Emotions in Drama Characters and Virtual Agents

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Abstract

Notwithstanding the differences displayed by drama criticism for what concerns the theoretical stance and the aims, the key role played by emotions seems to be a common aspect to most definitions of drama.

Although the field of computational drama has acknowledged this trend, we argue that the role of emotions in character design deserves more attention, as it is the key to establish a distinction between autonomous agents and drama characters. In this paper, we analyze a fragment of drama, taken from Shakespeare's Hamlet, to show how characters can be construed from agents as an outcome of drama, through the manipulation of their emotional qualities.

Introduction

Theater has modeled most of its technical and aesthetic canon onto well known behavioral models and social conventions. Western drama, as a cultural object, is an outcome of cultural elaboration as well, with a specific focus on emotions. Beyond its specific aims (religious, aesthetics, morals, socials, etc.), we can recognize its fundamental power to move the audience's emotions. Because western drama has selected the character as its major medium, the emotional bond between the character and the audience becomes crucial. Notwithstanding the differences displayed by the various approaches to drama for what concerns the theoretical stance and aims of their investigation, the key role played by emotions seems to be a common aspect to most drama definitions.

Research in computational drama has inherited from drama criticism the centrality of emotions Following the dominant paradigm of agents in AI, computational drama has implicitly equated characters to agents (Machado, Brna, & Paiva 2004; Rank & Petta 2005), thus establishing a perspective from which having a model of characters' emotions is necessary to improve the realism and the believability of the characters. In this approach ("character as

agent"), emotions have been integrated in the characters' rational model, in line with a well-established trend in cognitive studies (Damasio 1995). For example, in (Theune *et al.* 2003) emotions provide an instrument for increasing the individual variability of behavior in the automatic generation of plot. More recently, computational drama has tackled the issue of emotions at the expressive level. Here, works range from the emotional properties of editing and mise-en-scene in interactive drama (Zagalo *et al.* 2006), to emotion expression in avatars and virtual actors (Pelachaud 2005; Lisetti & Marpaung 2006).

Given the approaches described above, a shared, implicit assumption is that the representation of emotions accounts for the cognition of the emotions in the audience. In other words, the author describes emotions to provoke them into the listener's mind and soul. This assumption relies on a long tradition: in Plato's Ione (Plato 1997) it is clearly stated that the emotions are transmitted as a sort of "contagion" from the author to the audience via the representation made by the actor. A more prosaic definition of this effect can be synthesized in the so-called *participatory* attitude in contemporary aesthetics. Even if this attitude has been questioned by some theorists (Carroll 2003), nevertheless it is broadly accepted that the audience assumes a certain point of view upon the dramatic event.

Our working hypothesis is that emotions in drama must not only be accounted for to obtain realistic plots and believable characters, but also that they constitute the specific object of drama, embedded and conveyed through a formal structure. For drama, we intend a form of narrative that describes the story via character's action in present time (Szondi 1987) and has a carefully crafted premise, i.e., an authorial *direction* that shapes the dramatic climax until its solution (Egri 1946). In our view, emotional qualities are the means through which agents become characters: the so-called drama direction and its deployment through the plot are formulated in terms of the emotional qualities of the characters. In order to illustrate this hypothesis, we focus on a well-known example (the nunnery scene from *Hamlet*), where we examine the characters' emotional states as they emerge from an actional analysis of the script.
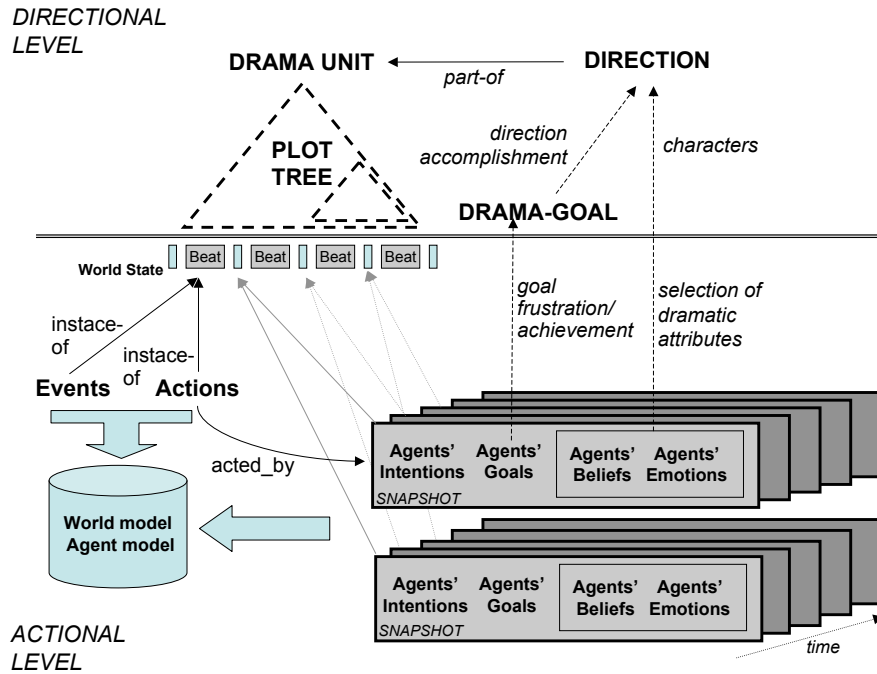
Figure 1: The meta-level ontology of drama. The higher level represents the directional level of drama, i.e. the way it accomplishes its premises through a sequence of elements situated at different levels of abstraction, the lowest level represents the anchoring of the direction in agents' actions, i.e. the actional level.

