Extended Concept for Meaning Based Inferences - Part 2
Version 2
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Gerd Doeben-Henisch
gerd@doeben-henisch

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Abstract

This text is a modification of version 1 of the paper entitled 'Extended Concept for Meaning Based Inferences - Part 2. Version 1' from September 1, 2020[1]. With this last post it became clear that there is an even more general scope behind these examples than understood before. In this text I try to outline this more general scope a little bit more. It can be that the future will shed even more light on this.

1 Transition Logic

Figure 1 gives an overview of the change rules X in relation to the assumed fulfilling world given as a state S. This is in congruence to what has been said before: an IF-expression will be checked of being satisfied (fulfilled) by the given world S and then some changes can happen.

The final effect of the changes is still given as a set of expressions E^- which shall be *removed* from the actual world S and those expressions E^+ which shall be *added* to the actual world S. Thus the transition from an actual world S to a *follow-up* world S' generated by some *causes* C will be manifested in a change in the describing *facts* F which constitute a *state* S, here the transition is given with the schema:

$$S' \quad = (S - E^-) \cup E^+ \tag{1}$$

[1]See: https://www.uffmm.org/2020/09/01/extended-concept-for-meaning-based-inferences-part-2-version

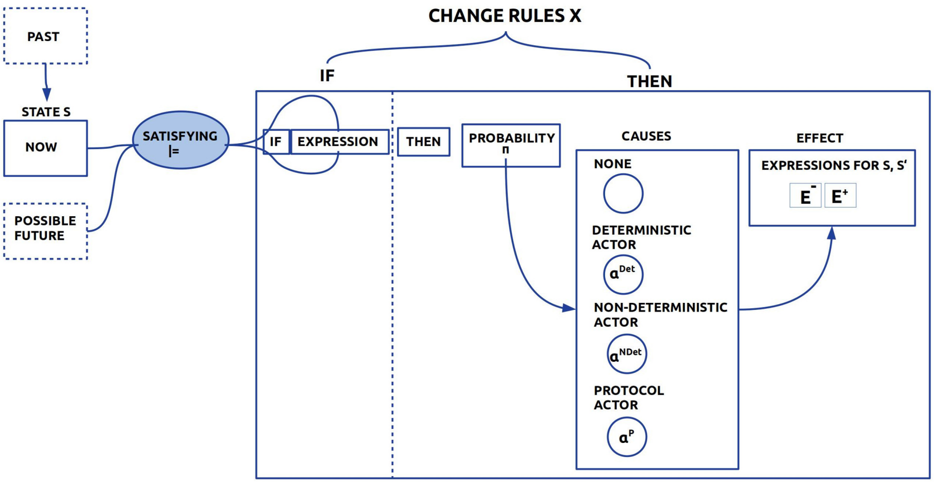

Figure 1: Change rules as societal rules of doing societal life.

1.1 Past, Now, and the Future

The *standard world* is assumed to be given as the set of facts forming the state S. The standard world is assumed to represent the 'Now', the present state. The *actual* world S is assumed to be the result of some *history* constituting the *past world* $S^{-} = \langle S^{-}_{-1}, S^{-}_{-2}, ..., S^{-}_{-n,...} \rangle$ understood as a series of states being to each other either predecessor or successor. Thus knowledge about the past world can shed some light on the actual state. Possible *future worlds* S^{+} are only given as abstract cognitive models of thinking, manifested as symbolic structures.

1.2 Conditional Expressions

The set of expressions which are constituting the IF-part – here called a *condition-expression* – have to be *valid*, have to become *satisfied*, have to be *fulfilled* by the facts of the state S. The IF-part of a change rule can contain more than one condition expression Φ, either as a *disjunction* written as $\Phi_1 \vee ... \vee \Phi_n$ or as a *conjunction* written as $\Phi_1 \wedge ... \wedge \Phi_n$. The disjunction is satisfied only if *at least one* of the condition expressions Φ_i is satisfied and the conjunction is satisfied when *all* condition expressions together are satisfied.

A condition expression can either be fulfilled by an *actual fact* from S or perhaps by some *future fact* in some future world S^{+}, but nobody really knows whether this will indeed happen. Thus as long as there is no actual fact available to fulfill a condition expression no satisfaction will become real.

1.3 Probabilities

If some condition expressions have been satisfied which control the execution of an effect $\{E^-, E^+\}$ then there exists always some probability π that this effect will occur.

1.4 Different Causes

1. **No Cause:** The occurrence of effects can be described *immediately*, without mentioning an explicit source of causes (cf. example No.1).
2. **Deterministic Actor:** There exists a determined process which – if triggered in the right way – will respond in a defined way (cf. part two of example No.2).
3. **Non-Deterministic Actor:** There exists a non-deterministic actor in the actual state which can react to the situation by causing some effect (cf. part one of example No.2).
4. **Protocol Actor:** A protocol actor is an *association* of at least two actors which have made an *agreement* to follow a defined *protocol* to reach together a certain *goal* (cf. example 3).
5. **Others:** Highly probably there exist other types of causes which should be incorporated in this list of possible causes.

2 Social Computing?

After this further reflection about our *state-changing paradigm* by using the knowledge of human actors with the goal to *improve this knowledge* within a *social dimension* it arises a picture of the *social* which is acting in a *social manner* to share and develop its *social knowledge* to improve the *social*. To name this process *social computing* would not be an adequate characterization if one would follow the direction of the encyclopedia of human computer interaction [HCI].[2]

Although in this case too the computer technology with the internet can support this kind of social computation but the main goal in the above paradigm is the enabling of social communication between all participants using explicitly their knowledge, their feelings, and their preferences to show each other what someone thinks and how one could improve a situation seen with the eyes off

[2] see: `https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/social-computing`

all participants.

