Annotating Characters' Emotions in Drama.

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Abstract. In this paper, we describe a methodology for annotating characters' emotions in narrative media. Given the semantic annotation of the story, the emotional state of its characters is inferred through SWRL rules that encode the emotion appraisal process.
In order to exemplify the model and test the emotional states generated by the SWRL module, we resort to a well-known dramatic situation and we compare the generated emotional states with the hand-coded annotation by drama experts.

Keywords: emotions, virtual agents, computational models of drama

1 Introduction

Annotating digital items with metadata describing their content is a crucial task for a number of goals, ranging from content-based search and retrieval to navigation. The encoding of metadata in semantic languages, then, enables their intelligent and productive manipulation, as shown by a number of initiatives that rely on semantic representation to generate novel and adaptive presentations [30, 18, 23]. As for narrative contents, such as movies, video clips, fictional tales, etc., the annotation must include information about the story: characters, incidents, structure, etc.

In this paper, we tackle an issue related with the annotation of narrative contents, i.e. the information about characters' emotions. Beside their importance in human behavior [8], emotions are one of the distinctive features of drama (intented as character-enacted story), as acknowledged since the Age of Enlightenment [11] and stated more recently by contemporary aesthetics [29, 17]. Often disregarded by annotation projects, which tend to focus on the identification of actions and events (see for example [14]), characters' emotions provide an important way of indexing narrative contents, since characters are the primary medium by which a narrative is conveyed to the audience [17, 6]. Building on the assumption that indexing media items based on characters' emotions can help both the access to media repositories and the presentation of retrieved items, we propose a rule–based approach to the annotation of characters' emotions. The goal of our proposal is to support the complex task of assigning emotional states to characters, since it requires extra time and effort besides the annotation of story incidents.

The pipeline we propose takes as input a semantic annotation of story incidents, consisting of naturally occurring events and actions intentionally performed by the characters. In order to automatize the annotation of characters' emotions, we resort a the well known model of emotions issued by cognitive studies [24], that has been successfully applied to computational models of characters [9, 25, 10]. In this paper, we propose a translation of this model into a set of reasoning rules, which assign emotional states to characters in response to story events. When rules are applied to the story annotation, they result in the assignment of emotional states to characters; since the format of the annotated story is RDF/OWL, rules have been implemented in SWRL. The validation of the rules has been performed by applying them to a well know drama excerpt (the "nunnery scene" from Shakespeare's Hamlet) and asking a drama expert to evaluate the appropriateness of the assigned emotional states.

This paper is organized as follows: in Section 2, we illustrate the Drammar ontology for story annotation, i.e., the input format of the task of emotion assignment; in Section 3, after surveying the related works, we describe a computational model of emotions that we tranlate into SWRL rules. In Section 4, we describe the annotation of an example taken from the Third Act of Shakespeare's Hamlet and we compare the characters' emotions generated by the emotion assignment rules with the interpretation of the scene delivered by the literature on drama. Conclusions end the paper.

2 Drama ontology

The story annotation follows the model provided by the Drammar ontology (written in Ontology Web Language, OWL), designed for the annotation of dramatic media objects, i.e., media having a character-enacted narrative content [7, 20, 31]. According to this model, a "story" is construed as a sequence of incidents [3], that, abstracting from the mise-en-scène properties, is motivated by the cause-effect chain [27]; this chain results from a complex interplay among characters, events, and environments, well known in play-writing techniques [12].

The annotation centers on the description of the story units: a unit is enacted by certain characters, who perform actions in it, and/or contains naturally occurring events. As a result of these actions and events (collectively named incidents), the unit brings the world state from an initial state to a final state, thus realizing the causal chain of incidents that is one of the main elements of story definition. Formally, a `Unit` is `enactedBy` some Agents and contains (*containsEvent*) some incidents (`UnitIncident`, i.e., an agent's action or an event). The `UnitIncident class` (inspired by the Time Indexed Situation and the Time Indexed Participation patterns defined by [16]) connects the occurrence of an event – no matter if it is an agent's action or a naturally occurring event – with the entities (agents and objects) which participate in it (*incidentFeatures*) and the process (action or event) which constitutes the incident (*featuresProcess*), setting the incident into the time extent indexed by a unit. Similarly, the `StoryState` class connects a given `State` (a state of affairs or a character's mental state) with the entities