An Ontology of Drama

Although a vast amount of descriptions have been proposed by drama criticism (Carlson 1984; Dukore 1974; Elam 1980 1987), their approach has always showed a lack of formal clearness. In recent years, the field of computational drama has revised the Aristotelian theory of drama to account for the newly added feature of interactivity (Laurel 1993; Murray 1998; Mateas 1999), opening the way to a full integration of drama into computer applications. In this Section, we sketch a meta-level ontology of drama that systematizes the basic notions about drama (Damiano, Lombardo, & Pizzo 2005). The goal of this ontology is to provide a formal representation of drama notions, as they emerge from a large corpus of theories dating back to Aristotle, for supporting the analysis and generation of drama in computer applications. The meta-ontology aims at representing the 'language of drama', independent of the form and the media through which specific dramas are realized, in order to make explicit the formal relations between the elements of drama that are not apparent in the form in which drama is usually delivered (for instance, text).

The general theory of drama forms the meta-level of the ontology, and relies on specialized object-level ontologies to provide the sources of knowledge that are necessary to ac-

count for specific drama realizations (for example, drama rules and conventions). The meta-level ontology of drama consists of two levels, a *directional level* that encodes the specific traits of drama and an *actional level* that connects such traits with the notion of agency.

In an operational approach, drama can be regarded as the combination of two main features: action at present time and a relevant conflict involving the characters' emotional values at stake. Drama moves toward the solution of this conflict, yielding an impression of movement, through a sequence of elementary units, called *beats* (McKee 1997), formed by a action-reaction pair. The solution of the conflict, called "direction" (Egri 1946; Hamon 1977), derives from the notion of "unity of action", originally expressed by Aristotle (see also (Styan 1963)). Beats determine changes that affect the values of the characters, thus accomplishing the drama direction. Beats are organized in larger and larger drama-units, according to a recursive structure (Lavandier 1994) usually consisting of three levels, called *scenes*, *sequences* and *acts* respectively. This structure forms the drama *plot*.

The directional level of the ontology (Figure 1, top) is centered on the notion of Drama unit, which consists of a Direction and a Plot. The Direction is stated as the value change of a set of characters' qualities (dramatic attributes). The Plot is a sequence of beats, in which some incidents occur.

These incidents consists of agents performing some actions and events occurring. The bridge between the Direction and the Plot is given by the notion of Drama goal. The Drama goal consists of the achievement or frustration of the goal of an agent (at the actional level, i.e., in the plot Beats), which modifies the value of the characters' attributes according to the Direction stated at the directional level. Given the recursive structure of the plot, there exists a direction for each sub-unit of the drama. As we postulate the inclusion of Drama units in larger Drama units, so we postulate that Drama goals of larger Drama units encompass the Drama goals of constituent Drama units.

