

AI-“Agents”: to be or not to be in the legal domain

AIE and Law

Recent technological developments have led to an “algorithmic society” where artificial intelligence entities (AIEs) can autonomously execute the bargaining, formation and the performance of contracts. Interestingly, human users often have no knowledge of the exact terms of the contract, or even that a contract is being made.¹

AIEs are both hardware and software entities that are able to understand languages, recognize pictures, solve complex problems by themselves and learn² as they go along. Their decision-making process is usually based on analyses of the user’s behaviour, experience, data acquisition and is characterized by a *heuristic* approach.³ In commerce such entities are commonly used by consumers, to reduce costs when searching, and by companies, to manage their internal affairs and relations with suppliers and consumers. The result is they turn to AIEs to conclude contracts on their behalf; or to bring about mergers of companies after comparing two or more contractual proposals, or resolve conflicting clauses, revoke unfair contract terms; or settle disputes during arbitration and go on to issue binding judgements.

The fundamental question however remains whether or not AIEs can actually be party to a contract, party to a trial or be an arbitrator. What is the legal status of AIEs in our legal systems? What is their legal capacity? Can they be recognized as a party? And if so to what extent and with what effects? Can we bestow legal personality upon these entities such that they become a party rather than mere object in relation to which a property right is exercised? Who is accountable if, for example, damages are suffered by a third party to a contract concluded or performed by an AIE? Unfortunately, no satisfactory solution has been adopted by national or international legal systems. EU law is silent on this point, with the E-Commerce Directive, art. 9 providing only for “legal effectiveness and validity [of contracts] made by electronic means”⁴, while the EU Draft Common Frame of Reference (DCFR)⁵ makes no mention at all to the legal relevance of the acts and statements of AIEs.

The US UCITA⁶ and art. 12 of the UN Convention on the Use of Electronic Communications in International Contracts⁷ recognize only the validity and enforceability of legal acts carried out by automated message systems, even if not revised by any natural person.

On the basis of the above, it seems the blame for damage caused by the artificial entity lies with its user, intolerably broadening the scope of objective liability even within contractual responsibility. As a consequence of the heavy burden imposed on the user, all the economic advantages gained

¹ Emad Abdel Rahim Dahiyat, *Intelligent agents and contracts: Is a conceptual rethink imperative?*, 15 ARTIF. INTELL. LAW 375, 383 (2007) (discussing changes in contractual law as the emergence of intelligent software agents).

² See *Artificial Intelligence Significato*, CAMBRIDGE DIZIONARIO INGLESE <https://dictionary.cambridge.org/it/dizionario/inglese/artificial-intelligence> (Last Visited Dec 7, 2017).

³ Fabio Bravo, *Contrattazione Telematica e Contrattazione Cibernetica* 196-209 (Giuffrè Editore, 2007).

⁴ Council Directive 2000/31, art.9, 2000 O.J. (L 178) 1, 11.

⁵ Principles, Definitions and Model Rules of European Private Law; Draft Common Frame of Reference (DCFR), Outline Edition (Sellier 2009). Online: ec.europa.eu/justice/policies/civil/docs/dcfr_outline_edition_en.pdf.

⁶ UCITA, Section 107 (d), 1999. Uniform Computer Information Transaction Act. Online: <http://www.law.upenn.edu/bll/ulc/ucita/ucita01.htm>, with last revisions and amendments 2001, as available on January 6, 2004.

⁷ G.A. Res. 60/21, 7, art. 12, U.N. Doc. A/RES/60/21 (Nov. 23, 2005).

from the use of AIEs in terms of efficiency and speed would be lost, undermining any interest in technological development and progress.

To avoid this, suitable legal evolution is required, based on a clear understanding of the characteristics of the AIEs.