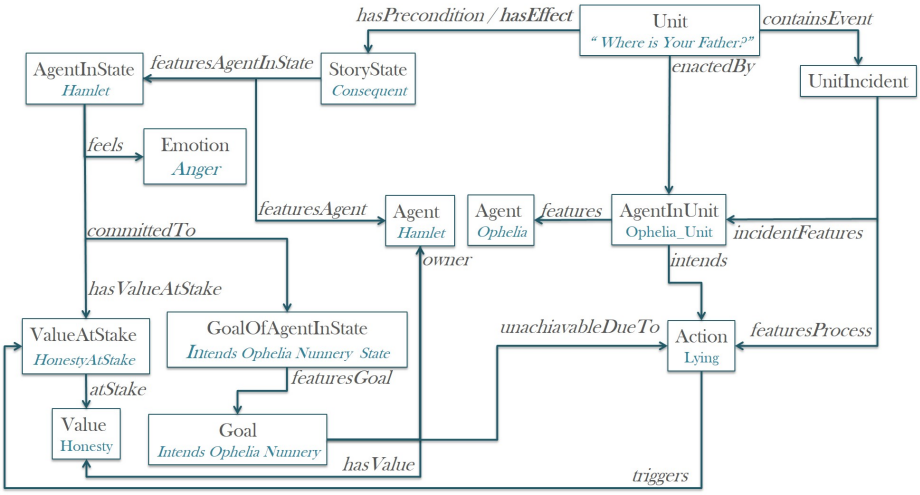

Fig. 1. The representation of preconditions and incidents of a story unit in Drammar (the "nunnery scene" of Shakespeare's Hamlet).

(agents and objects) which participate in it, and sets it in relation to a unit (*hasPrecondition* and *hasEffect*).

Characters' motivations and emotional states are modeled by the `MentalState` class, further subdivided in `Belief`, `Goal`, `Emotion` and `Value`. All these elements are dynamic: for example, an agent may form a goal and maintain it along several units, but the goal status may vary from one unit to another (it may be active only in certain units). Indeed, the connection between `Agent` and its dynamic elements is mediated by the `AgentInUnit` and `AgentInState` classes, both subsumed by the `Relation` top–level class.The `AgentInUnit` class represents the participation of a character to a certain unit, where the agent displays specific features (specific beliefs, emotions, qualities, and so on) that are unit-specific and cannot be attached to the definition of the character at the level of the entire story (the "character bible" in scriptwriting terms). The rational component of the agent (the interplay of beliefs, goals and planned actions) follows the well know BDI model [4, 13], according to an established practice in virtual agents [1]. In order to model the moral component of drama [5, 2], values are attached to the `Agent` through the *hasValue* property. A character's value can be put at stake (or re-established) by the occurrence of an incident.

For example, Fig. 1 depicts the core `Unit` of the well known "nunnery scene" from Shakespeare's Hamlet, where Hamlet tests Ophelia's honesty by asking her where her father is ("Where is your father?"), as part of a complex rhetorical plan aimed at inducing her to go to a nunnery. The unit is enacted by the `AgentInUnit` *Ophelia_Unit*, who performs the action of lying. The `Action` *lying* puts at stake Hamlet's value *Honesty* and makes Hamlet's goal *Intends Ophelia*

Nunnery State unachiavable in the story state effect (`StoryState` *Consequent*). This story state features the `AgentInState` *Hamlet_state* (linked to the `Agent` *Hamlet* through the property *featuresAgent*), which gathers the agent's relevant properties in a certain story state: here, *Hamlet_state* "contains" the (dropped) `GoalOfAgentInState` *Intends Ophelia Nunnery State* and the `Value` *Honesty*, which is at stake (see the property `hasValueAtStake`).

3 Annotating emotions

In this section, we describe a model of emotional appraisal suitable for drama, where the moral dimension is explicitly accounted for through the notion of moral values.

3.1 Computational model of emotions

Although different theories of emotions have been proposed (including physiological and dimensional models), most computational models are based on an appraisal theory, according to which cognitive processes are involved in the generation of emotions [24, 19, 28].

