Transforming Legal Rules into Online Virtual World Rules: A Case Study in the VirtualLife Platform*

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Abstract. The paper addresses the implementation of legal rules in online virtual world software. The development is performed within a peer-to-peer virtual world platform in the frame of the FP7 VirtualLife project. The goal of the project is to create a serious, secure and legally ruled collaboration environment. The novelty of the platform is an in-world legal framework, which is real world compliant. The approach "From rules in law to rules in artifact" is followed. The development accords with the conception "Code is law" advocated by Lawrence Lessig. The approach implies the transformation of legal rules (that are formulated in a natural language) into machine-readable format. Such a transformation can be viewed as a kind of translation. Automating the translation requires human expert abilities. This is needed in both the interpretation of legal rules and legal knowledge representation.

Keywords: Legal rules, computer implementation, translation, legally ruled collaboration, Ought to Be inworld reality.

1 Introduction

The paper is devoted to the operational implementation of legal rules in software. The issues arose while developing an online virtual world platform within the FP7 project "Secure, Trusted and Legally Ruled Collaboration Environment in Virtual Life" (VirtualLife). The purpose is to create a serious virtual world – not a game.

The legal rules of a VirtualLife virtual world initially are formulated in a natural language, for example, 'Keep off the grass'. This rule can be paraphrased 'The subject – an avatar – is forbidden the action – walking on the grass'. The rule demonstrates that the "Ought to Be reality" concept (see, e.g., [7]) can be extended from the real world to an online virtual world.

While developing software, a further translation of the rules into machine-readable format is required. Such a translation seeks capabilities of human experts. A team includes an expert in law, virtual world developer and programmer.

We argue that the translation of legal rules requires natural intelligence. A translator faces the following problems (including but not limited to):

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1. **Abstractness of rules**. Legal rules are formulated in abstract terms.
2. **Open texture**; see e.g. Hart's example of "Vehicles are forbidden in the park" [1].
3. **Legal interpretation methods**. The meaning of a legal rule cannot be extracted from the sole text. Apart from the grammatical interpretation, other methods can be invoked such as systemic and teleological interpretation.
4. **Legal teleology**. The purpose of a legal rule can be achieved by various ways.
5. **Heuristics** – the ability to translate high level concepts and invent new ones.
6. **Consciousness of the society**. Law enforcement is a complex social phenomenon.

The transformation we explore accords with the conception "Code is law" [6]. Our analysis of the transformation tackles the problems above. We proceed with an introduction to VirtualLife and its legal framework.