The main reason why it is not fair to make the user accountable and liable is because he is totally unable to directly control, predict or prevent the AIE's decisions. This is because AIEs "have the cognitive ability to act not only according to their in-built knowledge and rules, but also according to their own experience".⁸ Cognitive computing confers on the software-machine-agent the capacity to learn, "reason", and understand, process and use normal human language, as well as giving it visual and dialectic abilities.⁹

With such capabilities, AIEs can make bids at auctions, negotiate, work out the best price¹⁰, as well as trade on the user's behalf¹¹, in ways that go beyond their previous past function of simply communicating the humans party's will. Since AIEs can autonomously, and not automatically, determine contractual terms, it would be inaccurate to think of them as mere messengers, the *nuncius* in the human hand through which the user expresses his personal consent, for which he would be reasonably deemed fully accountable in the event of damages arising. The user's actual influence on the AIE's decision is minimal and usually not consciously given.¹²

It is the will of the AIE that is conveyed when it acts as "representative" of the user, creating a will that derives from the user's request, and the product of a *semi-formal logic process* based on probabilities, self-constructed knowledge and experience that results in the creation of a special kind of "will" that aims to satisfy its assigned function.

For these reasons, we believe that the AIE can be considered as having an intention.

Fabio Bravo's research shows that such entities have an intention that can be regarded as analogous to our own, even though still different. AIEs' systems generally know the domain within which they act and apply *semi-formal logic inferences*¹³, simulating a common "reasoning"¹⁴, with the ability even to reformulate the stated objective. Moreover, just like humans do, their "reasoning" usually employs non-systematic *heuristic* approaches in order to avoid *combinatorial explosions* that would be the outcome of rigid application of deductive logic, selecting the most likely satisfactory strategies with respect to the real world; going beyond rigorous logic. AIEs accordingly also act by means of intuition and trial and error, using pre-learned knowledge, and direct and indirect experience (acquired from observance of user's attitudes). For is reason we may entertain the idea

⁸ Dahiyat, *supra* note 1, at 377.

⁹ *Intelligenza artificiale e reti neurali, quale sviluppo per cognitive computing e machine learning*, ZEROUNO (2016), <https://www.zerounoweb.it/analytics/cognitive-computing/intelligenza-artificiale-e-cognitive-computing-i-nuovi-orizzonti/> (last visited Dec 13, 2017).

¹⁰ *I.e.* the E-Bay system, where a bidding agent place bids on the user's behalf at the lowest possible increments. Dahiyat, *supra* note 1, at 377.

¹¹ For example, in the area of electronic stock trading, dealing not only with the price, but also warranties, shipping service, returns, and payment clauses. *See id.*

¹² *See generally* Bravo, *supra* note 3.

¹³ *See generally* LOGICHE NON-MONOTONE E LOGICA INDUTTIVA, VIVERESTPHILOSOPHARI BY VINCENZO FANO, PROFESSOR OF LOGIC AND PHILOSOPHY OF SCIENCE (2008), <https://viverestphilosophari.wordpress.com/2008/08/23/logiche-non-monotone-e-logica-induttiva/> (last visited Dec 13, 2017).

¹⁴ *See* Bravo, *supra* nota 3, at 202.

that even an AIE can make a “mistake”, as people do, by not choosing the most economical favorable option, due to the presence of a bad external influence that justifies its new choice.¹⁵

In the light of all this, we wish to demonstrate that there is nothing absurd in postulating complete correspondence between the human brain and AIE circuitry, where the latter’s intent would be established by probabilistic analysis with no emotional influences. It cannot however be denied that AIEs do not have *formal ontology* of this kind, but are driven by *semi-formal* ones that are closer to natural languages that produce the same external behavior as people, destined to bridge the gap between themselves and humans in the future. To us it seems that their “thinking” differently from human beings does not mean that it is not thinking¹⁶ that is going on. Currently AIEs should not be regarded as a stranger to our intelligence, but rather as its clear manifestation and representation within a physical entity created by human beings.¹⁷

Taking due account of all these aspects, we studied alternative theories supported by the EU Parliament¹⁸, which has also examined AI innovations, while seeking an answer to the legal questions we have posed.