The model proposed by Ortony, Clore and Collins (OCC) [24] is an appraisal theory, i.e., a theory in which cognitive processes have the function of building a mental representation of the situation in which a person is involved. This representation (*person-environment relation*) is not limited to the external environment, but also includes the internal disposition of a person as goals, desires, intentions, norms and moral rules. Emotions arise from appraisal of the person-environment relation according to appraisal dimensions that are defined in the theory (i.e. desirability of an event) and they are defined as "valenced reactions" to events, agents and objects. In the OCC theory [24], the person-environment relation is represented by goals, standards and attitudes; the appraisal dimensions are represented by *desirability* (or undesirability) of an event, *praiseworthiness* (or blameworthiness) of an action, *liking* (or disliking) of an object.

Computational approaches tend to focus on the relation between goals and emotions; moral emotions, that require some deontic representation, have received less attention. For example, the EM (Emotion Model) system [26] integrates the OCC model of emotions into plan–based agents, using a domain-independent approach. For instance, the appraisal of the person-environment relation with respect to an event is performed by checking whether a goal is achieved or not as a consequence of the event. Standards are taken into account in EM, following the model of OCC, but their implementation is only limited to two standards related to well-being principles rather than moral values: *help-my-goals-to-succeed* and *do-not-cause-my-goals-to-fail*. These standards are goal-related and do not cover moral values.
In EMA [21, 22], the first fully-implemented framework for conversational agents, appraisal is formed by a set of independent processes that operate on a plan-based representation of person-enviroment relation, named *causal interpretation*.

This work is mainly based on Smith and Lazarus theory [19], so standards are not modeled. The authors consider the responsibility and intention of the agent as appraisal variables in performing an action.

Following the OCC model, [2] propose a computational model of emotions focused on moral emotions (e.g. *Pride*, *Shame*, *Reproach*, etc.) in which a BDI agent is endowed with moral values. The agent is driven by her moral values and the affective state is generated based on moral values and goals processing. A value is put at stake when one or more of its associated conditions hold in the state of the world. For example, when an agent performs an action that makes true in the state of the world one or more violation conditions, the agent appraises the action as blameworthy.

3.2 The Emotion Appraisal Process

In this work, we rely on previous work by [2] to establish an explicit link between characters' mental states, story incidents and characters' emotions, modelled according to the OCC model. As formally expressed in [22], in order to define a computational model of emotions starting from a reference theory, we must define (1) a derivation model of the appraisal variables (known as **Appraisal Derivation Model**) obtained from the person-environment relation; (2) a derivation model of the emotions (known as **Affect Derivation Model**), given the appraisal variables. In our approach, the *Appraisal Derivation Model* is based on goals and values processing. An event is evaluated as desirable when a goal is reached, while it is evaluated as undesirable when a goal is abandoned because it is not achievable. Regarding the evaluation of actions, an action is evaluated as praiseworthy when the action re-establishes a value, while we evaluate an action as blameworthy when the action puts at stake a value. The emotional state (i.e., joy, sadness, shame, etc.) is derived from the *Affect Derivation Model* by emotion-specific rules based on the result of the appraisal process.

According to the OCC theory of emotions, moral judgment is directly addressed by *Attribution emotion*s, which arise from the approval (or disapproval) of an action according to an agent's standards. This class encompasses the following emotions: (1) **Pride** (**Admiration**) arises from the approval of one's own (someone else's) praiseworthy actions (with respect to standards); (2) **Self-reproach** (**Reproach**) arises from disapproval of one's own (someone else's) blameworthy actions (with respect to standards). For example, an agent can appraise a lying action as blameworthy and, consequently, feel a Reproach emotion towards the agent who performed the action.
Unlike attribution emotions, that are directed towards actions, *well–being* emotions are directed towards events, i.e. the intentionality of the appraised process is not relevant. Joy and Distress, called *Well-being emotions*, are defined as follows: (1) **Joy** (**Distress**) arises from being pleased (unpleased) about a desirable (undesirable) event (with respect to one's own goals).
Compound emotions arise when a situation is appraised at the same time as an action and an event: (1) **Gratification** arises from the approval of one's own praiseworthy action with respect to standards (*Pride*) and from being pleased

