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Publication Trail and Update Rules

The Electronic News Journals (ENJ) are a medium for exchange of scientific information and debate. In particular, they serve as the forum where articles received by the ETAI (Electronic Transactions on Artificial Intelligence) are discussed publicly for review, in separate News Journals for each ETAI area.

The Electronic News Journal on Reasoning about Actions and Change (ENRAC), in particular, uses a publication trail where contributed information is first distributed on a daily basis as *Newsletters* using electronic mail and web pages in HTML. Then, contributions during the same month are compiled into an HTML version of the monthly *News Journal*. Finally, the same information is converted via Latex to a postscript version that is suitable for printing on paper and reading off-line. It is formally published and archived by the Linköping University Electronic Press in both its electronic and its paper form, as described on page (iv).

Offprints of individual segments. Each News Journal issue consists of a sequence of *segments* relating to specific topics. "Offprints" of these can be obtained from the URL:s indicated at the head of the first page of each segment. It is intended to maintain these URL:s and their contents for the foreseeable future. Misprints of minor significance are corrected in these offprints (but not in the E-Press version since it is considered archival).

Corresponding HTML edition with dynamic links. The HTML edition contains considerable numbers of links to other pages and structures on the net: articles that are available on-line, home pages of conferences and of individual researchers, links to other part of the ETAI structure, and so on. Due to the natural limitations of the paper medium, only some of the WWW links have been retained here as footnotes. In order to retrieve articles and other information that are referenced in the present issue, it is recommended to look up the corresponding issue in HTML and to use its link. The HTML issues of the News Journals on Reasoning about Actions and Change can be found at the following URL:

`http://www.ida.liu.se/ext/etai/actions/njl/`

It is intended that the HTML issues will by updated continously to the largest extent possible, for example by replacing URL links to the home pages of authors that have changed to another site.

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Dates of Publication

Since the date of publication may be understood either as the date of first public appearance, or as the day of reproduction on paper in many copies, and since both of these definitions may be difficult to apply in the case of electronic publication, we make the following clarifying statement.

The contents of the present issue were put on-line in their original, HTML version during the month of March, 1998. Then the contents were edited and formatted, resulting in the present, formatted version which was published on June 10, 1998, in two concurrent editions: an on-line edition and a paper edition. The on-line edition was timestamped electronically and put on-line by Linköping University Electronic Press at the URL specified on page (i). The paper edition was obtained by printing the on-line edition on a standard computer printer. It was reproduced in 200 copies, legally archived, and made available for distribution.

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http://www.ida.liu.se/ext/etai/actions/nj/9803/

The Month of March

Summary of News Journal Contents

The discussion about articles at the Commonsense workshop was lively during the previous month, February, and it addressed quite a number of workshop articles. During March, the discussion has concentrated on the **ontology of time**, that is, what structure does one wish to assume for time in a commonsense theory and/or for reasoning about actions and change? The present News Journal Issue is dominated by this topic. In addition, we have continued discussion about one ETAI submitted article (by Kakas and Miller), and about a few of the workshop articles.

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http://www.ida.liu.se/ext/etai/received/actions/003/

Protocol of continued on-line discussion during March, 1998
about the following research article:

Antonis Kakas and Rob Miller:

Reasoning about Actions, Narratives and Ramification

Q5. **François Lévy** (4.3)

Dear Antonis and Rob

Here are two late questions about your paper.

First, according to your view of ramifications, fluents can be initiated/terminated in two ways: either when an event occurs, or due to changing fluents in a constraint. The formal difference is that a fluent changing its value is not by itself an event. Do you consider it to rely on an ontological difference – i.e. in the process of modeling the real world, two kinds of objects of different nature have to be considered : events on the one side, (instantly) changing fluents on the other one. Or do you consider both similar, and make a difference on a purely technical ground (triggered events don't work to render this if the time line is dense)?

Second, as far as I understand, your predicate 'Whenever' embeds both a domain constraint and a notion of influence, in Michael Thielscher's sense in his AI97 paper. The domain constraint is what you call the static view – i.e. 'Whenever' being replaced by a material implication. The influence information is: in the formula L Whenever C, only L can be initiated, so one domain constraint yields as many 'Whenever' formulas as fluents can be influenced in it. But Thielscher's *Influence* predicate is binary, and of course his cause –> effect propagation is a different technique. I tried shortly some example, and couldn't find a difference in the flow of causality. Do you agree with these remarks? And do you believe that some formal correspondence could be established between your two formalisms?