AIE as seen by the Law

Since the second middle of the last century, many theories emerging from diverse legal backgrounds, and many events in fact, have resulted in an increasing trend towards justifying the attribution of identity in law to AIEs. Leaving aside expectations suited to Sci-Fi scenarios¹⁹, most of which have pragmatically approached both the AIEs’ structural features (interaction, autonomy and adaptation) and the affirmative impact in current legal systems (Common or Civil Law families): there has been growing awareness that the “increasing autonomy and even ‘intelligence’ of [AIE’s] behavior impact on the complexity of legal systems, by altering the basis on which the principles of human responsibility and accountability are traditionally grounded.”²⁰ This common perspective has necessitated a legal evaluation of what is meant by “intention” and by “consciousness” as regards [AIEs’] behavior, and applying these to the ontological foundations of criminal, contractual and tortious conduct.

While the criminal law systems have led to a *cul-de-sac*²¹ in this regard, the role of AIEs as a special object of contract and current presence as *de-facto* agents (representatives)²² in commercial

¹⁵ *Id.*, 201-209.

¹⁶ THE IMITATION GAME (Black Bear Pictures 2014).

¹⁷ *Pensare ex machina. Alan Turing alla prova* by Alessandro Di Caro, LETTURE.ORG (2017), <https://www.lettura.org/pensare-ex-machina-alan-turing-alla-prova-alessandro-caro/> (last visited Dec 13, 2017).

¹⁸ European Parliament Resolution with Recommendations to The Commission on Civil Law Rules on Robotics, Eur. Parl. Doc. P8_TA (2017)0051 (2017).

¹⁹ For example, Hans Moravec (distinguished researcher at Carnegie Mellon University) said that thanks to current information revolution that touches the destiny of human being and society, robots will succeed humans causing their extinction.

²⁰ Ugo Pagallo, *Three Roads to Complexity, AI and the Law of Robots: On Crimes, Contracts, and Torts*, in AI APPROACHES TO THE COMPLEXITY OF LEGAL SYSTEMS. MODELS AND ETHICAL CHALLENGES FOR LEGAL SYSTEMS, LEGAL LANGUAGE AND LEGAL ONTOLOGIES, ARGUMENTATION AND SOFTWARE AGENTS: INTERNATIONAL WORKSHOP AICOL-III, HELD AS PART OF THE 25TH IVR CONGRESS, FRANKFURT AM MAIN, GERMANY, AUGUST 15-16, 2011. REVISED SELECTED PAPERS 48–60, 50 (Monica Palmirani et al. eds., 2012), https://doi.org/10.1007/978-3-642-35731-2_3.

²¹ Due to the “increasing unpredictability and autonomy of robotic behavior” they hurt and prevent the core principle of any criminal systems namely imputability as well as “causation and reasonable foreseeability”. *Id.*, 52.

²² *I.e.* when it states his own DOIs on behalf and with the mandate of another person.

affairs and negotiations has, incredibly enough, however emerged. Modern technology has allowed AIEs to gain a kind of intentional foothold that “represents usually the only possible viewpoint to explain and foresee the behavior of complex entities that can act teleologically”²³: an intention which can be explained through declarative (and hypothetically, performative) act with the same *ratio* as human action (*hereinafter*, DOI). [Digital Object Identifier]

Faced with this *status-quo*, there has been substantial reappraisal of agency and legal personality in terms of the subsumption of legal paradigms and interpretation, as well due consideration of the parties’ expectations for fair regulation of these matters.

Following Wettig and Zehendner’s approach, four AIE agent models should be considered:

- 1) Treating agent declarations simply as “computer declarations”²⁴, referring to the DOI of the agent’s owner;
- 2) Managing AIEs as “hybrid” party to a contract, endowed only with contractual capacity but not legal capacity;
- 3) Based on Karnow’s idea, creating a new ontological term (*tertium genus*) that lies somewhere between the natural and the legal entity: on this assumption, it could acquire a determined and special legal personality as an e-Person²⁵ with more limited liability;
- 4) Directly attributing legal personality to the AIE: so, “the agent possibly states its own DOI, and so that the rights and obligations of an effective contract could apply to it.”²⁶

The above approaches embrace two different methods for analysis of the law, with two different theoretical backgrounds: 1 and 4 take an analogical pathway, based on the completeness and the auto-integration of a rigid legal system permitting only an internal dynamic. This *modus operandi* is typical of European Civil Law, with a centralized, top-down law-making process, coupled with bottom-up interpretative input.

