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Role of Agent Oriented Programming over Object Oriented Programming - A Part of Artificial Intelligence

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ABSTRACT

The first question is what is meant by an 'Agent'. The answer is, Software with Mental State. Agent Oriented Programming (AOP) sits one level of abstraction above Object Oriented Programming (OOP). In this paper, firstly we discuss what AOP is. Then we discuss the brief history of AOP after that we analyze how the change occurs due to Agent Oriented Programming over the Object Oriented Programming.

Keywords : Agent Oriented Programming, Object Oriented Programming

I. INTRODUCTION

Artificial Intelligence is one of the newest fields of intellectual research; its foundation began thousands of years ago where human fantasy of having intelligent and thinking machines appears in myths or stories. In recent years Agent oriented programming is one of the most important area of development, and still an area of considerable research. Wikipedia traces OOP back to the 1960s, while AOP came about from research into artificial intelligence by one Yoav Shoham in the 1990s [1].

Evolution of Programming Languages: Monolithic programming, Modular programming, Object-oriented programming, Agent programming . This paper discusses both the similarities and differences between objects and agents than u will decide how agent oriented programming have impact over object oriented programming.

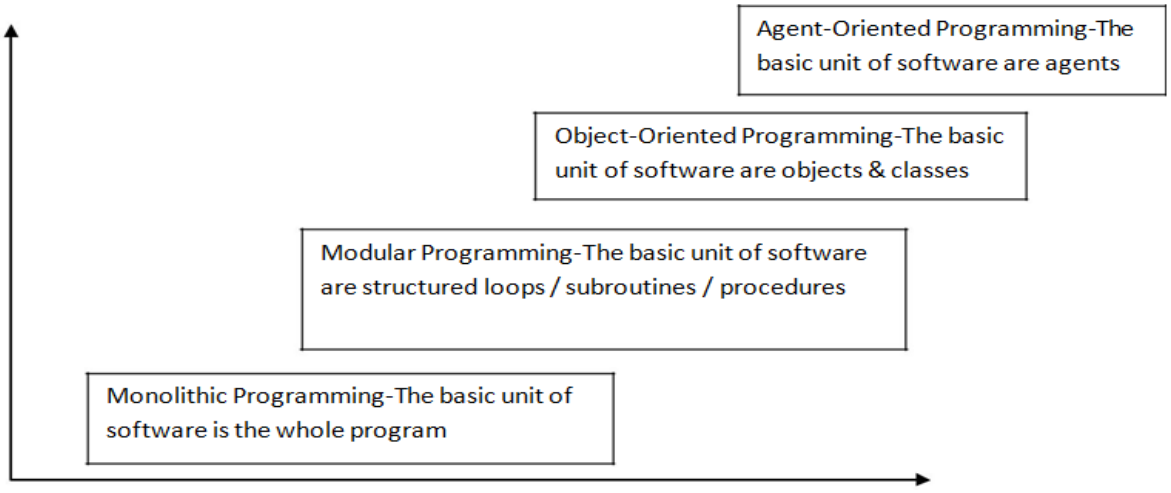

Figure 1

II. WHAT IS AGENT?

Agents means entity that functions autonomously in an environment. Agents provide a very effective way of building applications for dynamic and complex environments. develop software components as if they have beliefs and goals, act to achieve these goals, and are able to interact with their environment and other agents.[2]

Intelligent agent: Set of independent software Components linked with other applications. The main objective of an intelligent agent is to store the user preferences dynamically related to an application and implement the same when user accesses the same application. Intelligent Agent is an autonomous entity which learn from its environment and use their knowledge to acts upon an environment and directs its activity towards achieving goals. [3]