Best Regards
François

A5. **The Authors** (31.3)

Dear François,

Thanks again for your questions.

> *First, according to your view of ramifications, fluents can be initiated/terminated in two ways: either when an event occurs, or due to changing fluents in a constraint. The formal difference is that a fluent*

changing its value is not by itself an event. Do you consider it to rely on an ontological difference – i.e. in the process of modeling the real world, two kinds of objects of different nature have to be considered: events on the one side, (instantly) changing fluents on the other one. Or do you consider both similar, and make a difference on a purely technical ground (triggered events don't work to render this if the time line is dense)?

In answer to your first question: we do have an ontological difference between actions and fluents, but we don't make a distinction between different types of fluent. For example, a fluent can be terminated both 'directly' via a c-proposition and 'indirectly' via an r-proposition (e.g. 'Switch2' in the electric circuit example.) The essential point is that all fluents are only initiated via initiation points and only terminated via termination points, and that all initiation and termination points are characterised by a (relevant) action occurrence (i.e. an event). In other words, in our framework all changes in fluent values have as their root cause an event (or a set of concurrent events). Both the types of change identified above are 'direct' in the sense that the effect of the corresponding event is 'instantaneous' (where 'instantaneous' has a slightly different interpretation for discrete time than for dense or continuous time).

So the choice of whether to use r-propositions as well as c-propositions when modelling a particular domain is partly pragmatic.

$$\neg Switch2 \ \mathsf{whenever}\ \{Relay\}$$

can be read as "all the events which initiate *Relay* also terminate *Switch*2". The use of this r-proposition thus enables us to avoid writing a whole series of terminates propositions for Switch2 corresponding to each of the initiates propositions for Relay.

But there are other advantages in using r-propositions, as identified in the paper. Not least, it helps with succinctly and correctly capturing the effects of concurrent events. For example, the concurrent 'stuffy room' example in the paper is difficult to describe in $\mathcal{E}$ without r-propositions, and difficult to describe in conventional Event Calculus (at least without making some sort of distinction between 'frame' and 'non-frame' fluents).

Second, as far as I understand, your predicate 'Whenever' embeds both a domain constraint and a notion of influence, in Michael Thielscher's sense in his AI97 paper. The domain constraint is what you call the static view – i.e. 'Whenever' being replaced by a material implication. The influence information is: in the formula `L Whenever C`*, only* `L` *can be initiated, so one domain constraint yields as many* `Whenever` *formulas as fluents can be influenced in it. But Thielscher's Influence predicate is binary, and of course his cause $\rightarrow$ effect propagation is a different technique. I tried shortly some example, and could'nt find a difference in the flow of causality. Do you agree with these remarks ? And do you believe that some formal correspondance could be established between your two formalisms ?*

In answer to your second question: yes, we broadly agree with these remarks, in that r-propositions act both as static domain constraints and as unidirectional propagators of change. You're right as well with your observation that one domain constraint can yield a number of r-propositions. For example, a definitional domain constraint such as

$$Alive \leftrightarrow \neg Dead$$

would be represented with the r-propositions

$Alive$ whenever $\{\neg Dead\}$
$\neg Alive$ whenever $\{Dead\}$
$Dead$ whenever $\{\neg Alive\}$
$\neg Dead$ whenever $\{Alive\}$

However, we feel that it would be difficult to establish a formal correspondence between our approach to ramifications and Michael Thielscher's, for the reasons outlined in our discussion section. There seems to be a difference in the approaches in that Michael's effect propagation is 'approximately' instantaneous, whereas ours is 'truly' instantaneous (this is not to say that either is right or wrong - just that they're modelling slightly different concepts). This difference manifests itself in domains such as Michael's 'light detector' example (see Section 5 of his AI97 paper). We'd model the introduction of the detector with the single r-proposition

$Detect$ whenever $\{Light\}$

But we wouldn't get the same 'non-deterministic' behaviour of the detector that Michael gets - i.e. we wouldn't get the model in which the detector is activated when $Switch1$ is connected. Indeed, this model wouldn't make sense in a narrative-based formalism with explicit time - the detector would have been activated even though there was no time-point at which the light was on. (Michael expands on the theme of 'approximately' verses 'truly' instantaneous effects in his related paper in the proceedings of Common Sense '98.)

Tony and Rob.