

Live EHCPRs System

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Abstract

A thinking machine is a system that perceives its environment, learns from it, and interacts with it intelligently as per the requirement in the prevailing situation. Knowledge representation in the EHCPRs system by employing multi encryption will enhance its learning; give better understanding, imagination and feel of real world objects and concepts that would be encapsulated in multi lingual textual and audio encryption along with its suitable pictures and videos in the data base. In the beginning, implemented system (www.live-ehcprs-system.com) employs multilingual textual encryption of a concept or word in three languages; English, French and Hindi.

Keywords: Thinking Machine, Globalization, EHCPRs System, Intelligent agent, Localization

1. Introduction

A thinking machine is an information processing system which houses an intricate interlaced knowledge processing network with certain hierarchy of knowledge in a fixed region of memory made available on single server or globally spread memory set of N servers. The important characteristics of a thinking machine include traits such as reasoning, knowledge representation, planning, learning, perception, communication, movement and manipulation of objects. The bottle neck problem to all this is requirement of devising a generalized knowledge representation scheme which can also facilitate designing of a general procedure for multilingual context sensitive user interface, along with various general programs for top down and bottom up reasoning and efficient programs for all possible learning methods. The problem of representation for natural kinds and default reasoning, reasoning with incomplete and imprecise information and rules with exceptions and hierarchy is shown to be handled to great extent by employing

“Extended Hierarchical Censored Production Rules (EHCPRs)” in EHCPRs based multilingual context sensitive thinking machine [15].

2. EHCPRs System

The Extended Hierarchical Censored Production Rules (EHCPRs) System is presented here as an underlying generalised representational methodology in implementation of an online live multilingual thinking machine. An EHCPR is implemented with the help of extensive set of predefined pointers (like dendrites in a neuron) which would span a huge but efficient multilingual hierarchical network of knowledge structure. The EHCPRs System is presented live at www.live-ehcprs-system.com with multilingual and multi-encrypted representation and storage at word level to begin with and information retrieval with variable precision in varied context. Block diagram of the EHCPRs System showing its functional components to exhibit the capability as an Artificial Intelligent agent is shown in Figure 1.

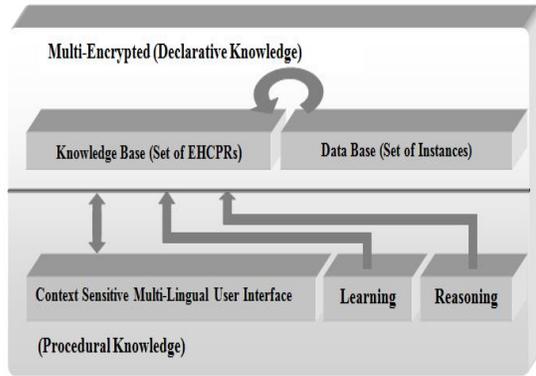


Figure 1: Block diagram of EHCPRs system

With the inclusion of new operators, the HCPR system[1] has been extended further with the name Extended Hierarchical Censored Production Rules (EHCPRs) System [5]. The EHCPRs System is an intelligent system which employs an EHCPR as a unit of knowledge for representing any possible concept or object in this world. Knowledge acquisition and extraction [4] [5] [7] [15] with different types of learning techniques are explained in [6] [13] [14]. EHCPRs system working in multilingual domain is exhibited in [6] [11]. System efficiency to work in different locales with different languages is exhibited in [11]. EHCPRs System exhibits efficiency to work with all possible logical reasoning [15] [10] [9] [8] [7].

3. EHCPR Representation

The Multi-Encrypted EHCPR structure will take the following form:

A [TE, PE, AE, VE]	{decision/concept/object} /*As Head of rule with all encryptions*/
If B[b1, b2, ..., bm]	{preconditions (AND conditions)}
Unless C[c1, c2, ..., cn]	{censor conditions (OR conditions)}
Generality G	{general concept}
Specificity S[a1,a2, ..., ak]	{specific concepts} /*mutually exclusive set*/
Has-Part [Part_Concept1:(Default),(Constraints), Part_Concept2:(Default),(Constraints),..., Part_Conceptp:(Default),(Constraints)]	{Characteristic properties}
Has-Property [Property_Concept1:(Default),	{Characteristic properties}

(Constraints),	
Property_Concept2: (Default),	
(Constraints),,	
Property_Conceptq: (Default),(Constraints)]	
Has_Instance [...]	{instances}
γ, δ (1)

Each concept represented as an EHCPR can have various instances and all instances of EHCPRs are represented uniformly through the same general form given below (3):

- Head /* particular instance of a concept / name of individual object*/
- Instance-of (a general concept)
- Has-Part (set of actual known parts)
- Has-Property (set of known true properties)
- (3)

Here, Head is the name of the instance. Instance-of is having the name of the concept, of which Head is an instance.

