response) Game of (Dunne and Bench-Capon, 2003). As was shown in (Modgil and Bench-Capon, 2008) this can be adapted to EAFs as follows. First, we rewrite the object level arguments of the EAF as meta level statements. This is a purely mechanical process: each pair of arguments in an attack relation is replaced by four arguments and their attack relations. Thus, for example, A_6 attacks A_5 is rewritten as: A_5 *holds*, which is attacked by A_6 *defeats* A_5, which is attacked by A_6 *does not hold* which is attacked by A_6 *holds*. Note that A_5 holds and A_6 *holds* do not directly attack one another, and so are not in conflict. Where A_5 and A_6 are value based arguments, we can reject A_6 *defeats* A_5 not only because we reject A_6, but also because we prefer the value of A_5 to the value of A_6. Thus A_6 *defeats* A_5 is attacked by (in our example) *compassion is preferred to prudence*, which is itself attacked by *prudence is preferred to compassion*. Each pair of attacking arguments is thus rewritten as a regular AF; figure 3 shows the new, regular AF, structure for the pair of arguments A_5 and A_6.

A TPI game proceeds by the proposer playing

an argument, the opponent playing an attacker, the proposer playing an attacker of that argument and so on, until one player cannot move. At this point a player can back up to a choice point and play a different attacker. This continues until no moves are possible (note that arguments under attack cannot be played). At this point we will have an admissible set containing the arguments played by the last player to move. If this was the proposer is will contain the original argument and this will have been shown to be acceptable. Because it is the Samaritan's preference we are trying to determine, we use the EAF in figure 2, rewritten as a regular AF. The dialogue then proceeds as follows:

> **Samaritan**: A_5 holds. *This is an argument justifying what the Samaritan did in the story*: current position is $\{A_5$ holds$\}$.

> **Opponent**: A_6 defeats A_5. *Opponent chooses a way to attack A_5.*

> **Samaritan**: AV_2 C > P. The preference argument is played: the alternative would eventually require A_5 holds to be played, but this is under attack. Current position is $\{A_5$ holds, C > P$\}$.

> **Opponent**: A_7 defeats A_5. *Opponent cannot play P > C, because it is under attack, and so backs up and chooses another line of attack.*

> **Samaritan**: AV_3 C > Cv. Current position is $\{A_5$ holds, C > P, C > Cv$\}$.

> **Opponent**: A_8 defeats A_5. *Again the opponent must back up since Cv > C is under attack.*
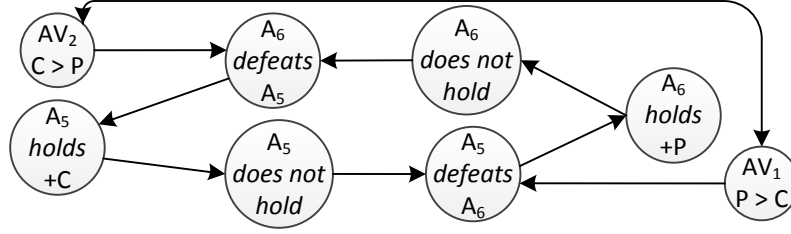
Figure 3: Regular AF for the A_5 - A_6 part if the EAF in figure 2

Samaritan: AV_5 C > R. Current position is $\{A_5 \text{ holds}, C > P, C > Cv, C > R\}$.

At this point the opponent must stop, since there are no further lines of attack. The Samaritan's position, $\{AC_3, A_5, AV_2, AV_3, AV_5\}$, comprises an argument justifying his action A_5, and the three value preferences required to defend that argument AV_2, AV_3 and AV_5. It is exactly this position that the audience is being urged to adopt, since it provides the answer to the lawyer's question "what does it mean to love your neighbour like yourself?".

In our opinion, the argument that the story of the *Good Samaritan* presents is accurately captured by the above dialogue. In contrast to (Govier and Ayers, 2012)'s traditional, more syllogistic analysis of the argument presented by the story (section 2), in the case of the dialogue no explicit norm or course of action is being advocated. This is exactly the way it should be: instead of advocating norms, stories (especially parables) convince by having the audience consider a character's motives by, as it were, engaging in an internal dialogue with the character.