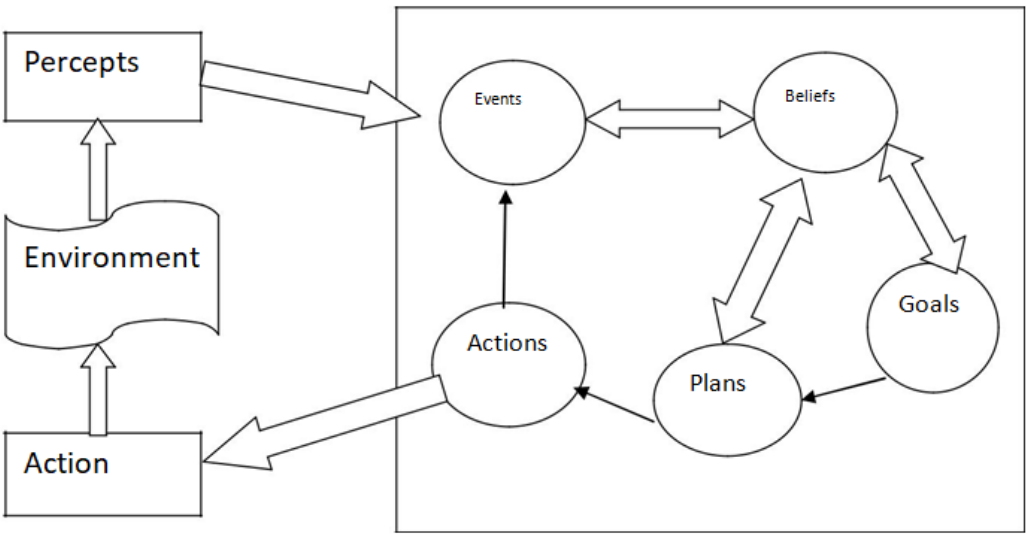

Figure 2

III. OVERVIEW OF OBJECT AND AGENT ORIENTED PROGRAMMING

Object-oriented programming is a programming model organized around objects rather than actions. Conventional procedural programming normally takes input data, processes it, and produces output data. The primary challenge of programming is how to write the logic. Object-oriented programming focuses on the objects that you want to manipulate, their relationships, and the logic required to manipulate them. The concepts of a type, class, interface, and object are closely related but it is important to understand the difference between these four terms. A type is a name that identifies specific members of a class, which can include methods, properties, data members, and events. A class defines the implementation of a type and its class members. An abstract class is essentially a type with an incomplete implementation. An interface also defines a type that identifies certain class members (properties, methods, or events) that a class must implement. An object is an instance of a class whose type can be represented as any class or interface that contributes members defined in the object's class hierarchy.[4]

AOP is a more recent development, and still an area of considerable research and standardization. The objective of Agent Oriented (AO) Technology is to build systems applicable to real world that can observe and act on changes in the environment. Such systems must be able to behave rationally and autonomously in completion of their designated tasks. Shoham suggests that AOP system needs each of three elements to be complete

A formal language with clear syntax for describing the mental state. This would likely include structure for stating beliefs, passing messages etc.

A programming language in which to define agents. The semantics of this language should be closely related to formal language.

A method for converting neutral applications into agents. This kind of tool will allow an agent to communicate with a non-agent .

Brief history of Agent oriented Programming

Shoham's first attempt at an AOP language was the AGENT-0 system in 1990. The key component of Agent-0 is speech act. A more refined implementation was developed by Thomas is PLACA in1993 (AGENT-0 extension with plans).The inability of Agent-0 is planning. PLACA used for Planning. AgentSpeak was developed in 1996 by Anand Rao.Golog was agent oriented language introduced in 1996 for Action theories, logical specification.

Some more Agent oriented programming languages

- ✓ 1997: 3APL (Hindriks et al.) used for Practical reasoning rules
- ✓ 2000: JACK (Busetta, Howden, Ronnquist, Hodgson) used for Capabilities and it is Java-based
- ✓ 2000: GOAL (Hindriks et al.)
- ✓ 2000: CLAIM (Amal El FallahSeghrouchni)
- ✓ 2002: Jason (Bordini, Hubner; implementation of AgentSpeak)
- ✓ 2003: Jadex (Braubach, Pokahr, Lamersdorf)
- ✓ 2008: 2APL (successor of 3APL) [2]

Aop versues Oop

Extension of OOP where objects become agents by redefining both their internal state and their communication protocol in intentional terms.

Agents have quality of volition that is using AI techniques intelligent agents judge their results and modify their behavior and their own internal structure to improve their perceived fitness Normal objects contain arbitrary values in their slots and communicate with messages.

AOP agents contain beliefs, commitments, choices, and the like and communicate with each other via a constrained set of speech type acts such as inform, request, promise, decline the state of the agent is called its mental state OO focused on defining interfaces for objects coupling where one objects needs to invoke a specific method with specific arguments on the other object thereby coupling the two in code.

This same method invocation does occur in agents with one major difference, there effectively just one method with each agent and one argument. All the semantics of the invocation are bundled into that one argument just like in human communication where one language is used to initiate complex cooperative behavior.

Agents may communicate using an ACL or ICL where objects communicate with a fixed method of interfaces Objects are abstractions of things like invoices.

Agents are abstractions of intelligent beings they are essentially anthropomorphic not intelligent in the

human sense only modeling an anthropomorphic architecture with beliefs, desires, etc

IV. CONCLUSION

In this paper, I discussed agent-oriented programming over Object-Oriented Programming , how Agent oriented programming is better ,where the tasks are in charge of autonomous computational entities, which interact and cooperate within a shared environment. Agents have th ability to learn , it can add subtract features dynamically. .I conclude this paper with remark that In order to strss and investigate, a full value of agent oriented approach, we need programming languages which work for agent development .

V. REFERENCES

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