

Defects of the will in software agents contracting

Francisco Andrade^a, Paulo Novais^b José Machado^b and José Neves^b

^a*Universidade do Minho, Escola de Direito, Portugal*

^b*Universidade do Minho, Departamento de Informática-CCTC, Portugal*

Abstract. The use of intelligent software agents brings along a lot of new issues in what contracting is concerned. Actually, to speak about contracts there must be two or more declarations of will, containing a consensual agreement, consisting of an offer and of an acceptance. But intelligent software agents operate in electronic commerce without any direct intervention of humans, and they have a control on their own actions and on their own inner state. So, legal difficulties obviously arise in such situations of contracting through the only intervention and interaction of autonomous intelligent systems. Thus being, the analysis of the process of formation of will and of issuing of declaration in electronic contracts negotiated (and eventually performed) by electronic software agents will be crucial to the development of intelligent inter-systemic electronic contracting. But, may the the rules of will defects be adapted to software agent contracting?

Keywords. Intelligent Software Agents, negotiation, contracting, declaration, will and defects

Introduction

Intelligent software agents operate in electronic commerce without any direct intervention of humans, and they have a control on their own actions and on their own inner state. So, legal difficulties obviously arise in such situations of contracting through the only intervention and interaction of autonomous intelligent systems, capable of acting, learning, modifying instructions and taking decisions: traditional legal principles have some difficulty to deal with the fact of agents celebrating contracts on their own. Thus being, the intervention of such intelligent devices in electronic commerce brings along a radical shift in the way we understand basic legal questions such as will and declaration. Declarations of will and agreements “will therefore no longer be generated through machines but by them, without any intervention or supervision of an individual”. Indeed, this type of “software” is capable of analyzing the situations, of forming its own will and of issuing its own contractual declarations without the human (users) being aware that a contractual negotiation has ever begun, let alone that a contractual agreement was reached.

In the terms of the general theory of Civil Law, the declaration of will is constituted by two different elements – the external element (the declaration itself) and the internal element (the will itself, the real and ultimate source of the declaration). This must be analyzed regarding the issuing of contractual declarations by intelligent software agents. Even though we might consider – as the American and Canadian legislation do – that the ultimate source of the will lies not on the electronic agent but

in the person or entity in whose interest the agent is acting, even considering the notion of attribution in the sense that the acts of the electronic agent might be attributed [9] to the human user, the truth is that, on one side, no one can actually anticipate what the contractual behaviour of the agent will be, and on the other side, there is the possibility that errors are intentionally committed by the software agent – arising from a negotiation strategy of its own – or even the possibility of the agent acting literally with good or bad faith. Thus being, the analysis of the process of formation of will and of issuing of declaration in electronic contracts negotiated (and eventually performed) by electronic software agents will be crucial to the development of intelligent inter-systemic electronic contracting [10].

1. Software Agents

In the current economical context, characterized by the existence of a global society, the access to information is crucial for any economical and social development, still important technological challenges remain. The representation, maintenance and querying of information is a central part of this problem. How can we obtain the adequate information at the adequate time? How can we supply the correct items for the correct people at the correct time? How and where can we get the relevant information for a good decision making? The organizations focus their competences in strategically areas and have recourse to external supplies, cooperating with sporadically partners, with the objective of reducing costs, risks and technological faults or maximizing benefits and business opportunities. One of the most radical and spectacular changes is the information unmaterialization, the task or procedure automation, the recourse to decision support systems or intelligent systems and to new forms of celebrating contracts (e.g., is it possible to practice commercial acts and celebrate deals using autonomous and proactive computational agents?). The negotiation processes through electronic means and the e-Commerce platforms may set new forms of contracts, with engagements and negotiations among virtual entities (Figure 1).

Software agents are computational entities with a rich knowledge component, having sophisticated properties such as planning ability, reactivity, learning, cooperation, communication and the possibility of argumentation [1]. The use of the agent figure is particularly adequate to such problems. The objective is to build logical and computational models, as well as implementing them, having in consideration The Law norms (i.e., legislation, doctrine and jurisprudence). Agent societies may mirror a great variety of human societies, such as commercial societies with emphasis to behavioural patterns, or even more complex ones, with pre-defined roles of engagement, obligations, contractual and specific communication rules.