about a desirable event with respect to one's own goals (*Joy*); (2) **Remorse** arises from the disapproval of one's own blameworthy action with respect to standards (*Self-reproach*) and from being displeased about an undesirable event with respect to one's own goals (*Distress*); (3) **Gratitude** arises from the approval of someone else's praiseworthy action with respect to standards (*Admiration*) and from being pleased about a desirable event with respect to one's own goals (*Joy*); (4) **Anger** arises from the disapproval of someone else's blameworthy action with respect to standards (*Reproach*) and from being displeased about an undesirable event with respect to one's own goals (*Distress*). For example, in the third act of Hamlet (Shakespeare), Hamlet feels *Anger* emotion towards Ophelia because she lied to him. Hamlet appraises the action performed by Ophelia as blameworthy (i.e. he feels *Reproach* emotion toward Ophelia) and is no longer motivated to send her to a nunnery with aim of saving her from the corruption of the courth (i.e. he feels *Distress* emotion because the event of lying is undesirable with respect to his goal).

Given the appraisal variables (elicited by the *Appraisal Derivation Model*), the *Affect Derivation Model* generates emotions according to the following domain-independent rules: (1) **Joy** if the appraisal variable "desirable" is generated (i.e. a goal is achieved); (2) **Distress** if the appraisal variable "undesirable" is generated (i.e. a goal is unachieved); (3) **Pride** and **Admiration** if the appraisal variable "praiseworthy" is generated (i.e. an action re-balances a value at stake); (4) **Self-reproach** and **Reproach** if the appraisal variable "blameworthy" is generated (i.e. an action puts a value at stake). According to OCC model [24], when both appraisal variable regarding actions and goals are generated, the *Affect Derivation Model* generates the following compound emotions: *Gratification* (*Joy* and *Pride*), *Gratitude* (*Joy* and *Admiration*), *Remorse* (*Distress* and *Self-Reproach*), *Anger* (*Distress* and *Reproach*).

3.3 Appraisal Rules

Based on the computational model proposed in [2], we encode the generation of emotions in a set of rules, based on OWL description logic, in order to annotate the characters' emotional state in an automatic manner. We decided to use the SWRL rule language to infer the characters' emotional state given the availability of tools for SWRL rules (the Pellet reasoner supports SWRL rules and Protegé has an editor for writing SWRL rules in the OWL ontology Drammar) and because the SWRL language was designed as an extension of OWL and it is one of the simpler rule languages [3].
As described in the previous section, the Drammar ontology describes story units

[3] At the present moment, we don't need to interchange rules with other systems, so we don't adopt the standard RIF language (W3C Rule Interchange Language). Anyway, it is possible to exchange most SWRL rules via RIF http://www.w3.org/2005/rules/wiki/RIF_FAQ.

ANTECEDENT (Appraisal Derivation Model):

Agent, AgentInState, AgentInUnit: Agent(?xAg), Agent(?yAg), AgentInState(?xStateEff), AgentInState(?yStateEff), AgentInState(?xStatePre), agentInStateFeaturesAgent(?xStateEff, ?xAg), agentInStateFeaturesAgent(?xStatePre, ?xAg), agentInStateFeaturesAgent(?yStateEff, ?yAg),

Unit: Unit(?u), enactedBy(?u, ?yUnit), features(?yUnit, ?yAg), hasEffect(?u, ?sEff), hasPrecondition(?u, ?sPre),

StoryState: storyStateFeaturesAgentInState(?sEff, ?xStateEff), storyStateFeaturesAgentInState(?sEff, ?yStateEff), storyStateFeaturesAgentInState(?sPre, ?xStatePre),

Action: Action(?action), intends(?yUnit, ?action),

Value: atStake(?vAtStake, ?v), hasValue(?xAg, ?v), stateHasValueAtStake(?xStateEff, ?vAtStake), triggeredBy(?vAtStake, ?action),

Emotion type individual (for DL SAFE rules): *emotionType(ReproachEmotion, "reproach"),* Emotion(ReproachEmotion)

CONSEQUENT (Affect Derivation Model):

cognitiveAppraisal(ReproachEmotion, ?action), stateFeels(?xStateEff, ReproachEmotion), towardsTo(?xStateEff, ?yStateEff)

Fig. 2. The Reproach SWRL rules (represented in an informal syntax for readability).

