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AUTONOMIC COMPUTING SYSTEM WITH MESO TO SUPPORT ONLINE DECISION MAKING

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ABSTRACT

When we work hard, our hearts beat becomes faster. When we are hot, we sweat. The internal functions within our body regulate themselves. Correspondingly, won't we like to have systems that can heal themselves? The Autonomic computing systems must be able to detect and respond to changing conditions with little or no human intervention. The goal of autonomic computing is to create systems that can run themselves, capable of high-level functioning while keeping the system's complexity invisible to the user. So decision making is a critical issue in such systems, which must learn how and when to invoke corrective actions based on past experience. Successful autonomic systems will need to be self-configuring, self-optimizing, self-protecting, and self-healing. So we describes the design, implementation and Evaluation of MESO, a pattern classifier designed to support online, incremental learning and decision making in autonomic system. A novel feature of MESO is its use of small agglomerative clusters, called Like spheres, that aggregate similar training samples. Like spheres are partitioned into sets during the construction of a memory efficient hierarchical data structure. This structure facilitates data compression, which is important to many autonomic systems. MESO achieves high accuracy while enabling rapid incremental training and classification.

Keywords: MESO

INTRODUCTION

Increasingly, software needs to adapt to dynamic external conditions involving hardware components, network connections, and changes in the surrounding physical environment For example, to meet the needs of mobile users, software integrated into hand-held, portable and wearable computing devices must balance several conflicting concerns, including quality-of-service, security, energy consumption, and user preferences. The millions of business, billions of people that compose them, and trillions of devices on that they will depend upon. All require the services of IT industry to keep them running but the average complexity of system is

increasing day by day. Currently this complexity is managed by highly skilled humans but the demand for skilled IT personnel is already high, with labour costs exceeding equipment cost. It's a problem that is not going away but will grow exponentially.

So IBM's vice president of research, Paul Horne, introduced the idea to the National Academy of Engineers at Harvard University in March 2001.The solution is to build computer system that regulate themselves much in the same way our bodies autonomic nervous system.

2.1 Self-Configuration

Autonomic systems will configure themselves automatically in accordance with high-level policies representing business-level objectives. When a new component is introduced into an Autonomic accounting system, it will automatically learn about and take into account the composition and configuration of the system. It will register itself and its capabilities so that other components can either use it or modify their own behavior appropriately.

Regulate and protect our body, this new model of computing is called Autonomic computing. Actually the Autonomic computing is the approach to self managed computing system with minimum of human interference. Main characteristic of Autonomic computing are self configuration, self optimization, self healing, and self protection. It is the emerging area of study and grand challenge for the entire IT community. In recent years numerous advances have been made in software mechanism so, new approaches to decision making is needed to enable software to capture the relative importance of different inputs. When confronting a dynamic physical world, for systems to learn from past experience and remember effective responses to the sensed environment, they must be able to filter an enormous number of inputs that may affect the decision. Moreover, many systems must make decisions in real time to prevent damage or loss of service. We argue that perceptual memory, a type of long-term memory for remembering external stimulus patterns may offer a useful model for an important component of decision making.

2. CHARACTERISTICS OF AUTONOMIC COMPUTING

2.2 Self-Optimization

Autonomic systems will continually seek ways to improve their operation, identifying and seizing opportunities to make themselves more efficient in performance or in cost. They will proactively seek to upgrade their function by finding & verifying, and applying the latest update.

2.3 Self-Healing

Autonomic computing systems will detect, diagnose, and repair localized problems resulting from bugs or failures in software and hardware, perhaps through a regression tester. Using knowledge about the system configuration, a problem diagnosis component would analyze information from log files, possibly supplemented
with data from additional monitors that it has requested.

2.4 Self-Protection

Autonomic systems will be self-protecting in two senses. They will defend the system as a whole against large-scale, correlated problems arising from malicious attacks or cascading failures that remain uncorrected by self-healing measures. They also will anticipate problems based on early reports from sensors and take steps to avoid or mitigate them.

3. ARCHITECTURE OF AUTONOMIC COMPUTING

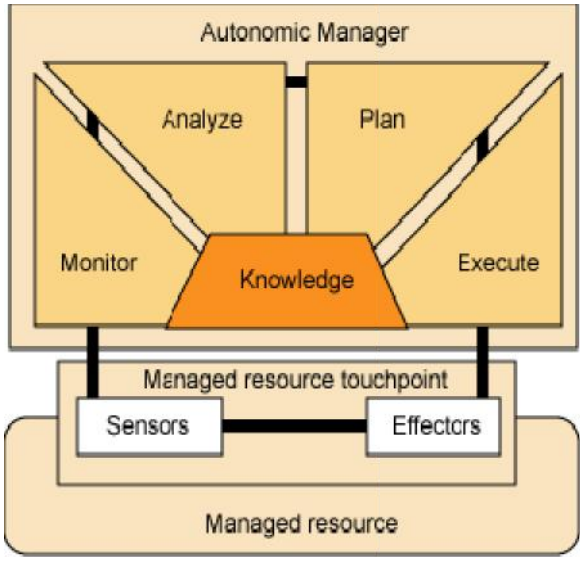

Fig 3. Architecture of Autonomic Computing System

Autonomic computing system uses control loop which is the process by which events can be detected and dealt with and This process involves five steps as follows.

3.1 Monitor:First, the system looks for the events, detected by the sensor from whatever source -- be it a log file or an in-memory process. The system uses the knowledge base to understand what it's looking at.

3.2 Analyze:
When an event occurs, the knowledge base contains information that helps to determine what to do about it.

3.3 Plan:
After the event is detected and analyzed, the system needs to determine what to do about it using the knowledge base. The symptom database might have information, or a central policy server might determine the action to take.