The traditional programming languages do not support the description of certain types of behaviour which usually involves computational agents. In genesis, systems that incorporate those functionalities have a multi-layer architecture, evolve from esoteric software sub-systems, network protocols, and the like. On the other hand, once one deals with multi-agent systems, it must be guaranteed that they may answer to different and simultaneous demands, in a secure and error free way. An agent must be able to manage its knowledge, beliefs, desires, intentions, goals and values. It may be able also to plan, receive information or instructions, or react to environment stimulus. It may communicate with others agents, share knowledge and beliefs, and respond to

other agents upon request. It may cooperate, diagnosing errors or information faults in its knowledge bases, sharing resources, avoiding undesirable interferences or joining efforts in order to revisit the knowledge bases of its own and of its peers, in order to reach common goals [2].

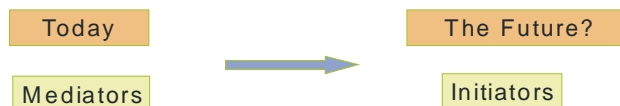


Figure 1. Agents roles

2. Defects of the will in software agents

We must consider the Civil Law “defects of the will”, as the possibility that the issued declaration is coincident with the will of the agent but, for some reason, the will itself was formed in a vicious or defective wayⁱ. In this respect, legal Doctrine usually distinguishes between defect of the will on the basis of error, on the basis of “dolus” and on the basis of coactionsⁱⁱ~

2.1. Error

Let’s start then with the figure of error, not considered as a divergence between will and declaration, but instead as a defect of the will itself (or of the formed will), of a will that could (and should) have been formed in a different wayⁱⁱⁱ. In this situation, error does not lie on the declaration (which is actually coincident with the will) but in a moment previous to the declaration, on the very moment when the will was formed^{iv}. The declarer formed his will in a certain way, because he did not know, or he did not know exactly, some of the essential aspects of the situation in analysis. The mental representation of the main and determinant reasons (either facts or legal reasons) for the producing of an intention to negotiate was made by the declarer in a vicious way^v. Articles 251^o and 252^o of the Portuguese Civil Code state about “Error on the person or on the object of the negotiation” and “Error on the motives”. But an error falling upon the determinant motives of the will is not, in principle, a cause of annulment of the negotius, except in the situations expressly considered by articles 251^o and 252^o nrs. 1 and 2 [3]. That is to say, if the error falls on the person of the declaree or on the object of the negotius^{vi}, or if the parties themselves have recognized, upon agreement, that the motive is essential (article 252 nr. 1), or else if the error falls on the circumstances that constitute the basis of the negotius (art. 252^o nr. 2) [6] [3]. Among the different types of error referred, we think that the one that will most likely occur in situations of declaration issued by intelligent software agents is the so-called “error on the object of the negotius”, both in the case of error on the identity of the thing which is the object of the negotius and in the case of error on the qualities of the thing^{vii} (it must be said that these “qualities” are intrinsic to the thing itself and will only be considered essential if they are considered decisive and determinant for the decision of contracting, considering the legal or economic finality of the object^{viii ix}).

However, for this vice to be considered for an eventual annulment of the legal negotius, it is required that the error is considered determinant in the formation of the will of the declarer^x. And, besides essentiality, it is still required that the error is

excusable, that is to say that it is committed in such circumstances that, an average person, in identical situation, might as well have committed the same error^{xi}.