in terms of a triple composed of the story state preceding the unit, the unit incidents and the story state following the unit, treating units as operators in which the action and events (i.e., the story incidents) bring the state of the story world from a certain configuration of another. So, we leverage this structure to model how the emotional state of an agent changes from unit preconditions to effects as a consequence of the occurrence of the story incidents. The agent's emotions are established in the effects of the unit as a consequence of the appraisal process. The rules are subjective, and are based on agent's values and goals before and after a unit, and on the action performed by the agents in the units. Note that, the dynamic processing of values and goals, featured in a practical agent architecture, is replaced here by the annotation process, i.e. the annotators specify the values and goals states in units story states, the actions performed in the unit, etc.

Broadly speaking, we encode the *Appraisal Derivation Model* in the SWRL rules antecedents and the *Affect Derivation Model* in the SWRL rules consequents. For example, the *Reproach* SWRL rule antecedent is based on the evaluation of an action performed by another agent: if a value, owned by the a certain agent *?x*, is put at stake by an action performed by another agent *?y*, the *Reproach* SWRL rule fires. The consequent encodes the *Affect Derivation Model* and generates the appropriate affective state (i.e. the agent *?x*, owner of the value put at stake, feels a *Reproach* emotion toward the agent *?y* who performed the blameworthy action). Specifically, the *Reproach* SWRL rule (represented in Fig. 2 with an informal syntax for readability), fires when, in the `StoryState` precondition *?sPre*, an `AgentInState` *?xStatePre* has a `Value` *?v* that, in the `StoryState` effect *?sEff*, is put at stake (*atStake(?vAtStake, ?v)*) by

an `Action` *?action* performed by another agent in the unit (the `AgentInUnit` *?yUnit*). [4] In the following, we describe the SWRL rules activation for emotions in agents. The activation of the emotion **Pride** depends upon (a) an agent's value at stake – in the preconditions of the unit; (b) the appraised action, performed by the agent in the unit, that rebalances the value at stake – in the effects of the unit.

When the attribution of praiseworthiness (or blameworthiness) is directed towards the actions of another agent, the agent feels an Admiration emotion. The activation of **Admiration** depends upon: (a) the appraising agent's value at stake – in the preconditions of the unit; (b) the appraised action performed by another agent, that rebalances the value at stake – in the effects of the unit. The activation of **Self-reproach** emotion depends on: (a) an agent's value not at stake – in the preconditions of the unit; (b) the appraised action, performed by the agent in the unit, that puts the value at stake – in the effects of the unit. When the focus is on the agency of others, the emotion generated is Reproach. The activation of **Reproach** emotion depends on (a) an agent's value not at stake – in the preconditions of the unit; (b) the appraised action, performed by another agent in the unit, which puts the value at stake – in the effects of the unit. For instance, in the narrative unit analyzed in the next section, Hamlet feels *Reproach* towards Ophelia because, by telling him a lie, she puts Hamlet's value of honesty at stake.

When the same incident is appraised simultaneously along the praiseworthiness dimension and the desirability dimension, compound emotions are generated. For example, the combination of Distress and Reproach gives the **Anger emotion**, i.e., the agent's feels *Reproach* towards another agent who performed a blameworthy action and *Distress* for the undesirability of the effects of this action. The rule for the **Joy** emotion depends on the following elements: (a) an agent's unachieved goal – in the precondition of the unit; (b) the achievement of the goal in the unit's effects; (c) a process (no matter if it is an action or an event) occurred in a unit's incident, which has determined the goal achievement. The rule for the **Distress** emotion depends on the following elements: (a) an agent's unachieved goal – in the precondition of the unit; (b) a process (no matter if it is an action or an event) in a unit determines the goal achievement; (c) an agent's goal is not achieved – in the effect of the unit.