The actional level (Figure 1, bottom) unfolds a rational perspective on the incidents that occur in the beats. Since the behavior of agents in drama tends to be intentional and goal-directed, the actional level adopts the BDI model of agency to analyze the actions observed in the beats and their motivations. According to the BDI model of agency, agents are goal-directed and resource-bounded: given their Desires (or goals), agents devise Intentions to pursue them, based on their Beliefs about the world (Bratman, Israel, & Pollack 1988; Cohen & Levesque 1990; Rao & Georgeff 1991). The model of agency based on rationality, then, is not sufficient by itself to catch the complexity of human action (Damasio 1995). So, a model of emotions like OCC (Ortony, Clore, & Collins 1988) must be introduced in the action level to account for the role of emotional aspects in the behavior of agents. Agents interfere - more or less intentionally - with the achievement of the Drama goal, thus introducing in drama the characteristic element of conflict.

In order to enforce the distinction between the directional and actional level, only the emotions and the beliefs of the agents are selected for representation at the directional level as dramatic attributes, confining the role of deliberative structures (goals and intentions) at the actional level. At the actional level, object-level ontologies include both general world knowledge (like the Standard Upper Merged Ontology, or SUMO, IEEE P1600.1) – needed to establish the commonsense knowledge whose role is pervasive in drama – and domain-specific knowledge.

The agents' actions and the changes in their mental states bond the audience to the dramatic narration and are the input to a cognitive representation of the so-called dramatic character in the audience's mind. Characters do not appear as such in the ontology, as they constitute its outcome as *dramatic functions*. Note that this account is in line with a tradition dating back to Aristotle, according to which the notion of character (ethos) is not primitive with respect to the notion of plot; rather, it is a derived notion with respect to the centrality of plot. Characters follow from the interpretation of the actional level of drama in terms of agents' mental attitudes, and in particular, of emotions.

Example

In order to illustrate how the model we developed can be used to formally describe the "cultural object" called drama, we resort to a well known example taken from Shakespeare: the "nunnery scene" in the Third Act of *Hamlet* (Shakespeare). In this scene, Ophelia is sent to Hamlet by Polonius and Claudius to confirm the assumption that his madness is caused by his rejected love. In order to do so, according to the two conspirers, Ophelia should induce him to talk about his inner feeling. According to Freytag, 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 (Freytag 1863).

We consider the Hamlet's example very consistent with the emotion-based approach to agents, because it is very clear how the author has shaped the agent's emotions and actions to create the strong idea of a drama character, so tight and impressive that we cannot help to think of it (the dramatic function in the text) as a real being (the individual Hamlet) (Bloom 1998). Although the play addresses a number of moral, ethical and psychological issues, it has become famous as the drama of "indecision" or of the "fight of reflection over action". Along the whole drama, the character of Hamlet fails to reach most of his goals, and most of his actions are never fulfilled by a rewarding accomplishment. Rather than been moved by a rational behavior, it looks guided by emotions. In fact, the final revenge on Claudius is taken almost by chance and on an emotional impetus (the killing of the mother).

The methodology is the following. First, we analyze the actional structure of the script, then we identify the drama units that constitute the scene, at increasing level of abstractions. For each drama unit, at each level, we identify the drama goal of the unit, then we assign emotions to the characters based on their cognitive states, following the cognitive model of emotions proposed by Ortony, Clore and Collins (OCC model (Ortony, Clore, & Collins 1988)). This model - previously adopted in computational drama by (Bates, Loyall, & Reilly 1994), is particularly suitable for this task: since it contains emotion types that model an agent's appraisal of self and other agents' actions, it naturally lends itself to accommodate the dialects of characters in drama. The actional level is reconstructed in a bottom-up manner, starting from the observable behavior displayed by the agent in the script. Based on the SUMO ontology of actions, the verbal and non-verbal actions executed by Hamlet and Ophelia are mapped to action types. By doing so, an account of the beat-level of the scene is obtained, in which actions are gathered in action-reaction pairs.

The analysis of the scene (according to the ontology of drama described in the previous section) is reported in Figure 2. The first three columns on the left contain the directional level of the scene, in which the sequence of ac-

