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Towards Systems Using WWW to Presume What Could and Would Have Happened

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Given the opportunity to present our common sense retrieval research experiences to the participants of "Computing Meaning and Understanding" organized session, we will introduce the theoretical side underlining the need of machines which are able to predict human's behavior. By giving the real life applications the ability to guess user's or actor's previous or following actions we plan to widen the range of their applicability. In our presentation we will explain our latest achievements on this field and describe the problems while developing Web-based common sense retrieval algorithms.

1. Introduction

In our opinion the Internet expansion brought us even more revolutionary possibilities than we usually suppose it did. Thanks to the "wisdom of crowd"[1], programmers do not have to decide for their programs behaviors anymore. Programs we cannot fully control might sound scary but a very new dimension opens to the computer scientists. We have more and more data to use - not only for enriching our knowledge but also to build a machine knowledge. There is a very new chance for already existing well-elaborated ideas [2][3][4] or newer as [5][6] to give only a few and their comeback is being noticed in many current systems and approaches as [7][8] or our own [9] and [10]. In our previous presentations during organized sessions titled "Everyday Language Computing", we brought to the light our two ideas related to using the crowd wisdom of Internet users - average personality[11] and associations[12]. This time we participate in "Meaning and Understanding Computing" organized session to show the community how important for us, and probably for most applications needing to understand a meaning, is the ability for guessing the correct sequence of events. We also briefly mention the possible usage of these ideas in newly-born field of Machine Ethics.

2. Theoretical Basis

The Web Intelligence movement [13] is one of the most vital fields of Computers Science although it is not widely used for common sense processing - unknown (uncommon) knowledge is what usually researchers seek. There are several projects on collecting common sense - like the most famous CyC[14] or MIT's OpenMind CommonSense[15]. However, their manual methods are limited. For that reason we started our research in order to gather and process everyday knowledge in fully automatic manner. Basically we are trying to observe children while achieving such knowledge and then implement the ideas from observations. But the point for us is not to make a machine reasoning like human but a machine which is able to analyze human's reasoning. In short, a machine should know what will be the user's next step or what kind of event brought hum/her to the current state. Then it must presume if this state is positive or not in order to operate or withhold from operating.

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3. Methods

3.1 Schankian Scripts Retrieval

We use works of [3] to retrieve and calculate common behavior patterns [10] which combined with Positiveness calculation give the system information about what consequences will a given action bring. For example stealing, raping and killing are measured by the Positiveness but neutral escaping becomes negative while inside of "robbery script".

3.2 Causal Rules Retrieval

This works on the same basis as Scripts Retrieval but uses several Japanese "if" forms which have abilities to categorize causal dependencies[17]. In this case Usualness of single happenings becomes more important - if a Script cannot be created, it can be made from single causalities generalized semantically with Backward Categorizing.

3.3 Affective Processing

There is a need to distinguish pleasant and unpleasant event in our theory. In our research we base on usual methods [16] for retrieving opinions but reconstructed to work on common expressions or words, not the name entities as in current applications. We measure which event or action is positive or negative calculating Web concurrencies [9] of affect expressions.

4. Where to Implement?

This year we want to combine our methods developed so far and test them by simulating a closed-environment robot. In the first stage the safety calculations will be checked when user is not at home. The goal will be to discover the meanings of actions or states and react properly. At this

point we expect an enormous amount of new problems and probably not less failures due to new circumstances.

4.1 Closed Environment vs. Real World

As we can see almost every day, lots of happenings around us are unpredictable. But we do not want machines which react unpredictable for such happenings. We claim that if robots learn, as children, in closed environments first, if their processing of "smaller accidents" is well evaluated (although learning, feedback and evaluation processes were not mentioned here, they may become very important depending on the machine's purpose), we could count on their ability for creating analogies. But another question is - do we want machines to decide for ourselves where we are not at home just because they are able to create analogies? Our methods eliminate bigger scale problem analysis in most cases naturally. There is much information on the Web about what to do when one cuts his/her finger but also what to do in order to kill someone. In such cases the negative result must stop a machine from performing an action.

5. Conclusions

We plan to make a machine learn to chose actions in a similar way as most people of given culture would usually do without deeper analysis of the philosophy underneath. Most of us do not decide to steal to reach some goal or put the tooth-paste on our breads. Sometimes the answer why we do not do it is difficult even for human and this is also a reason why we usually do not try to answer such questions. If we presume that our lives are a constant struggle between emotions and common sense, a struggle which keeps our "life balance", a robot surely must be programmed to preserve it. During the session we would like to trigger a discussion about pros and cons of "democracy-depended algorithms" for better understanding of such "social meanings".

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