4 Example and Validation

In order to illustrate how the model we developed can be used to formally describe characters' emotions the "cultural object" called drama, we resort to a

[4] Notice that, we need to declare in the antecedent of the rule the individual *Reproach* emotion. The reason is that arbitrary SWRL rules would lead to undecidability, so only so-called DL-safe rules are implemented in reasoners. DL-safe rules are rules applied only to named individuals, they do not apply to individuals that are not named but are known to exist. So, we need to assert the individual category Reproach emotion in the antecedent of the rule.

well known example taken from Shakespeare: the "nunnery scene" in the Third Act of *Hamlet* (Shakespeare). According to Freytag [15], the "nunnery scene" is the third (and the climax) of the four "ascending stages" in the play. After that, there is the tragical incident (stabbing of Polonius) and then the slow return and the final catastrophe. In the "nunnery scene", Ophelia is sent to Hamlet by Polonius and Claudius to confirm the assumption that his madness is caused by his rejected love. In the middle of the scene Hamlet puts Ophelia on a test to verify her loyalty. Because he guesses (correctly) that the two conspirators are hidden behind the curtain, he asks the girl to reveal where her father Polonius is. She decides to lie and replies that he is at home.

As an example of annotation, we describe the annotation of the story incident extracted from the "nunnery scene" in which Ophelia lies to Hamlet. In Drammar, we model the climactic story segment, in which Ophelia decides to lie about Polonius's location, as a `Unit` (named "Where is your father"); this is unit is enacted by two agents, Hamlet and Ophelia. The participation of these agents in the unit is bridged by two instances of the `AgentInUnit` class, *Ophelia_unit* and *Hamlet_unit*. In Fig. 1 the example is illustrated but, for space reasons, we include only the outstanding elements. Before the units occurs, in the state which constitutes the precondition of the unit (not reported in Fig. 1), Hamlet is committed to the goal *intends Ophelia Nunnery* and he owns the value *honesty* that it is not at stake. During the unit, Ophelia performs the *lying* action that, in the effect of the unit (*Consequent*), makes (see the property `unachiavableDueTo`) Hamlet's goal *intends Ophelia Nunnery* unachievable and puts at stake (see the property `triggeredBy`) the Hamlet's value *honesty* . Given the description of the "nunnery scene" according to the Drammar ontology (provided in the previous section), we validated the suitability of our value–based model of moral emotions for story characters by adopting the following methodology.

The validation of the emotion model illustrated relies on an annotation process, carried out in the CADMOS project [5] as part of the metadata enrichment of digital heritage [31]. The workflow of the CADMOS project is as follows. Given an audiovisual item, the annotator breaks the item into units (Segmentation phase), and defines a timeline of incidents as perceived from the movie. Units are independently identified through the boundaries of the incidents that occur. Then, she annotates the metadata for each unit, encoding the agents actions (i.e. the story incidents forming a timeline), the characters goals that motivate them, and the entities involved, according to the Drammar ontology (Annotation phase). Finally, the goal-action relation is displayed by matching the incidents in a timeline with the actions and the goals of the characters, to reveal the structure of the story plot in a visualization (Visualization phase). In the case of the "nunnery scene" from Hamlet, we have worked on the film directed by Laurence Olivier (Two Cities Film production, UK, 1948), based on Shakespeares text. Here we provide a validation process for our model for the annotation of emotions, based on an augmentation of the CADMOS manual annotation, with a subsequent check of the results on the actual interpretation

[5] http://cadmos.di.unito.it

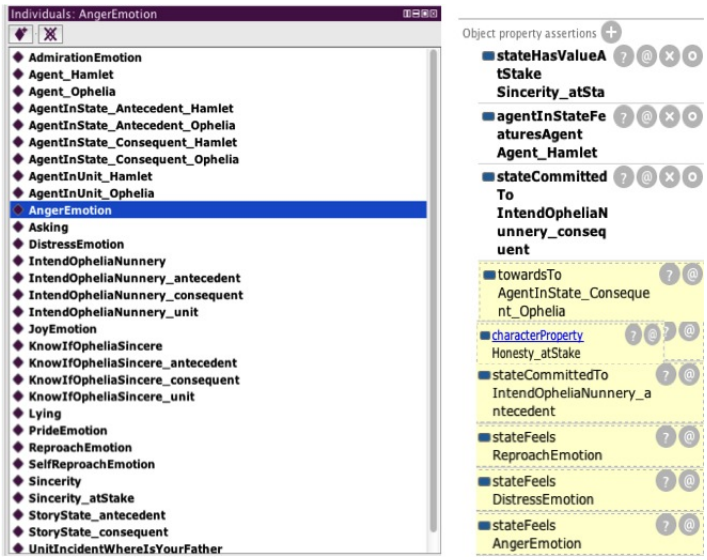

Fig. 3. According to SWRL, Hamlet feels Reproach, Distress and Anger emotions.