Thus being, can we speak of error-vice regarding contracts celebrated through the intervention of intelligent software agents? Let's consider a practical possibility pointed out by Giovanni Sartor [7], considering a software agent in charge of online selling a set of ancient jewels, considering the weight, age and the material they were worked on. In the referred situation, one of the articles for sale (a ring) was erroneously classified and, thus being, the software agent ended up accepting a certain price, erroneously convinced that the ring was silver's, when actually it was gold's. Is there a reason for an annulation of the contract? If the contract had been celebrated and concluded between human people there could be a reason for annulation. What then in the case of a contract celebrated by software agents? Of course a software agent is not capable of distinguishing silver from gold^{xii}, it just reasons upon the elements that are contained in its Knowledge Base and these elements will tell him that silver and gold have different values. The question here will be to determine what an excusable error might be for a software agent. And it will certainly be excusable, for instance, the fact that an agent assumes that an object, presented in a photograph with the title "silver" is really a silver object, even though it actually is not silver's. But maybe it will no longer be an excusable error whenever the title refers, as it suggested by Sartor, the words "Gold 18 K". In this situation, it seems that the software agent should, according to its Knowledge Base and experience, reach the conclusion that it would not be convenient to sell as silver an article identified by the word "Gold".

Anyway, we must pay attention to the fact that annullability based on this type of error will depend on the concrete situation and on the possibility of the error regarding (or not) the whole negotius or just a part or aspect of it. The issue of incidental error must be considered. Annulation may fall over the whole negotius or just upon a part of it or certain of its aspects^{xiii}.

2.2. *Dolus*

From the example pointed out by Giovanni Sartor, we can still imagine the possibility of the error in the formation of the will arising from a false representation intentionally transmitted by another software agent. We are talking of a software agent trying to obtain negotial advantages by inducing another agent in error (or, still - when perceiving the error of the software agent counterpart - negotiating upon the false assumption of the counterpart, keeping it in error and getting an advantage from the same error). An important issue is to know whether or not we can talk of *dolus*^{xiv} - as a vice or defect of the will -- in this situation. Or whether a software agent can, within the course of its negotial performance, induce the counterpart agent in error, either by transmitting to it perceptions that will in the end be revealed as false^{xv}, either by destroying or hiding information that could lead the counterpart agent to form its will in a different way^{xvi}.

For the consideration of *dolus*, as a defect of the will, it is mandatory the verification of the following requirements: 1) the declarer had been induced or kept in error (or the declaree had not comply with a concrete duty of elucidation); 2) the error had been provoked or hidden by the declaree or by a third part; 3) the declaree had used for that purpose any type of artifice, suggestion or cheat [6] [3].

However, it must be said that there are two different types of "dolus", one tolerated and accepted by law (the so-called *dolus bonus*) which, thus being, is not a motive for

any contract annulment, and another type (the so-called *dolus malus*), based on a practice or omission^{xvii} relevant enough for an annulment of the contract^{xviii}. But, can a software agent act with “*dolus malus*”^{xix}? Can a software agent, illicitly and on purpose induce or keep someone else (and this could as well be either a human as another electronic agent) in error? After the above referred on the characteristics of the agents and knowing their capacity to look for the best strategies for the prosecution of their aims, it is not possible to disregard the possibility of the agent, eventually, acting with a purpose of deceiving the counterpart (human or electronic), namely by intentionally cheating and deceiving or even omitting an information duty and, thus, causing or dissimulating an eventual error of the counterpart. Let’s consider, once again, the situation above referred by Giovanni Sartor. If the software agent (seller)^{xx} perceives the error of the agent (buyer) – and this one, thinking the ring is of gold, buys a silver ring at a price correspondent to a gold one—and still sells the ring as if it was gold, trying just to obtain the best possible price, we may be facing indeed a situation of a vicious will (of the buyer) derived from the behaviour or omission of a software agent (seller). Of course, in principle – upon the fact that software agents should in principle be assumed as truthful – it looks that the possibilities of a “*dolus*” in behaviour or declaration will occur much more seldom in software agents contracting than in human contracting; however, the possibility of lye and of deceit does also exist in electronic contracting through software agents.