DU n (intentions)	DU n.n (intentions)	DU n.n.n (intentions)	Beat (starter's goal)	Beat (action types)
1 Polonius&Claudius know(Polonius&Claudius,"Hamlet's feelings")) - TRUE Ophelia know(Ophelia,"Hamlet's feelings")) - TRUE Hamlet away_from(Ophelia, Polonius&Claudius) – FALSE *Hamlet.disappointment*	**1.1** Ophelia know(Ophelia "Hamlet's feelings") *Ophelia.hope* *Hamlet.reproach*		1 Ophelia at (Ophelia,room) - TRUE	**arrive** (Arriving) **leave** (Leaving)
			2 Ophelia start_interaction(Ophelia,Hamlet) - FALSE	**greet** (SocialInteraction) **leave** (Leaving)
			3 Ophelia start_interaction(Ophelia,Hamlet) - TRUE	**give** (UnilateralGiving) **reject** (GivingBack)
			4 Ophelia introduce_topic(Ophelia,Hamlet,"Hamlet's feelings") - FALSE	**give** (UnilateralGiving) do_nothing
			5 Ophelia introduce_topic(Ophelia,Hamlet,"Hamlet's feelings") - TRUE	**accuse** (Stating) do_nothing
	1.2 Hamlet at(Ophelia,nunnery) *Hamlet.hope* Ophelia know(Ophelia, "Hamlet's feelings") – TRUE	**1.2.1** Hamlet believe(Ophelia, "moral values are false") *Hamlet.anticipation*	6 Hamlet introduce_topic(Hamlet,Ophelia,"moral values") - TRUE	**ask** (Requesting) **ask** (Requesting)
			7 Hamlet introduce_topic(Hamlet,Ophelia,"moral values") - TRUE	**ask** (Requesting) **ask** (Requesting)
			8 Hamlet declare(Hamlet,Ophelia,"moral values are false") - TRUE	**declare** (Stating) do_nothing
			9 Hamlet argue(Hamlet,Ophelia,"moral values are false") - TRUE	**prove** (EducationalProcess) do_nothing
		1.2.2 Hamlet believe(Hamlet,Ophelia, "affections are false") *Hamlet.expectation* Ophelia know(Ophelia, "Hamlet's feelings") – TRUE	10 Hamlet introduce_topic(Hamlet,Ophelia,"affections") - TRUE	**declare** (Stating) **concess** (Stating)
			11 Hamlet declare(Hamlet,Ophelia,"affections are false") - TRUE	**declare** (Stating) do_nothing
			12 Hamlet argue(Hamlet,Ophelia,"affections are false") - TRUE	**argue** (EducationalProcess) **regret** (Expressing)
		1.2.3 Hamlet intend(Ophelia,go(Ophelia, nunnery)) *Hamlet.looking_forward*	13 Hamlet advise(Hamlet,Ophelia,(go(Ophelia,nunnery))) - TRUE	**advise** (Directing) do_nothing
			14 Hamlet argue(Hamlet,Ophelia,(go(Ophelia,nunnery))) - TRUE	**argue** (EducationalProcess) do_nothing
			15 Hamlet advise(Hamlet,Ophelia,(go(Ophelia,nunnery))) - TRUE	**advice** (Directing) do_nothing
			16 Hamlet argue(Hamlet,Ophelia,(go(Ophelia,nunnery))) - TRUE	**argue** (EducationalProcess) do_nothing
	1.3 Hamlet: at(Ophelia,nunnery) – FALSE *Ophelia.fear_comfirmed*	**1.3.1** Hamlet know-if(Hamlet,sincere(Ophelia)) – TRUE Hamlet intend(Ophelia,go(Ophelia, nunnery)) - FALSE *Hamlet.anger* *Ophelia.fear*	17 Hamlet know-if(Hamlet,sincere(Ophelia)) - TRUE	**ask** (Requesting) **lie** (Pretending)
			18 Hamlet believe(Claudius&Polonius,mad(Hamlet)) - TRUE	**burst_out** (Expressing) do_nothing
			19 Hamlet believe(Claudius&Polonius,mad(Hamlet)) - TRUE	**burst_out** (Expressing) **pray** (Expressing)
			20 Hamlet menace(Hamlet, Claudius&Polonius) - TRUE	**menace** (Committing) **pray** (Expressing)
			21 Hamlet insult(Hamlet, Claudius&Polonius) - TRUE	**insult** (Committing) do_nothing
		1.3.2 Ophelia know(everybody,"Ophelia's feelings") – TRUE *Hamlet.pity*	22 Ophelia complain(Ophelia,destiny) - TRUE	**burst_out** (Expressing) **leave** (Leaving)

Figure 2: The analysis of the "nunnery scene" (Hamlet, Third Act) according to the ontology of drama. The three leftmost columns contain the directional level of the scene, segmented into Drama Units (DU) at different degrees of abstraction (three level have been found in this analysis). For each unit, the characters' goals that characterize it are reported, together with the information about their achievement (expressed as truth value) and the emotional change they determine (the dot notation indicates the character to which an emotional state is attributed). The two rightmost columns contain the actional level, i.e., beats and their goals; each beat consists of an action-reaction pair. Hamlet's actions are in the grey boxes.