3.4 Execute:
When the plan has been formulated, it's the effectors that actually carry out the action, as specified in the existing knowledge base.

3.5 Knowledge :
In knowledge base we are storing resembling patterns in tree format .Each node of this tree is set of like spheres which are again divided at greater depths.

4 .OPERATION OF MESO

As shown in Fig. 4, two basic functions compose the operation of MESO: training and testing. During training, patterns are stored in perceptual memory, enabling the construction of an internal model of the training data. Each training sample is a pair (xi,yi) where xi is a vector of continuous, binary, or nominal values, and yi is an application specific data structure containing meta information associated with each pattern.

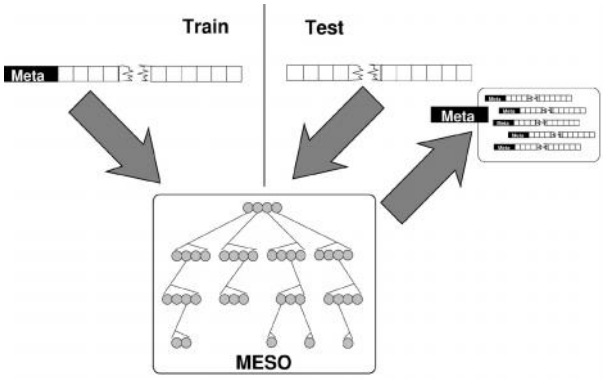

Fig.4. High Level View of MESO

Meta information can be any data that is important to a decision-making task, such as the codification of an adaptive action to be taken in response to certain environmental stimuli. For efficient retrieval. MESO tests the new pattern and returns either the metainformation associated with the most similar training pattern or a set of similar training patterns or their metainformation. In some domains, it may not be possible to collect a representative set of training samples a priori, so incremental learning is required.

5. WHAT IS LIKE SPHERE

To construct MESO we require Like spheres. A novel feature of MESO is its use of small agglomerative clusters, called Like spheres, that aggregate similar training patterns.

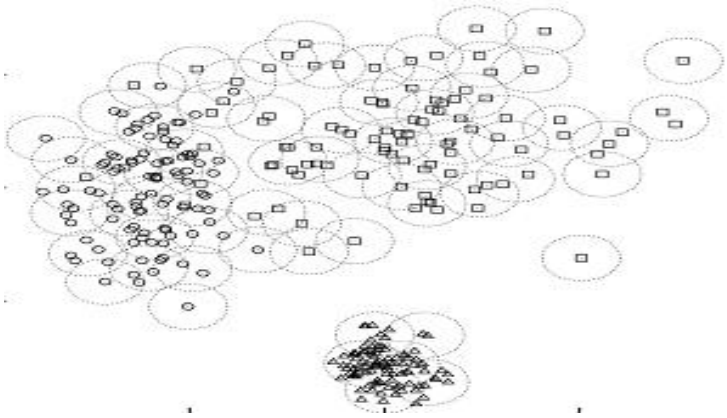

Fig 5 Like Spheres

6. MESO TREE STRUCTURE

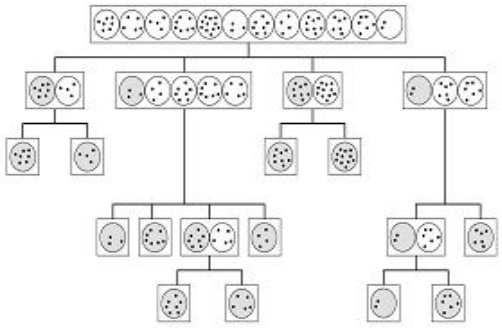

Fig. 6 MESO tree structure.

MESO uses a tree structure to organize training patterns for efficient retrieval. However, the MESO tree, depicted in Fig. 6, is novel in that its organization is based on Like spheres. This self organized tree is built starting with a root node, which comprises the set of all sensitivity spheres. The root node is then split into subsets of similar spheres which produce child nodes. Each child node is further split into subsets until each child contains only one sphere.

7. ADVANTAGES

1. It reduced the dependence on human intervention to maintain complex systems.
2. It reduced deployment and maintenance cost.
3. It provides Server consolidation to maximize system availability.
4. It allows most large Web Sites & corporate data centers for Accretion of server, and other technologies on different platform.
5. It Provide high productivity, Stability, security, fewer system errors

8. APPLICATIONS

1. IBM z Series server offer advanced Autonomic Computing feature as Intelligent Resource Director (IRD).
2. Server Load Balancing:
Process of distributing service request across group of server.
3. Automatic Updation of Software:
update application without having to stop system allow you to continue working during update.
4. Antilock Breaking System:
It uses electronic sensors and Solenoid valve in wheel which allow wheel to lock when car goes into skid and thus prevent Accident.

9. CONCLUSION

The Autonomic Computing is a ‘FLEDGING’ Technology which provide high Productivity, Avaliability, Stability, Security to system due to its Self healing, Self configuring, Self optimization and Self protection characteristics and is very well supported by MESO that uses pattern classification and clustering technique to support online decision making in Autonomic Computing System.

Thus the arrival this system in the market bring Revolution to Computer age, but still it is in infancy of its development and still much to go long. So if we imagine its future we can say its CRACKING.

10. REFERENCES

1. J.O.Kephart and D.M.Chess, The Vision Of Autonomic Computing, Jan 2003.
2. E.P.Kasten and P.K.Mckinley, MESO Perceptual Memory to Support Online Learning, Oct ,2004.
3. IEEE Transaction on Knowledge and Data Engineering Vol. 19, No.4, April 2007.