2.3. *Moral coercion*

Another possibility of getting a vicious negotial will is the one related to moral coercion. It is the case whenever the will to contract is formed as a result of an illicit threat of the declaree or of a third person, being this threat enough to decisively determine the will of the declarer^{xxi}. In this situation, the declarer is not only aware of the circumstances and aspects of the negotium, but also of the declaration he makes and of its consequences. But his will is viciously formed, since his behaviour is induced by an illegitimate threat^{xxii}. And his declaration is thus determined by the fear of an evil which “the declarer has been illicitly threatened “of (art. 255° nr. 1 of Civil Code). However, it must be paid attention to article 255° nr. 3 of the Civil Code, which exclude from the range of moral coercion the “...threat of a regular exercise of a right” and the ordinary “reverential fear”^{xxiii}.

In a situation of contracting through intelligent software agents, it will be quite normal that these might have in consideration the relations established between them and eventual situations in which gratitude might play an important role in the formation of the decision of contracting itself, under certain conditions. So, it looks plausible that the issue of gratitude between software agents can be foreseen here as one species more of “reverential fear” and, thus being, it may not be relevant as a defect of the will, and it will not be for itself capable of producing a situation of contract annulment. However, it may on the other side be considered as a declaration issued under moral coercion the declaration of a software agent having suffered threats from another software agent, for instance, regarding its reputation in the electronic environment. This will certainly be a situation that can be considered (at least, having recourse to an analogical interpretation) in the range of application of article 255 nr. 2 of the Civil Code. The analogy between software agents and humans is quite obvious: if the human declarers have reasons to be concerned (and threatened) with (by) attacks on their honour, so will the electronic intelligent declarers (software) concern themselves for their reputation

and the need to keep it good. Thus being, any attempt to force a declaration through “blackmail”, even though on a software agent through threats to its reputation, must be considered as capable of generating a true defect (vice) of the will, and hence, as capable of eventually generating an annulation of the contract^{xxiv}.

2.4. Accidental incapacity

Article 257^o of the Civil Code presents a particular situation of a declaration issued by someone that, in a certain moment and for any particular reason, is “accidentally without capacity of understanding the meaning of the issued declaration or without having the free exercise of his will”. It is a particular situation that classical doctrine usually integrates among the defects of the will. Traditionally, civil doctrine includes in this article the situations of psychic anomaly and “any other (drunkenness, hypnotical states, and so on) which do not allow the declarer an understanding of the practiced act or the free exercise of his own will” [6]. Although it is certain that drunkenness or hypnosis are states only possible for a human being – and not for a software agent – will it be possible to foresee the possibility of acts practiced by intelligent software agents being, further on, annulated on the basis of a declaration issued by the agents under a situation of accidental incapacity? We think it is still possible, although an analogical interpretation of the rules may be required. But let us think of a negotiation going on between software agents in a negotial session, in which the values declared by the agents are the following:

Agent A offers to sell X for the price of 80.
Agent B offers 0 € for X.
Agent A insists in the value of 80.
Agent B offers 387,99999.
Agent A requires B to confirm the offer.
Agent B offers 4.543,876555.
Agent A, once again, requires confirmation of B's offer.
Agent B declares to “offer” 7.899.545,453678.
Agent A accepts.

Through this sequence of declarations, until A's final acceptance, it is easy to understand that there is no coherence at all in the “offers” formulated by B. That is to say, upon this, that software agent B, for any reason, just started to shoot and to send totally incoherent declarations. It looks that we will be in a situation under which we may easily accept that software agent B is no longer neither in condition of understanding what is going on, nor of understanding what is being proposed by software agent A. Actually, although continuing to issue formal declarations, referring possible values, the succession of its declarations present totally incoherent values, values completely absurd for that negotius in concrete. Actually, for some reason, electric failure, sudden increase in humidity conditions of hardware, any failure in the platform on which it acts, the software agent started to exhibit, momentarily, a negotial behaviour that is not conforming to what should be its normal way of proceeding, had not such an alteration on its environment had occurred. And this behaviour turns out to be so absurd, that there will be no doubts as to qualify it as due to a notorious incapacity^{xxv}.