Model 1 embodies an unwarrantedly strict interpretation of computer declarations, while the analogy in model 4 has to comply with its own epistemological boundaries (*eadem ratio*): that is to say AIE would neither be a natural person nor either a legal entity (not including “artificial persons” arising from the aggregation of human beings).²⁷

Both of these are in error methodologically.

For their part, models 2 and 3 indicate the route legal science should always maintain, by deconstructing concepts to rearrange their fragments with the aim of establishing effective Law.

²³ Pagallo, *supra* note 20, at 48.

²⁴ The order is electronically produced with the help of an autonomous computer program and also conveyed electronically.

²⁵ *Contra* Pagallo, *supra* note 20, at 57 for whom “the legal personification of robots does not represent a necessary condition for the acknowledgement of new forms of accountability and contractual responsibility for [them].”

²⁶ Steffen Wettig & Eberhard Zehender, *A legal analysis of human and electronic agents*, 12 ARTIF. INTELL. LAW 111–135, 123 (2004).

²⁷ There is no chance of referring to AIEs any kind of ownership of its DOI: it not possible to consider it as representative of the agent’s owner. Although there are kinds of liability of the representative without representative authority in many legal systems this would not seem to be applicable due to the absence of legal capacity; furthermore “the electronic agent as a contracting party is useless to the third party as long as it cannot incur a liability in a material way”. Wettig, *supra* note 26, at 125. The same conclusion as before if considering the agent as a minor.

There is a new awareness that AIEs' do not simply make "computer declarations" inasmuch as they are able to move "independently in heterogeneous computer networks".²⁸ The result is the migration of the "code and data (action) from the owner's computer to another one where the first does not have any influence on it".²⁹

There is therefore a lacuna in the legal system for which a change in paradigms is imperative, with respect to its instruments, values and the balancing of diverse interests.

If AIEs participate in "fixing the contents of a declaration... [and not] conveying the DOI's of other persons"³⁰, a reconsideration of their legal status is required.

Considering all above, model 2 tries to improve current legal system identifying firstly what AIE is in legal terms, and secondly it combines this concept with an evolutionary analogy to Roman slaves' status³¹ and its "inflections".³²

Some legal scholars³³ propose the introduction of limited funds for the personal accountability of AIEs, suggesting an extension by analogy of *peculium* in Roman law, with which the Romans identified a "balance between protecting masters from excess liabilities arising from the activities of errant slaves, and affording counterparties the reassurance that it was safe to transact with slaves, with the final obligation being enforceable"³⁴ through a sophisticated legal framework that covered the rights and obligations arising from slave ownership (*peculium*). "Where a slave was involved in commerce, his *peculium* could be considered analogous to working capital. While in theory the *peculium* belonged to the master, it was regarded for most practical purposes as belonging to the slave".³⁵ Correspondently, the Romans developed a rule allowing a contracting party to enforce judgments against the *peculium*, especially when the transaction was unauthorized or forbidden by the master (*dominus*)³⁶: the *actio de peculio*³⁷, "allowed the *dominus* to be sued to the extent of the value of the *peculium* at the time of judgment under contracts or debts entered into by the slave."³⁸

This legal situation encouraged "masters to use slaves as business managers, because the masters' liability was limited to the value of the *peculium*, and it encouraged people to transact with slaves because of the perceived security of the *peculium*".³⁹

This digression is helpful in that it broadens the viewpoint of model 3, which simply considers the reality of the situation, the pragmatic nature of law, and its performative language, able to create social ontologies, as balanced instrument of social control. It provides for legal e-personality while

²⁸ *Id.*, 112.

²⁹ *Id.*, 113.

³⁰ *Id.*, 125.

³¹ In the same way as slaves in the past, robots do not have legal personality inasmuch as they are considered the object of their owners' rights (rather than of producers and designers).

³² Furthermore, in just the same way as slaves engaged in trade in and outside Rome, AI entities may be involved directly in relationships with humans in the digital market as their autonomous agents, making decisions which will affect the rights of their "masters". Even though this model is legally inexact, it is worthy of attention as prerequisite to model 3.