5 Implementing our model

Generating arguments from stories and presenting the different possible extensions based on the value orderings allows one to gain insight into the point of the story: why did the characters act as they did, and which attitudes are advocated in the story? Whilst this is interesting as a theoretical exercise, one additional aim is to implement a system that allows people to explore the stories and character motives in an interactive and intuitive way. One option is to allow humans to engage in a dialogue akin to the ones in section 4.2, thus allowing users to for example, interrogate an agent representing the Samaritan about his motives, and thus gain a better understanding of the story. This can then be used for educational purposes, for exam-

ple, schoolchildren learning about values through stories.

For such a system, the following separate elements need to be implemented.

1. *Construct initial AATS+V on the basis of a story.*

2. *Include additional hypothetical transitions: 'what could the characters have done and why?'.*

3. *Generate a VAF of arguments and critiques based on AATS+V.*

4. *Execute a dialogue based on the VAF.*

Elements 1 and 2 have been done manually for a few stories: the fable of the *Ant and the Grasshopper* and the Parables of the *Prodigal Son* and the *Good Samaritan*. Ideally part of this process is automated if we want to build a more substantial corpus. For element 1, we can first automatically extract the characters and events from stories, especially from fairly short and simple stories such as fables. This is certainly not trivial but very well possible (see e.g. (Hogenboom et al., 2011)). However, as was discussed earlier, the values expressed by the story depend on the cultural background of the reader: the same story may have different interpretations. Furthermore, element 2 is also hard to fully automate as additional hypothetical transitions are often implicit in the stories, so for elements 1 and 2 human annotation will have to be used, based on skeleton AATS+V's that are constructed using event extraction.

For element 3, currently, Prolog and PHP implementations[3] exist (Wyner et al., 2012),(Wardeh et al., 2013). The PHP tool is based on (Atkinson

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and Bench-Capon, 2007) and so does not include arguments based on look ahead.

Once the arguments are available, it becomes possible to reason with them in a dialogue. Recently a dialogue game for arguing about the motives found in fables and parables was proposed (Bex and Bench-Capon, 2014). This protocol can be implemented in a dialogue game execution engine (Bex et al., 2014b), which allows for mixed initiative dialogues between software agents and humans through a simple interface (see (Bex et al., 2013)), making it possible to reason with the agents in a story in a similar way as shown in section 4.2. Furthermore, users can input new, value-based arguments about what they think the characters' choices in the story were. These arguments can then relatively easily be inserted as a new transition in the AATS+V (cf. (Reed et al., 2010)), using the mapping given in this article. Thus, the interface may also serve as a knowledge ellicitation tool to find different interpretations of the stories.

6 Conclusion

In this paper we have shown two important connections between computational models of narrative and computational models of argumentation: how argumentation can be used to understand stories, in terms of the motives and attitudes of the characters, and how stories can themselves be used to present arguments, especially arguments designed to persuade the audience to adopt particular attitudes. We have argued that parables can be interpreted as arguments of this sort, and illustrated our views with the famous parable of the *Good Samaritan*. We have identified several advantages of using stories in this way.

Using stories enables the consideration of hypothetical choices, so that the choice can be made clear and memorable, allowing us to benefit from the vividness of the concrete, without needing to have had any particular experience. Moreover using stories excludes irrelevant considerations: we need not consider facts and actions not mentioned in the story; this simplifies the construction of the AATS, and disbars irrelevant counter arguments, allowing for focus to be kept on the main point at issue. Stories are intended to reinforce or change attitudes: this is preferred to presenting a specific set of norms, since attitudes tend to produce an instinctive, and hence more immediate, response and can be applied to numerous, as yet unfore-

seen, situations. Moreover, they go deeper and so are more to be relied on. This is why soldiers are taught the history of their regiments: the tales of heroism and derring-do can inspire the loyalty and camaraderie required to bind them into an effective unit in a way in which standing orders cannot hope to do. Often there is no objective argument for an attitude or a norm, and so we need to rely on an emotional reaction, which is more easily produced by a story, especially one which allows the hearers to draw the conclusion for themselves (as does the good Samaritan parable, where the conclusion is stated by the addressee, not in the parable itself).

Engaging in a dialogue about a story further draws out the message of the story, and thus dialogue can act as an aid for story understanding. Our model, when combined with an application for argumentative dialogue, makes these dialogues about stories possible. Users can engage in meaningful discussions about a story not just with each other but also with the characters in a story which, when asked, will explain their motives and thus clarify the point of the story. In this way, our model comprises not just a theoretical discussion of understanding and arguing with stories, but also provides a first step towards a promising applications that can be used in, for example, educational settings.

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