3. Conclusion

Upon analysis of the main situations related to defects of will, it must be admitted that almost all of these situations may occur in electronic contracting through software agents. Nevertheless, it must also be admitted that there are still many difficulties in the application of the Civil Code rules to situations in which software agents issue declarations. Sometimes, it will be almost impossible to realize the ways upon which the will of the agent was formed. And besides that, even when the acts of the software agents may fall under the stipulation of the referred articles of the Civil Code, there will still be difficult and delicate questions to solve, such as the ones related to the application of the general rules of annullabilities or with the notion of essentiality (for a software agent!!!) of certain errors. And there will be a further and obvious difficulty: it is not possible (yet) for a software agent to present a demand in Court, requiring an annulment of a contract, let alone invoking the essentiality of a certain committed error. However, these difficulties do not invalidate that, in many situations, it is already possible to apply, in a useful way, the rules of defects of the will to contractual relations entered in by intelligent software agents. Furthermore, in most cases, software agents will be acting in favour of a third party (usually a human or a collective person). Yet, some difficulties may arise in the application of the annullability rules, since article 287° of the Civil Code states that “will have the legitimacy to require the annulment the persons in whose interest the law establishes it”^{xxvi}. And of course strong doubts will arise as to whether human persons can be considered as legitimate parts in a requirement of annulment of contracts entirely negotiated and celebrated between intelligent software agents only. To avoid further situations of doubt (and also to avoid eventual and aberrant situations of human users of software agents being considered as illegitimate parts) it would be wise to consider a revision of the laws of electronic commerce considering the possibility of software agents having defects of the will and also the human users of the software agents as legitimate parts for requiring in Court the annulment of contracts on that basis.

Anyway, even considering that some legal developments may well occur in the next years, there will remain actual difficulties inherent to the fact that contracts may (from now on) be processed online and without any human intervention. This will always bring along enormous difficulties in order to understand what the real will of the software agent was and if this will was viciously formed or not. And in many situations it will not be possible to distinguish whether an error of the software agent was essential or not. As these are evident difficulties brought along by a totally new way of contracting, operating in conditions that were never even dreamed by civil codes legislators. Nevertheless, we think that some of these difficulties might be overcome, and that the general rules of Civil Law will not have to support significant distortions or adaptations in order to be also applied to this new way of contracting.

ⁱ “Having occurred a vice, the inner side of the declaration is under question. The problem does not exist neither in a sort of divergence between declaration and will, nor in a lack of the latter, but in the deformation of the will itself during its process of formation. The vicious will diverges from the will that the declarer would have without the deformation (conjectural or hypothetical will)” [3].

ⁱⁱ “If the will was determined upon a defective knowledge of the situation, we have the figure of error. If error was determined by machinations of the other part or by him illicitly

dissimulated, we will talk of “dolus”. If the will was determined without any external freedom, under the pressure of violence or threats, we will have the coactions” [4].

ⁱⁱⁱ Civil Code distinguishes, basically, between the error in declaration and error on the motives, since the error may as well lay upon the objective or external element of the negotial declaration as upon its inner or subjective element” [3]

^{iv} “when error falls only on the will (the inner element), it does not produce a divergence between will and declaration. The declaration is in perfect conformity with the will; yet, the latter is viciously formed. We speak thus of an error on the motives (still referred as error-vice). The will, as it was badly formed or because it is not free, is formed under a vice, although it converges with the respective declaration” [3].

^v “error-vice consists of the ignorance (or lack of exact representation) or in a false idea (inexact representation) of the declarer, on any circumstance (fact or legal) determinant for the formation of the will, in such a way that if he knew the real situation he would not have wanted the negotius, or at least he would not have wanted it in the precise terms that he accepted it. Thus, this is an error focused on the negotial motivation of the declarer, falling always on the determinant motives of that will.” [4].

^{vi} “The most important exception to the legal rules of error on motives, in the exact measure that this one is not a cause of annulation, is constituted by the error falling on the determinant motives of the will, when these are referred to the person of the declaree or to the object of the negotius (art. 252° nr. 1, 1st part). The error brings along the possibility of the annulation of the negotius in the precise terms of art. 247° (art. 251).” [3].