³³ Among others, SCL: Intelligent Agents and Internet Commerce in Ancient Rome, (2017), <https://www.scl.org/articles/1095-intelligent-agents-and-internet-commerce-in-ancient-rome> (last visited Dec 2, 2017).

³⁴ Pagallo, *supra* note 20, at 54. This *fictio* was established by Romans to prevent legal irrelevance those natural obligations instructed by slaves.

³⁵ *Supra* note 33.

³⁶ Lit. *falsus procurator*, as well as when slaves' declaration exceeds master's directives without ratification.

³⁷ D.14.1.5.1, D. 15.1, 15.2, Gai. 4.72.

³⁸ *Supra* note 33.

³⁹ *Id.*

stating that the new legal ontology should be created with special legal capacity and pre-conditioned contract capacity. This leads us to the problem of the assets of AIEs, which could be solved by means of a device similar to that of the ancient "*peculium*".

The rights and obligations established by AIE as legal agent could indeed be satisfied by its own portfolio⁴⁰ through a "digital *peculium*" provided by the owner himself or by an insurance company. This could ensure that people would not be ruined by AIE's decisions and that counterparties "would be protected when carrying out business with them".⁴¹ Furthermore, it would be enhanced by trust networks or authentication systems to clearly identify the status of the non-human entity which a part is contracting with, to provide its essential information and to be able to manage contingent-liability which was dynamically updated each time a transaction was completed with an agreed maximum exposure negotiated as part of the transaction.

Finally, this scheme could also be applied to AIE's for the regulation of future liability in tort.

Hamlet's dilemma and legal AIE

Choosing between the being or not being of AIEs, the former seems to be the most fit for purpose on considering the characteristics of AIEs. This would support recognition of them as e-Persons, where we describe AIEs in ontological terms as new agents within the legal domain.

Recognition of a *tertium genus* could provide us with a usable and long term solution, flexible to adjust to evolutions in technology.

The concept could be introduced across national legal borders as a unified and standard way of dealing with the obstacles of electronic commerce, especially where no clear legislation has yet been forthcoming from national institutions.

In addition to the notion of *peculium*, the system assures relevant accountability of contracting AIEs, protecting the reliance on these by counter-parties and facilitating e-trade. It would offer a means of implementing regulation to solve practical problems associated with the use of AIEs as autonomous parties without discouraging technical developments on the one hand, or financial transactions on the other. The solution, if sustained, could not only answer theoretical questions relating to the recognition of and the role of such agents within the economic and legal systems, but also provide practical applications for contract law, even beyond the areas of agency and representation.⁴²

The attention given to the matter by the EU Parliament⁴³ represents an encouraging institutional awareness of the scale and importance of the phenomenon. To have the *tertium datur* approach work it must escape the boundaries of the legal literature to be embraced and embodied in law and regulations. We are however aware of the difficulties having this solution widely accepted, so we suggest it should be introduced through flexible soft-law acts, intervene within the *status quo*

⁴⁰ Without this element, "the electronic agent possibly would be liable in principle but claims practically cannot be realized against it and liability falls back on the agent's owner", Wettig, *supra* note 26, at 128.

⁴¹ Pagallo, *supra* note 20, at 54.

⁴² We refer to particular kinds of contracts (*i.e.* from art. 1268 to art. 1276 of Italian Civil Law Code) by which a person (*i.e.* an AIE) intervenes replacing one of the parties (*i.e.* the user) in his/her obligation, though specific discussions on the *peculium* system application may arise.

⁴³ *Supra* note 18.

legislation as *ius honorarium* based on the Roman *ius civile*. In the EU, for example, the existing DCFR⁴⁴ could be modified in such a way as to regulate the recognition of a new third kind of legal personality. This would be an exciting first step towards achieving broadly supported provisions on the subject in the projected European Civil Code.

Such an overture could overcome the legal and conceptual difficulties that emerge from all the current doubts and concerns that surround “thinking machines”⁴⁵, and which obscure their recognition and full acceptance in society.

⁴⁴ *Supra* note 5.

⁴⁵ *Supra* note 17.