tions listed in the plot is segmented into increasingly larger sub-sequences (drama units), each characterized by a drama goal. The two rightmost columns contain the actional level of the scene, i.e., the actual actions performed by the two agents, Hamlet and Ophelia, and their immediate goals. The purpose of this distinction, at the actional level, is to account for the pragmatics of actions (for example, in beat 9, the rhetorical question posed by Hamlet to Ophelia, while literally being a question, is a way to introduce a new topic). In the action type column, the actions of each agent are accompanied by the corresponding action type (*process* type in SUMO ontology): the description of actions relies on more fine-grained descriptions to account for the complexity of the characters' plans and actions in the script.

As illustrated in the previous section, the fulfilment or frustration of the characters' goals is the instrument through which the drama goal – which induces a relevant change in the emotional state of the unit's protagonist – is achieved. For this reason, the drama goals of the drama units, at each level, are accompanied by a truth value that indicates if the goal has been achieved or not by the end of the unit (no value means that the goal is pending at the end of the unit, and may later become true or false, or remain so). For each unit, then, at each level, the table reports the emotional change induced by the activation of that goal (this is the case for future-oriented states, like hope), by its achievement or frustrations (for emotional states that involve the appraisal of self- or other-executed actions, like reproach). For space reasons, some elements, like the characters' beliefs, are omitted in the table, and will be introduced only in the analysis that follows.

In terms of the drama structure, the increasingly abstract structure of actions corresponds to the hierarchy of drama-units having the scene itself as the top-level unit. However, the scene is not the orderly execution of one agents's plan followed by the execution of the other agent's plan. Only one agent has the initiative, at any moment, and the other possibly reacts by cooperating or not. Moreover, actions may fail and be repeated, so replanning also appears as part of reactivity.

The scene has a tripartite structure. In the first part (D.U. 1.1), Ophelia pursues the goal of inducing Hamlet to reveal his inner feelings, as a way to discover the cause of his madness (believed to be his love for Ophelia by Polonius and Claudius). Ophelia's goal is formally stated as `know(Ophelia,"Hamlet's feelings")`; all along the beats that compose the unit, she maintains the initiative (she is always the starter of the beat) in the attempt to achieve this goal. In order to meet him, she goes to the castle room where Hamlet is, and tries to start an interaction with him `(start_interaction(Ophelia,Hamlet))`, while Polonius and Claudius overhear hidden behind the curtains. Hamlet, who does not want to foolish the woman for which he still has a strong affection, initially tries to take the leave from her (beats 1-2), but is finally forced to take part in the interaction as she tries harder and harder to approach him, finally resorting to the physical contact to keep the interaction open (the giving action in beat 3). Ophelia then proceeds in her plan by introducing the topic she is interested in: Hamlet's feelings toward her (`introduce_topic(Ophelia,Hamlet,"Hamlets feelings")`, beats 4-5). Since her first attempt to focus his attention on their relationship does not succeed (beat 4), she makes a second, more explicit attempt, that sounds like an accusation (beat 5 "Rich gifts wax poore, when givers prove unkinde."). By the end of the unit, Ophelia has not achieved her goal, which remains pending. However, the unit ends here, since Ophelia looses the initiative.

At the beginning of the second part of the scene (D.U. 1.2), Hamlet, having fully grasped the real intentions of Ophelia, has reactively formed a goal of its own. This goal, which depends on his affection for Ophelia – that makes him act as to attempt to save her from the corruption of the court of Elsinore – consists of trying to induce her to abandon the court going to a nunnery (`at(Ophelia,nunnery)`). So, he tries to convince her that moral and affective values do not hold anymore (D.U. 1.2.1, beats 6-9), and that everybody, including himself, is corrupted (`believe(Hamlet,Ophelia,"moral values are false")`), so that she would spontaneously decide to go to the nunnery (in D.U. 1.2.3, `intend(Ophelia,go(Ophelia,nunnery))`). Notice that, in his argumentation, Hamlet follows a precise and recognizable rhetorical scheme (Mann & Thompson 1988), according to which the subject is first introduced (by means of questions: beats 6-7 "Are you honest?","Are you faire?"), then the thesis is declared (beat 8), and finally proved (beat 9). The same sequence of introducing, declaring and arguing for is then repeated in D.U. 1.2.2 for the subject of affections (`believe(Hamlet,Ophelia,"affections are false")`, beats 10-12) – the specific case being represented here by Hamlet's love for Ophelia ("I loved you not"). In D.U. 1.2.3 (beats 13-16), having exposed his beliefs about corruption, Hamlet directly invites Ophelia to go to a nunnery ("Get thee to a nunnerie", beat 13), then further arguing in favor of his advice: at this point, according to Hamlet "rhetorical plan", this advice should emerge from the argumentations provided in the previous two units with strength of rational evidence. All along Hamlet's exposition, Ophelia remains confused, incapable of forming a goal in reaction to Hamlet's rhetorical assault.