provided by the filmic scene. We start from a list of the values that are put at stake in the scene. Such values are listed manually, analyzing the text and selecting the moral values that Hamlet explicitly mentions in his utterances. The listed values are assigned to the story states where they hold, given the incidents occurring in the unit. Then, we run the model and compute the emotions that result from an application and insert them in the effects of some unit. In particular, we run the SWRL module on the annotated example (encoded in OWL), thus obtaining the characters' emotions after the incidents contained in the scene. Finally, we check the emotions annotated in the augmented metadata against the actor's actual interpretation.

In the nunnery scene, the scholar listed the following values for Hamlet: honesty, fairness, chastity, and purity. Here we focus on the unit where the "honesty" value is put at stake (see the Fig. 1), actually where Hamlet asks Ophelia where Polonius is and Ophelia lies, replying that he is at home (while he is behind a curtain). By applying the SWRL rules above, the *Distress* and *Reproach* rules fire; therefore, also the *Anger* rule fires because *Anger* is a compound emotion formed by the emotions *Reproach* and *Distress*. The *Reproach* rule fires because Ophelia's action (lying to Hamlet about where her father is) is appraised as blameworthy by Hamlet, since the action puts the value "honesty" at stake. The *Distress* rules is applied because the goal of sending Ophelia to the nunnery is no longer achievable due to the lying action performed by Ophelia in the unit incident (i.e. saving Ophelia from the corruption of Elsinores court is now impossible because she lied to protect the King and her father – hence she is already corrupted). The *Anger* rule fires because in the same incident an action (lying)

is evaluated as blameworthy (the honesty value is put at stake by another agent: Ophelia) and the goal is not reached. According to SWRL rules, Hamlet feels *Anger* (also *Reproach* and *Distress* are derived by the rules) towards Ophelia at the end of this short and intense interchange (Where is your father? At home, my lord.). In Fig. 3 we report the properties that are inferred, for *Anger* emotions and for the agent Hamlet, by the reasoner through the SWRL in the story state effect of the unit. The scene, as interpreted by Lawrence Olivier, confirms the consistency of our reasoning with the *Anger* showed by Hamlet (and visible in this well know interpretation) as a consequence of Ophelias lie.

5 Conclusion

In this paper we described a model of the appraisal of emotions, with a focus on moral emotions. Relying on the notion of value, we proposed a general model of value-based appraisal of actions.

We implemented our model as a set of SWRL rules on the top of the Drammar ontology, previously developed for the annotation of story and characters, and tested it on a dramatic situation. We validated the characters' emotional state generated by the SWRL module on a well-know narrative situation and we compared it with the characters' emotions hand-coded by drama experts.

References

1. R. Aylett, M. Vala, P. Sequeira, and A. Paiva. Fearnot!–an emergent narrative approach to virtual dramas for anti-bullying education. *LNCS*, 4871:202, 2007.
2. Cristina Battaglino, Rossana Damiano, and Leonardo Lesmo. Emotional range in value-sensitive deliberation. In *AAMAS*, pages 769–776, 2013.
3. David Bordwell, Kristin Thompson, and Jeremy Ashton. *Film art: an introduction*, volume 7. McGraw-Hill New York, 1997.
4. M.E. Bratman. *Intention, plans, and practical reason*. Harvard University Press, Cambridge Mass, 1987.
5. L. Lesmo C. Battaglino, R. Damiano. Moral appraisal and emotions. In *Workshop EEA - Emotional and Empathic Agents, AAMAS*, 2012.
6. Noel Carroll. Art and mood: preliminary notes and conjectures. *The monist*, 86(4):521–555, 2003.
7. M. Cataldi, R. Damiano, V. Lombardo, A. Pizzo, and D. Sergi. Integrating commonsense knowledge into the semantic annotation of narrative media objects. *AI* IA 2011: Artificial Intelligence Around Man and Beyond*, pages 312–323, 2011.
8. Antonio Damasio. *Descartes' error: emotion, reason, and the human brain*. Putnam, 1994.
9. R. Damiano and A. Pizzo. Emotions in drama characters and virtual agents. In *AAAI Spring Symposium on Emotion, Personality, and Social Behavior*, 2008.
10. João Dias, Samuel Mascarenhas, and Ana Paiva. Fatima modular: Towards an agent architecture with a generic appraisal framework. In *Workshop on Standards in Emotion Modeling*, Leiden, 2011.
11. Denis Diderot. *The paradox of acting*. Chatto & Windus, 1883.
12. Lajos Egri. *The art of dramatic writing*. Wildside Pr, 2007.

