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6.UAP Project Proposal: Integrating Genesis With Open Mind

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The Genesis system represents an effort to create artificial intelligence by focusing on the deep interaction between vision and language in human intelligence. We now understand that language goes beyond communication and plays a significant role in the direction of perception and thinking ^[1]. The focus of this project is on the Genesis/Language side, where the system processes English stories with a small set of provided English rules in an attempt to develop higher levels of understanding. For example, Genesis/Language can find instances of revenge in Macbeth with the following reflective knowledge rule: “xx’s harming yy leads to yy’s harming xx” ^[2]. The system currently contains a small number of hardcoded “common sense” rules, which only represent a small fraction of what humans probably understand as common sense. The purpose of this project is to expand the set of common sense rules available to Genesis by using data collected over a long period of time by the Open Mind group.

The Open Mind Indoor Common Sense database contains information gathered through the internet by the Open Mind group ^[3]. The SQL database made available to artificial intelligence researchers contains forty-eight tables of data; preliminary scanning of the kind of data in each table has yielded eleven tables which contain data potentially useful to the Genesis system. The data represents human completions of statements that encapsulate some piece of common sense knowledge. For example, one set of prompts corresponding to the *:locations* table of the database could have been: “In *:room*, one expects to find *:object*.” The *:locations* table

contains just under six thousand (*:room*, *:object*) pairs from these statements. For more specific information on the eleven potentially useful tables, an informative summary sheet is attached.

Upon completion of the project goals, the Genesis system will have access to thousands of English rules generated from the Open Mind data via a SQL server hosted somewhere in CSAIL. The generation of English statements from target words contained in the Open Mind database will leverage Professor Winston's extensions to the Genesis system that make use of the START Generator. The linguistic structure of the rules will be different for each table, but the specific structures have yet to be determined. The best structures should correctly encapsulate as many table entries as possible, without adding complexity that the Genesis system will have trouble comprehending. We anticipate that the SQL server of English rules will be deployed in about a month, including a set of tools in Genesis to re-generate these rules if demands change in the future.

The natural extension to this project is modifying the Genesis system to actually apply and use these rules in story processing scenarios. The current state of the story processing code appears to scale poorly with respect to available rules. As Professor Winston bluntly stated, we expect the addition of thousands of rules to "bring Genesis to its knees." Several long-standing parts of the Genesis system may require a complete overhaul to make use of the new rules. Not much else is known about this stage of the project, but this could require the remainder of the semester to complete.

Once the Genesis system can make use of the new rules, we expect the capabilities of the system to noticeably increase. The story processing abilities of the system should instantly benefit from new common sense knowledge, and over time, we expect Genesis/Vision to benefit from the increased language abilities as well.

References

- [1] : Winston, Patrick. *Genesis White Paper: S3, Taking Intelligence To The Next, Much Higher, Level.* <http://courses.csail.mit.edu/6.803/pdf/whitepaper.pdf>
- [2] : Genesis Source Code. *File: source/stories/macbeth-reflective-knowledge.txt*
- [3] : Open Mind: Indoor Common Sense. <http://openmind.hri-us.com/>