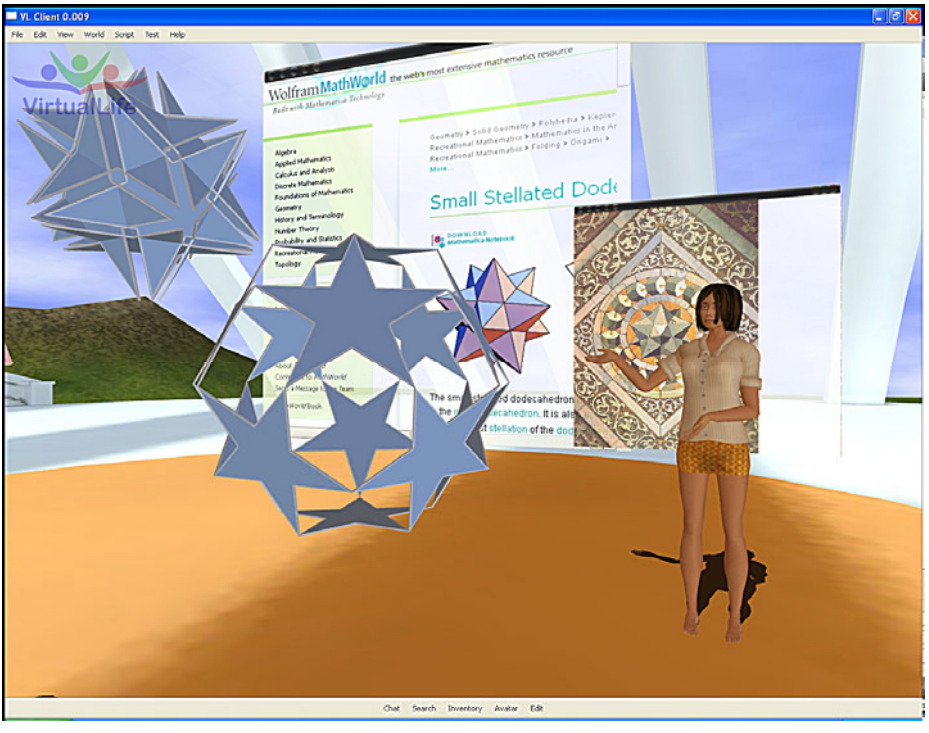

Fig. 1. Interaction with an object, a complex solid, in a lesson within a virtual world [4]

2 About VirtualLife

The goal of VirtualLife software is a new form of civil organization, realized by the creation of secure and ruled places within a virtual world, where important transactions can occur (where transactions are those that normally occur in real life) [2]. At present VirtualLife is targeted at learning support scenarios, such as a

university virtual campus. A professor avatar gives a lesson whereas student avatars listen (Fig. 1). An avatar can interact with other avatars and inworld objects.

3 Focus on VirtualLife Legal Framework

VirtualLife's legal framework consists of three tiers (Fig. 2):

1. A 'Supreme Constitution';
2. A 'Virtual Nation Constitution'. E.g., Constitution VN1, …, Constitution VNn;
3. A set of different sample contracts.

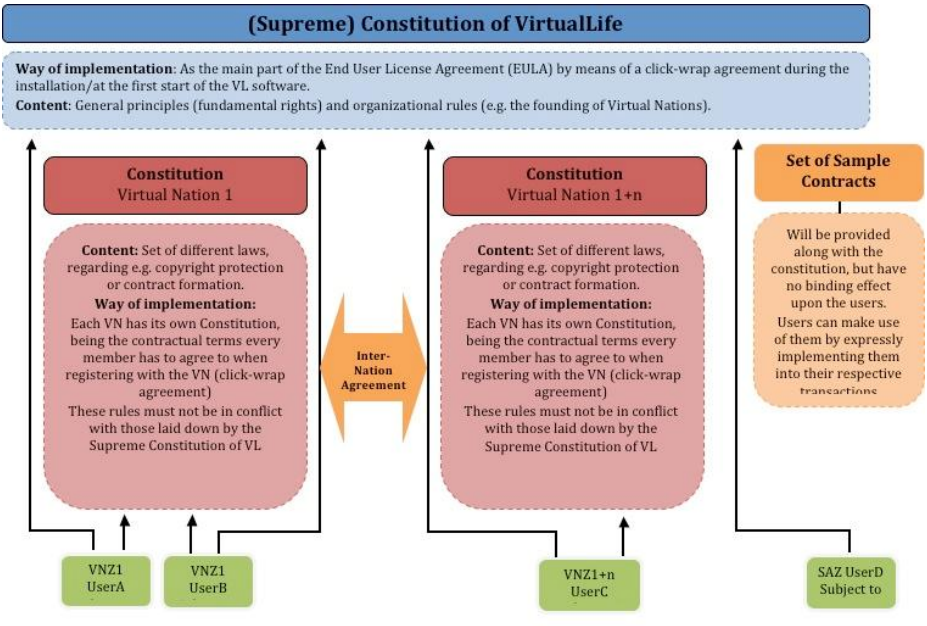

Fig. 2. The three tiers of VirtualLife legal framework – a Supreme Constitution, a Virtual Nation Constitution and a set of different sample contracts[1]

Initially the legal framework was elaborated in project deliverables[2]; see also [8]. Further the elaboration was in the form of the technical specification of Virtual Nation laws. The editor of rules is comprised – it serves as a tool to compose laws.

A virtual world is quite different from a standard video game, where there is a story, a final purpose, and the system only allows for a limited set of actions. In a virtual world there is not a determined purpose and there is not a game over. People move their avatar and establish their second life, driven by different purposes. Thus

[1] Spindler, G., Prill, A., Schwanz, J., Wille, S. D7.1 Preliminary Report of the Legal Fundamentals Concerning Virtual Worlds. VirtualLife deliverable, 2008.