13. Susan L. Feagin. On Noel Carrol on narrative closure. *Philosophical Studies*, (135):17–25, 2007.
14. Alexandre RJ Francois, Ram Nevatia, Jerry Hobbs, Robert C Bolles, and John R Smith. Verl: an ontology framework for representing and annotating video events. *MultiMedia, IEEE*, 12(4):76–86, 2005.
15. Gustav Freytag. *Technique of the drama, an exposition of dramatic composition and art.* S.C. Griggs and Company, Chicago, 1985.
16. A. Gangemi and V. Presutti. Ontology design patterns. *Handbook on Ontologies*, pages 221–243, 2009.
17. Alessandro Giovannelli. In sympathy with narrative characters. *The Journal of Aesthetics and Art Criticism*, 67(1):83–95, 2009.
18. Eero Hyvönen, Eetu Mäkelä, Tomi Kauppinen, Olli Alm, Jussi Kurki, Tuukka Ruotsalo, Katri Seppälä, Joeli Takala, Kimmo Puputti, Heini Kuittinen, et al. Culturesampo: A national publication system of cultural heritage on the semantic web 2.0. *The Semantic Web: Research and Applications*, pages 851–856, 2009.
19. Richard S Lazarus. Progress on a cognitive-motivational-relational theory of emotion. *American psychologist*, 46(8):819, 1991.
20. Vincenzo Lombardo and Rossana Damiano. Semantic annotation of narrative media objects. *Multimedia Tools and Applications*, 59(2):407–439, 2012.
21. Stacy C Marsella and Jonathan Gratch. Ema: A process model of appraisal dynamics. *Cognitive Systems Research*, 10(1):70–90, 2009.
22. Stacy C. Marsella, Jonathan Gratch, and Paola Petta. Computational models of emotion. In K. R. Scherer, T. BÃnziger, and Roesch, editors, *A blueprint for an affectively competent agent: Cross-fertilization between Emotion Psychology, Affective Neuroscience, and Affective Computing*. Oxford University Press, Oxford, 2010.
23. Johan Oomen, Lora Aroyo, Stéphane Marchand-Maillet, and Jeremy Douglass. Personalized access to cultural heritage: multimedia by the crowd, for the crowd. In *ACM Multimedia*, pages 1521–1522, 2012.
24. Andrew Ortony, Allan. Collins, and Gerald L. Clore. *The cognitive structure of emotions / Andrew Ortony, Gerald L. Clore, Allan Collins*. Cambridge University Press Cambridge [England] ; New York, pbk. ed. edition, 1988.
25. F. Peinado, M. Cavazza, and D. Pizzi. Revisiting Character-based Affective Storytelling under a Narrative BDI Framework. In *Proc. of ICIDIS08*, Erfurt, Germany, 2008.
26. W Scott Reilly. Believable social and emotional agents. Technical report, DTIC Document, 1996.
27. Shlomith Rimmon-Kenan. *Narrative fiction: Contemporary poetics*. Psychology Press, 2002.
28. Klaus R Scherer. On the nature and function of emotion: A component process approach. 1984.
29. Greg M Smith. *Film structure and the emotion system*. Cambridge University Press, 2003.
30. Chiel van den Akker, Ardjan van Nuland, Lourens van der Meij, Marieke van Erp, Susan Legêne, Lora Aroyo, and Guus Schreiber. From information delivery to interpretation support: evaluating cultural heritage access on the web. In *WebSci*, pages 431–440, 2013.
31. Antonio Pizzo, and Vincenzo Lombardo. Ontologies for the metadata annotation of stories. In *to appear in Digital Heritage 2013, Marseille, France.*