In the third part of the scene (D.U. 1.3), Hamlet tries and verifies whether his goal of convincing Ophelia to abandon the court has been achieved (D.U. 1.3.1). However, he does so in a subtle and indirect way, which contemporarily fulfills the goal of addressing the two felons hidden behind the curtains: in beat 17, he asks Ophelia where her father is, offering her a chance to follow his teaching by calling the bluff.

Here, the immediate goal of Hamlet, as an agent (testing

Ophelia, `know-if(Hamlet,sincere(Ophelia)))` is fulfilled by the fact that she answers; at the character's level, Hamlet's goal of knowing if she is sincere is fulfilled as well. However, Hamlet's higher-level goal of convincing Ophelia to go to a nunnery (`intend(Ophelia,go(Ophelia,nunnery))` to subtract her from the corrupted court, fails when she answers with a lie (beat 17, "At home, my Lord"), thus eventually achieving the drama goal that Hamlet is disappointed. He becomes upset, and starts feigning madness again (beats 18-19), proceeding then to menace and insult Ophelia's father, Polonius, under the cover of the madness (beats 20-21). In beat 22, the initiative returns to Ophelia (D.U. 1.3.2), who ends the scene with a complain about her tragic destiny ("Oh woe is me, T'have seene what I have seene, see what I see.", with the goal `know(everybody,"Ophelias feelings"))`.

Starting from the account of the beliefs and intentions of Hamlet and Ophelia, it is possible to apply OCC model of emotions to attribute them emotional states that correspond to their appraisal of the evolving scene. The analysis is tightly related to the characters' goals, since they play a key role in the model itself. In the first part of the scene (D.U. 1.1), Ophelia's intention to induce Hamlet to talk about his inner feelings induces an emotional state of `hope` in her. On the contrary, her actions inspire `reproach` to Hamlet, since her conduct is blameworthy from his point of view – he does not like her to act in agreement to her father's aims. In D.U 1.2, once he has formed the intention to convince her to go to the nunnery, subtracting her to her father's orders, he experiences increasing `hope`. In the subsequent unit, D.U. 1.3, Hamlet's hope that his plan succeeds is `disappointed` by Ophelia's lie and he burst into `anger` with Ophelia. At this point, Hamlet's initial reproach for Ophelia's behavior has turned into anger, due to the undesirable consequences of her behavior for him (D.U. 1.3.1). At the same time, Ophelia sees her `fear confirmed` that he has truly fallen into madness. By the end of the scene, Hamlet's hope for success in saving Ophelia has turned into utter disappointment, while Ophelia, although her initial goal has been, literally speaking, fulfilled (Hamlet has actually confessed his feelings, denying his love for her), meets her tragic destiny, for which she finally deserves Hamlet's `pity`.

Discussion

Each drama - as well as any object of art - has got a specific mood, an overall kind of feeling associated in the audience cognition and tied to a specific mise-en-scène (Smith 2003). This mood is only partially related to the agent's emotions in that drama. We generally think that Othello is the drama of Jealousy, Hamlet the drama of Doubt, Romeo and Juliet the drama of Love, etc. The author cannot have a prescriptive attitude toward mood, because it relies completely on the cultural environment in which the representation of drama takes place. Only the so called artistic and cultural clichés are produced to obtain this sort of pre-determined mood effect (intuitively a woman in black, a cloudy dark sky and a grave music should provoke a sad mood). Nevertheless, the use of clichés prevents the truly emotional participation of the author, so to prevent the contagious effect on the audience. Hence, even if there are moods in drama, they aren't related to specific dramatic rules. In fact, the interpretation can easily modify this mood without modifying the basic structure of the drama characters. With the same agent's actions, a representation may turn Othello in the drama of love, Hamlet in the drama of remorse, Romeo and Juliet in the drama of hate.