Here is space for many more thoughts about the subject.

3 Examples

3.1 Example 1

S={A house is burning in the city AAA}.
X=IF {A house is burning in the city AAA} THEN $\pi = 0.9$: E^{+}={The fire brigade is coming immediately}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {The fire brigade is coming immediately}

3.2 Example 2

In this example we have in the first part of the example a non-deterministic actor α^{NDet} with name 'Peter' which does some action and thereby he is changing the situation:
S={The room is dark. Peter is in the room}.
X=IF {The room is dark & Peter is in the room} THEN $\pi = 0.9$: α^{NDet}(S) *causes* E^{+}= {Peter pushes the light-button}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {Peter pushes the light-button}

S takes S'.

In the second part of the example the change caused by Peter triggers a deterministic actor α^{Det} which is given by the light-electricity of the room: pushing the light-button turns the light on:

S={The room is dark. Peter is in the room. Peter pushes the light-button}.
X=IF {Peter pushes the light-button} THEN $\pi = 1$: α^{Det}(Peter pushes the light-button) E^{-} = {The room is dark}, E^{+}= {The light is on}.
S'=S - $E^{-} \cup E^{+}$
S'=(S - {The room is dark}) $\cup$ {The light is on}
S'={Peter is in the room. The light is on.}.

3.3 Example 3

Protocol actors are a very common phenomenon of everyday life, from very simple until extremely complex. A simple protocol actor would be a *buyer-*

actor: Peter wants to buy some bread in a bakery. There exists a convention which functions as a protocol that goes as follows (typically, no natural law):

1. You enter a bakery.
2. You say what you want to buy.
3. The wanted object will be collected.
4. You have to pay the prize.
5. The object will be handed out to you.
6. You are leaving the bakery.

This could be organized as follows:

S={Peter wants to buy bread. There is a bakery. }.
X=IF {Peter wants to buy bread & There is a bakery} THEN $\pi = 0.9$: α_{Peter}^{Det}(Peter wants to buy bread. There is a bakery.), ACTION={Peter enters the bakery} , EFFECT=E^{+}= {Peter is in the bakery}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {Peter is in the bakery}
S'={Peter wants to buy bread. There is a bakery. Peter is in the bakery.}.

S takes S'.

From the moment when Peter entered the bakery one has to assume by convention (here now interpreted as protocol) that Peter as well as the service of the bakery *know about the protocol* and that Peter as well as the service keeps this protocol like a list of ToDos which have to be serviced. It could be a *good practice* to have *written texts* which describe a *protocol* P and that every time, when two or more persons start to act according to a protocol this *protocol text* D_P could be attached to the state as part of the state description. More *official* protocols exist if there are institutions like *schools*, *state agencies*, or special legal formats of companies, which are notarized.

S={Peter wants to buy bread. There is a bakery. Peter is in the bakery }.
X=IF {Peter wants to buy bread & Peter is in the bakery} THEN $\pi = 0.9$: α_{Peter}^{Det}(Peter wants to buy bread & Peter is in the bakery), ACTION={Peter talks to the service} , EFFECT=E^{+}= {Peter has ordered a bread}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {Peter has ordered a bread}
S'={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread}.

S takes S'.

S={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread}.
X=IF {X is in the bakery & X has ordered a bread} THEN $\pi = 0.9$: $\alpha^{Det}_{Service}$(X is in the bakery & X has ordered a bread), ACTION={The Service collects a bread} , EFFECT=E^{+}= {A bread has been collected}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {A bread has been collected}
S'={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread. A bread has been collected}.

S takes S'.

S={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread. A bread has been collected}.
X=IF {A bread has been collected & Peter has ordered a bread} THEN $\pi = 0.9$: α^{Det}_{Peter}(A bread has been collected & Peter has ordered a bread), ACTION={Peter pays the bread} , EFFECT=E^{+}= {The bread has been payed}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {The bread has been payed}
S'={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread. A bread has been collected. The bread has been payed}.

S takes S'.

S={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread. A bread has been collected. The bread has been payed}.
X=IF {The bread has been payed} THEN $\pi = 0.9$: $\alpha^{Det}_{Service}$(The bread has been payed), ACTION={The bread is handed out} , EFFECT=E^{+}= {The bread has been handed out}.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ {The bread has been handed out}
S'={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread. A bread has been collected. The bread has been payed. The bread has been handed out}.

S takes S'.

S={Peter wants to buy bread. There is a bakery. Peter is in the bakery. Peter has ordered a bread. A bread has been collected. The bread has been payed. The bread has been handed out}.
X=IF {The bread has been handed out} THEN $\pi = 0.9$: α^{Det}_{Peter}(The bread has

been handed out), ACTION=$\{$Peter left the bakery$\}$, EFFECT=E^{-}= $\{$Peter wants to buy bread. Peter is in the bakery$\}$, E^{+}= $\{$Peter is on the street$\}$.
S'=S - $E^{-} \cup E^{+}$
S'=S $\cup$ $\{$Peter is on the street$\}$
S'=$\{$There is a bakery. Peter has ordered a bread. A bread has been collected. The bread has been payed. The bread has been handed out. Peter is on the street$\}$.