^{vii} “On error on the object it is usually referred that it may as well fall upon its own identity (errore in corpore) or only upon its qualities” [4].

^{viii} “Qualities of an object are those factors determinant of the value or of the wanted use, but not the price nor the value themselves, neither the ownership of the object. A quality is essential whenever it is decisive for the conclusion of the negotius, according to the legal or economic finality of the latter; a quality is essential, not whenever legal traffic confers this attribute, but instead whenever the declarer does it” [3].

^{ix} It must not be confused with the legal issue of the so called “Redibitorius Vices” as the hidden vices of the sold thing, that turn it unfit for the use it is destined to, or that reduce in such a way its aptitude for the same use in such a way that “if the buyer knew it, he would not have wanted it or he would not have accepted the price he paid for it”. In this situation, specific rules must be applied [3].

^x “Essentiality, in this sense, consists in the error having had a decisive role on the determination of the will of the declarer, in such a way that, had he known the real state of things, he would not in any way have wanted the negotius to be concluded” [4].

^{xi} “Dominant doctrine still requires that the error is excusable. Excusability happens when the error does not arise from an extraordinary and totally inexcusable ignorance or in the total lack of sagacity or diligence, in such a way that an average person, under the same circumstances, would have also incurred in the same error. On the other side, the inexcusable error is the major error. It is the scandalous error, the one proceeding from a serious fault of the agent; it is the one in which an average person with a normal intelligence and experience would not have fallen into” [4].

^{xii} Although it is possible that an intelligent software agent recognizes in the catalogue photograph, in the situation referred by Giovanni Sartor, the word “Gold” and thus might even “know” that it refers to a material different from silver, and to which a different value will correspond.

^{xiii} “Having occurred an error on the person or on the object of the negotius, the range of the annullability depends on the range of the relevant error. The error may fall upon the negotius as a whole: without the error the contract would not have been concluded; the error may fall upon one part or one aspect of the negotius: without it, the contract would not have been concluded in its precise terms. Here we stand in front of an incidental error” [3].

^{xiv} “It is the case of a provoked error...it is the case, after all, of employing any “suggestion or artifice in order to induce in error or to keep in error any of the contractors”; but in the concept of “dolus”, in a broad sense, it must still be considered, under the name of “bad faith”, the “dissimulation of the error of the other contractor, when it is known” [4].

^{xv} still, in the case referred, let’s suppose that the software agent decides to propose the sale, to another software agent, of an article (which it knows is silver) as if it were gold, in such a way as to get a more advantageous contract for its customer.

^{xvi} “the suggestion or artifice will be revealed in any strategy or machination capable of transfiguring truth – and that actually transfigures it (otherwise, there would be no error)-, either by creating an illusion, either by destroying or hiding any elements that might enlighten the deceived agent. There must thus be any deceitful process. It can be simple words containing inexact statements, or words tending to withdraw the attention of the deceived agent from any clue that might enlighten it; and it may be works (facts) therefore acted in order to provoke or maintain the error. Dissimulation, on the other side, consists on a simple silence upon the error in which the other contractor has fallen.” [4].

^{xvii} “The dolus action may be positive or omissive. In the first situation, the agent’s intervention occurs in order to lead the counterpart into error; in the second situation, the agent doesn’t act or talk, in order to keep the error in which the counterpart has fallen” [5].

^{xviii} it does not constitute illicit dolus, although it is considered as general dolus, neither usual artifices or suggestions, considered as licit according to the dominant conceptions in the commercial legal traffic, nor the dissimulation of the error whenever no duty of elucidation impends on the declaree, resulting from the law, from contractual stipulations or from the dominant conceptions in legal traffic” [3].

^{xix} in [8] vol. IV, page 312: “...dolus malus, intentional deceit intentionally purported by means of suggestions or tempting and deceitful statements, and artifices or fraudulent manoeuvres, consisting in dissimulating the reality of things under a false semblance, or in putting the counterpart in conditions of not being able to perceive it, or of not having full conscience he is doing, subscribing or accepting...”.