As stated in the previous section, the nunnery scene is part of the rising action in the Freytag's triangle. Here, the drama is reaching its emotional climax because Hamlet is facing more and more clearly his failure. In this specific scene, the raising quality needs a further personal failure, provided here by the disappointment experienced by Hamlet at Ophelia's refusal to give up her respect for the (corrupted) values of Elsinore court. However, the audience cannot perceive the personal failure of the drama character unless the audience assumes a set of facts that are not explicitly stated and that are not even known - at least in part - to the two protagonists.

If the agent in drama is provided with a believable model of emotions, it comes that the audience will tend to participate by assuming a certain point of view (PoV), and feeling emotions accordingly. The Dramatic PoV bonds the audience with a specific character (Hamlet, Nora in "A dolls' house"). Observing a drama, the audience selects the character to assume for its PoV. We assume that the author drives the PoV by managing the change of emotions in the character: in fact, the audience tends to establish the emotional bond with the character that changes the most (the main character (Egri 1946)). Hence, drama provokes emotions in the audience via a specific means as the main character.

In the example, the author carefully makes us choose Hamlet's point of view. In fact, the scene starts where the famous monologue ("to be or not to be") ends; i.e. after the audience has built a strong emotional bond with the character. During the nunnery scene, the focus stays always on Hamlet. The nunnery scene is an example of the use of the "dramatic irony" (the audience's surplus of information). The audience knows that Claudius and Polonius are hidden behind the curtains, and Shakespeare gives some hints that Hamlet knows it as well. It is important to stress that the emotional progress of the sequence cannot be traced in the absence of the awareness of the two felons' presence on stage: Hamlet's hanger is a believable reaction *only if* we take into account his awareness that Ophelia is lying; differently, Hamlet would not become a drama character, but would remain an incoherent agent. Hence, the drama character, as the outcome of the dramatic process, has a more complex state of beliefs and emotions, compared with the beliefs and emotions of the simple Hamlet agent on stage. Notice that the

1.	Hamlet: Soft you now! The fair Ophelia!–Nymph, in thy orisons Be all my sins remember'd.
2.	Ophelia. Good my lord, How does your honour for this many a day? H.: I humbly thank you; well, well, well.
3.	O.: My lord, I have remembrances of yours That I have longed long to re-deliver. I pray you, now receive them. H.: No, not I; I never gave you aught.
4.	O.: My honour'd lord, you know right well you did; And with them words of so sweet breath compos'd As made the things more rich; their perfume lost,
5.	O.: Take these again; for to the noble mind Rich gifts wax poor when givers prove unkind. There, my lord.
6.	H.: Ha, ha! are you honest? O.: My lord?
7.	H.: Are you fair? O.: What means your lordship?
8.	H.: That if you be honest and fair, your honesty should admit no discourse to your beauty. O.: Could beauty, my lord, have better commerce than with honesty?
9.	H.: Ay, truly; for the power of beauty will sooner transform honesty from what it is to a bawd than the force of honesty can translate beauty into his likeness: this was sometime a paradox, but now the time gives it proof.
10.	H.: I did love you once. O.: Indeed, my lord, you made me believe so.
11.	H.: You should not have believ'd me; for virtue cannot so inoculate our old stock but we shall relish of it:
12.	H.: I loved you not. O.: I was the more deceived.
13.	H.: Get thee to a nunnery:
14.	H.: why wouldst thou be a breeder of sinners? I am myself indifferent honest; but yet I could accuse me of such things that it were better my mother had not borne me
15.	H.: I am very proud, revengeful, ambitious; with more offences at my beck than I have thoughts to put them in, imagination to give them shape, or time to act them in. What should such fellows as I do crawling between earth and heaven?
16.	We are arrant knaves, all; believe none of us. Go thy ways to a nunnery.
17.	H.: Where's your father? O.: At home, my lord.
18.	H.: Let the doors be shut upon him, that he may play the fool nowhere but in's own house. Farewell. O.: O, help him, you sweet heavens!
19.	H.: If thou dost marry, I'll give thee this plague for thy dowry,– be thou as chaste as ice, as pure as snow, thou shalt not escape calumny. Get thee to a nunnery, go: farewell.
20.	H.: Or, if thou wilt needs marry, marry a fool; for wise men know well enough what monsters you make of them. To a nunnery, go; and quickly too. Farewell. O.: O heavenly powers, restore him!
21.	H.: I have heard of your paintings too, well enough; God hath given you one face, and you make yourselves another: you jig, you amble, and you lisp, and nickname God's creatures, and make your wantonness your ignorance.
22.	H.: Go to, I'll no more on't; it hath made me mad. I say, we will have no moe marriages: those that are married already, all but one, shall live; the rest shall keep as they are. To a nunnery, go. [Exit.]
23.	O.: O, what a noble mind is here o'erthrown! The courtier's, scholar's, soldier's, eye, tongue, sword, The expectancy and rose of the fair state, The glass of fashion and the mould of form, The observ'd of all observers,–quite, quite down! And I, of ladies most deject and wretched That suck'd the honey of his music vows, Now see that noble and most sovereign reason, Like sweet bells jangled, out of tune and harsh; That unmatch'd form and feature of blown youth Blasted with ecstasy: O, woe is me, To have seen what I have seen, see what I see! [Re-enter King and Polonius.]