[2] Spindler, G., Prill, A., Anton, K., Schwanz, J. D7.2 "Constitution" of a Virtual Nation. Model of a Contract about a Legal System of a Virtual Community. VirtualLife deliverable, 2009.

the rules of play should be replaced by a sophisticated legal framework, which is considered to be essential in order to guarantee the existence of a secure and safe virtual world. In VirtualLife, the legal system takes into account both real life values and real world laws [2].

3.1 From Rules in Law to Rules in Artifact

A Virtual Nation Constitution contains special provisions as regards, for example, the protection of objects used in that Virtual Nation under copyright law or the authentication procedure required to become a member of that nation.[3] Distinct Virtual Nations, e.g., a university virtual campus and a virtual mall, should be governed by different rules. Different rules of copying inworld objects should govern different nations, for example, CopyRight and CopyLeft nations.

It is worth to note that the Supreme Constitution is placed at the level of contract law. This binds the user on the contractual level and contributes to law enforcement.

Some examples of rules can be listed:[4]

- An avatar is forbidden to touch objects not owned by him or a certain group.
- An avatar is forbidden to create more than a given number of objects.
- An avatar is forbidden to use a given dictionary of words (slang) while chatting.
- An avatar of age is forbidden to chat with avatars under age.

If an avatar violates a rule, for instance, steps on the grass, his reputation is decreased. The rule enforcement is implemented by triggers. They trigger the changes of the virtual world states and thus invoke avatar script programs. The triggers implement a demon concept which is known in artificial intelligence; see, e.g., [3].

'Keep off the grass' can be viewed as a toy rule. In the real world the text is usually written on a sign. This rule can be treated as a specialisation of a certain more general rule, e.g., 'Keep the peace', 'Preserve the nature'. Every legal rule is usually formulated abstractly and covers a broad set of cases. The rule also assumes certain preserved values such as life, health, property, the established order, the nature, etc.

In order to implement the rule, a computer has to be explained what the grass is. Apart from this objective element, intentional factors need an explanation, too. Hence, the legal concepts, such as fairness, malice and negligence, have to be explained. For example, in the case an avatar is pushed by another avatar, the fault analysis can invoke distinguished causation theories[5]. Here we can ask: How far can be moved forward in representing all this?

We note the difference of interpretation between a legal rule and technical system rule. The legal rule allows a freedom of interpretation, the technical rule – does not. A certain degree of freedom in the legal rule is even intentionally introduced when designing the legal system. The technical system cannot afford such a freedom.

The open source problem [1] is characteristic of the legal system. The reason to formulate a legal norm abstractly is inherent in the complexity of the real world. A

[3] Cf. footnote 1, p. 11.

[4] Cordier, G., Zuliani, F. D7.3 Virtual Nation Laws – Technical Specifications. VirtualLife deliverable, 2009.

[5] Hart, H.L.A., Honoré, T. Causation in the Law, 2nd edition, Oxford 1985.

variety of potential cases cannot be foreseen. A variety of factors is not known in advance. The real world changes permanently; see, e.g., Web 2.0 applications.

A technical system, on the contrary, is required to foresee its future behavior. The system is designed to decide 'yes' or 'no'. Therefore the technical system is tested, verified and validated. Within the established social system, deciding a legal case for yes/no can be hard. The judge can also take a middle decision – yes/no/other.

3.2 The Editor of Rules

The rule concept follows the approach of Vázquez-Salceda et al. [9]. Similarly, laws are expressed in VirtualLife in the form of Norms.[6] A Norm is composed by: (1) NORM_CONDITION, (2) VIOLATION_CONDITION, (3) DETECTION_MECHANISM, (4) SANCTION, and (5) REPAIR.