^{xx} a difficult issue would be the one of knowing what would be the usual behaviours of software agents in electronic commerce, in order to determine what could become accepted as dolus bonus. But the usual rules of commerce between humans will certainly end up by being incorporated in the Knowledge Base of software agents.

^{xxi} “Moral coercion consists in a psychological pressure determining the will, in such a way that the declarer lacks (like the victim of dolus) the external freedom” [3].

^{xxii} “The threat directed to the declarer must be illicit. Illicitness may as well be referred to the prosecuted purpose (for instance, illegal acts) or to the means used (blackmail). But it may also refer to an inadequacy between the purpose and the means. In this situation, illicitness arises from the inadequacy of the relation means-purpose, being the purpose itself illicit (for instance, a threat of denouncing tax violations in order to force a negotial declaration” [3].

^{xxiii} Reverential fear is the fear to displease people to whom submission or respect is due” [3].

^{xxiv} interesting question will be the analysis of a possible application in this situation of art. 256º Civil Code, regarding coercion by a third party, and the requirement in such a case that “it is serious the evil and justified the fear of its accomplishment”. How to interpret this requirement towards threats arising from software agents and regarding other software agents? In [6] on comments to article 256º, refer that “it will be on the criteria of the Court to estimate the seriousness of evil and to appreciate the fundamentals of error”. But how will a Court react in the case of a negotial declaration issued by an intelligent software agent under (illicit) pressure or blackmailed by another software agent? Anyway, it looks clear that a proved threat to the reputation of the electronic agent must be considered as an evil (or threat of an evil) serious enough, in order for the software agent to have a justified fear of a prejudice or harm.

^{xxv} we must question what a notorious fact for a software agent might be. But we think that, it will not be too daring to state that the behaviour of agent B, as referred above, will constitute a notorious fact or evidence that something wrong is going on with the negotial behaviour of the software agent in this particular situation – and that this will be notorious or evident even for another software agent.

^{xxvi} “There is, thus, an issue of law to be solved and not just, as it happens with nullity, the appreciation of an interest in the concrete situation” [6].

Acknowledgments

The work described in this paper is included in Intelligent Agents and Legal Relations project (POCTI/JUR/57221/2004), which is a research project supported by FCT (Science & Technology Foundation – Portugal).

References

- [1] N. R. Jennings and M. J. Wooldridge, Software Agents, IEE Review, January, 1996, 17-20.
- [2] Andrade F., Neves J., Novais P., Machado J., Software Agents as Legal Persons, in Virtual Enterprises and Collaborative Networks, Camarinha-Matos L. (Ed), Kluwer Academic Publishers, ISBN 1-4020-8138-3, 2004, 123-132.
- [3] Hörster, Einrich Ewald, A Parte Geral do Código Civil Português – Teoria Geral do Direito Civil, Livraria Almedina, Coimbra, 1992.
- [4] Andrade, M., Teoria Geral da Relação Jurídica, Coimbra Editora, vol. II, 1983, 56-57.
- [5] Ascensão, José de Oliveira. Direito Civil e Teoria Geral, vol. II, Coimbra Editora, 1999.
- [6] Lima, Fernando Andrade Pires de / Varela, João de Matos Antunes. Código Civil Anotado, vol. I, Coimbra Editora Limitada, 1987.
- [7] Sartor G. L'intenzionalit a dei sistemi informatici e il diritto. Rivista trimestrale di diritto e procedura civile. 1: 2003, 23-51.
- [8] Cunha G. Tratado de Direito Civil – Código Civil Português, Coimbra Editora, vol. I, 1929, 422.
- [9] Weitzenboeck, E. Electronic Agents and the formation of contracts. International Journal of Law and Information Technology 9(3): 204-234.
- [10] Barbagalo E. Contratos Eletr nicos - Editora Saraiva, S o Paulo, 2001.