Figure 3: The nunnery scene from the Third Act of Shakespeare's Hamlet. Boxes show the segmentation into beats.

analysis in Figure 2 is conducted by taking the surplus of information into account: in the beat column (the rightmost one), Ophelia's answer to Hamlet's question about his father is listed as a lie, but it is necessary that it is treated as such by Hamlet in order to ascribe him the feeling of disappointment that appears at the directional level of drama.

To conclude, we reverse the assumption that drama emerges as outcome of the interaction among characters (seen as agents): characters are a function of drama and they emerge from carefully design drama direction. Virtual agents, driven by a careful drama design, induce – through the exposition of their actions and emotions (virtual agents describe emotions by a mimetic process) – the formation of drama characters. Here, it is important to be aware of a frequent misunderstanding. The novelist uses the lines to represent a sequence of emotions with his own tools, i.e. the written words. The painter describes emotions via the colors and shapes. A piano score may also be interpreted as sad or cheerful, according to the way the melody is handled, timber or the rhythm it is given. However, the emotions - only human - are described (i.e. provoked in the audience) through specific tools and following a translation schema based upon cultural conventions. The misunderstanding happens when we use a medium that simulates the human being to describe human emotion. The audience tends to obliterate the language level, to withdraw the semantic device, and is prone to confuse the iconic sign (the agent) with the fictional hu-

man being (the character) it represents. Because of this, the drama has a strong capacity to trigger our emotional participation, triggering our cognitive disposition to experience.

Conclusions

The analysis reported in the example and its discussion make it possible to draw some conclusions that are relevant for computational drama, and, in general, for affective communication between virtual characters of any kind and human spectators, or users.

The drama character doesn't coincide with the agent who acts in drama, at least, not entirely. According to an Aristotelian notion of drama, it is important to draw a clear distinction between the *ethos* described within the drama, and the outcome of drama. In drama, the character is a *dramatic function* that operates on a set of dramatic attributes, not only an autonomous agent. Better to say that the drama character is the outcome of a complex representational process, driven by the notion of direction, that leads to a sort of "distilled version" of the bare agent. The use of a centralized control to drive the agents' interaction in drama, in order to substantiate a proper direction, first proposed by Mateas (Mateas 2000) through the notion of drama manager, can amend the gap between the notions of "character as agent" and "character as drama function". However, the analysis of a classical

example, although simplistic, shows that, in order to grasp the complexity of dramatic effects underlying real dramas, a full-fledged, cognitive model of the emotions and of their expression is needed to account for the design of dramatic characters.

Finally, the example highlights the complexity of drama under many aspects: while the character of Hamlet is more easily depicted by using the tool provided by a cognitive model of emotions, the emotional nuances experienced by Ophelia are not fully grasped by using this model. The character of Ophelia, in fact, does not match with a rationality-inspired model such as the BDI model of agency. She does not show, in fact, the features of autonomy that characterizes the model, being more strongly subject than Hamlet to many external sources of authority, including her father, Polonius. Finally, it is important to underline, across the entire scene, the role played by social and interactional rituals, that constrain the framework against which the interaction develops, posing many sorts of obligations (social, institutional, and so on) on the characters' autonomy.

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