A NORM_CONDITION is expressed by:

- TYPE – Obliged, Permitted, or Forbidden
- SUBJECT – Avatar, Zone, or Nation
- ACTION – ENTER, LEAVE, CREATE, MODIFY, MOVE, CREATE, TRADE, SELL, BUY, CHAT, etc.
- COMPLEMENT – AREA, AVATAR, OBJECT, etc.
- IF {LOGICAL EXPRESSION USING SUBJECTS Properties}

An example of Norm, referring to Norm composition:

1. Condition: FORBIDDEN Student_Avatar ENTER Library IF Student_Avatar.age < 18
2. Violation condition: NOT over_age(Student_Avatar) AND admit(Student_Avatar, Library)
3. Detection mechanism: call over_age(Student_Avatar) when Student_Avatar enters Library
4. Sanction: decrease_reputation(Student_Avatar); notify avatar
5. Repair: log and roll back if applicable

3.3 Values Protected by VirtualLife Law and the Law of Avatars

VirtualLife laws – like laws in general – identify purposes and protected values. These are the values of a Virtual Nation (VN). The values shall be enforced by code – a set of technologically implemented rules and laws.

The purpose of a virtual nation is described at the beginning of the Virtual Nation's constitution. Examples of values, which are immanent in a real-world constitution of a state, are democracy, life, legal certainty, etc. In legal theory, norm is a basic element of the law. Values can be worded explicitly, but mainly they are implicit. For example, the Code of Conduct within the Supreme Constitution identifies equality (non-discrimination), avatars integrity, honor, reputation, privacy, free movement, freedom of thought, sanctity of property, etc. Such explicit representation contributes to detect violations of the Virtual Nation laws by the users.

We argue that the behavior of artificial agents (including avatars) shall be governed by law, too. We call this kind of ruling "virtual law". Thus the Ought to Be inworld

[6] Cf. footnote 4, p. 14.

reality is identified. An example of a rule is that an avatar is forbidden to harm (kill, hit, etc.) another avatar. Thus we approach a code of avatars [5].

4 Conclusions

We focus on two activities which are implied by the implementation of a legal framework. The first is the observance of the law by software users. This is a classical function of law as identified in legal theory. The second activity is the transformation of legal rules into machine code.

The latter is attributed to informatics. It contributes to the enforcement of avatars law. The editor of rules serves as a tool for human-driven translation. A human translator has to distinguish between the methods of law and informatics. Just to mention a few differences, they are the abstractness of legal norms, the open texture problem in law, methods of legal interpretation, legal teleology, and heuristics to invent low level concepts.

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References

1. Bench-Capon, T.: The Missing Link Revisited: the Role of Teleology in Representing Legal Argument. Artificial Intelligence and Law 10(1-3), 79–94 (2002)
2. Bogdanov, D., Crispino, M.V., Čyras, V., Glass, K., Lapin, K., Panebarco, M., Todesco, G.M., Zuliani, F.: VirtualLife Virtual World Platform: Peer-to-Peer, Security and Rule of Law. In: eBook Proceedings of 2009 NEM Summit Towards Future Media Internet, Saint-Malo, France, September 28-30, pp. 124–129. Eurescom GmbH (2009)
3. Brachman, R., Levesque, H.: Knowledge Representation and Reasoning. The Morgan Kaufmann Series in Artificial Intelligence, San Francisco (2004)
4. Čyras, V., Lapin, K.: Learning Support and Legally Ruled Collaboration in the VirtualLife Virtual World Platform. In: Grundspenkis, J., Kirikova, M., Manolopoulos, Y., Novickis, L. (eds.) Advances in Databases and Information Systems, Associated Workshops and Doctoral Consortium of the 13th East-European Conference, ADBIS 2009, Riga, Latvia, September 7-10 (2009) (in press)
5. Koster, R.A.: Declaration of the Rights of Avatars (2000), `http://www.raphkoster.com/gaming/playerrights.shtml`
6. Lessig, L.: Code version 2.0. Basic Books, New York (2006)
7. Pattaro, E.: The Law and the Right: A Reappraisal of the Reality that Ought to Be. A Treatise of Legal Philosophy and General Jurisprudence, vol. 1. Springer, Heidelberg (2007)
8. Spindler, G., Anton, K., Wehage, J.: Overview of the Legal Issues in Virtual Worlds. In: Proceedings of the First International Conference on User-Centric Media, UCMedia 2009, Venice, December 9-11 (2009)
9. Vázquez-Salceda, J., Aldewereld, H., Grossi, D., Dignum, F.: From Human Regulations to Regulated Software Agents Behavior. Connecting the Abstract Declarative Norms with the Concrete Operational Implementation. Artificial Intelligence and Law 16(1), 73–87 (2008)