4. Reasoning

This EHCPRs System exhibits efficiency to work with all possible logical reasoning. Various forms of logic, viz., Default Logic, Non-monotonic logic[2], Variable Precision Logic and Context sensitive logic have been employed in the EHCPRs system[9][10]. Strength of implication of relationships between preconditions and conclusion in the presence of censors is described in [1]. Extraction of knowledge from different knowledge bases in different knowledge schemes [3] and use of different encryptions[4] to use all the existing medias of concept description have been done.

5. Learning

The ability to learn is acquiring new knowledge, behaviours, skills, values, understanding, and may involve synthesizing different types of information. Information collection, knowledge filtration and reorganization of collected knowledge without losing context are the major standards of learning. This thinking machine starts with initial knowledge given to it to adapt further. This supervised learning prepares system/machine to learn now whatever knowledge comes to it whether it is procedural or declarative. Suitability of an intelligent system for all

knowledge workers can only be decided by the environment provided by the system to the knowledge workers.

“The best learning approaches use all the senses to adapt any concept” Imagination uses all senses to adapt any concept. For EHCPRs system learning happens both ways i.e. supervised and unsupervised learning. Efforts are to make EHCPRs system independent to learn using data mining, text mining and web mining techniques i.e. the learning and translation procedure need to be automated by combining some language technologies like information retrieval, summarization, information extraction, machine translation, and language generation. To achieve above said goals extracting EHCPRs from production rules, censored production rules, Semantic Network, Frames, Hierarchical Production rules and from Hierarchical Censored Production rules is the major area to work. initially we consider predicates logic, Semantic Network, frames and production rules(apart from EHCPRs) as our preliminary knowledge banks(PKB), it may be n number of knowledge banks as scripts, fuzzy logic based, NN based, evolutionary based etc. based on different KRs. So the system must be able to extract knowledge, adapt it and reaffirmation of repeated knowledge automatically boost the knowledge in terms of strength factor as gamma, delta, etc. this knowledge extraction is of two- step process: a) from external sources to our PKBs and b) from these configured files to our system KBs. The EHCPRs System’s knowledge base serves as a top level ontology and describes very abstract and general concepts that can be shared across many domains and applications.

Concepts existence is common to all locales, context sensitivity can also be defined for all locales. One thing that makes difference is language to a particular locale. Text encryption and audio encryption get changed while picture encryption and video (not all the time) get changed.

- a) Automatic extraction of various concepts works when a particular concept is generated. A Concept in this context may be defined as anything which is capable of holding any information from which knowledge can be extracted and correlated with other concepts in the domain. So we can conclude here that every piece of

knowledge about particular concept is a concept as well. Practically it means each set of operator’s attributes that are possessing information in the EHCPR structure are further treated as a new concept by the system if they are not existing already. While feeding knowledge about a particular concept in the knowledge base, we are actually discovering a number of new concepts resulting in cloud of concepts. Let us explore furthermore our example of Bird.

- b) Since instances are represented as individual object/ occurrences of the concept. Instances of any concept will be stored in database but other than textual encryption will also enrich the existing data base automatically as it works for the concept as it is.
- c) The whole knowledge base is giving access to existing knowledge in hierarchical network structure. Using generality and specificity operators with graphical tools system will be able to portray complete knowledge in the said structure.



Figure 2: End user searched concept view

6. Future Research

Live EHCPRs system is managing knowledge base of concepts with the basic nuclear unit of a character.

Currently, globalization is being done in the EHCPRs System, i.e., the text encryption of any concept changes on change of locale and rest all encryptions remain same. With the change of language/locale, change in other encryptions need to be done as future work. Future work also need to be done for automatic translation of any EHCPR in other languages from online dictionaries available.

Conclusion

An EHCPR is suggested as a unit of generalized knowledge representation in an online working EHCPRs System as a prototype of live thinking machine at present. There is lots of scope for improvement in the implemented system made available online. The user interface and reasoning is required to be variable in various terms with varied context of the background and history of the user. Similarly it would be make to sense the time, language preferences, colours, location, etc., automatically and give suggestion without explicitly asking from the user for these details unless warranted. The efforts would be to grow the system in many more Indian and foreign languages and domain such as education, medical, agriculture, Global position finder and route or other suggestion thereof, weather forecast as par the location, web recommender system etc.

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