

---

# Object Oriented Software Development for Artificial Intelligence

Girma Yohannis Bade<sup>1</sup>, Akalu Assefa Afaro<sup>2</sup>

<sup>1</sup>Department of Computer Science, Wolaita Sodo University, Wolaita, Ethiopia

<sup>2</sup>Department of IT, Wolaita Sodo University, Wolaita, Ethiopia

## Email address:

girme2005@gmail.com (G. Y. Bade), akalu.assefa@gmail.com (A. A. Afaro)

## To cite this article:

Girma Yohannis Bade, Akalu Assefa Afaro. Object Oriented Software Development for Artificial Intelligence. *American Journal of Software Engineering and Applications*. Vol. 7, No. 2, 2018, pp. 22-24. doi: 10.11648/j.ajsea.20180702.11

**Received:** October 1, 2018; **Accepted:** November 1, 2018; **Published:** December 5, 2018

---

**Abstract:** With the advent of computers, life has become a lot easier. The computer's ability to perform numerous tasks at a high speed has helped humans in many ways. Complex calculations that were previously done by hand, can now be done quickly using computers. Unlike humans, computers don't get tired. These machines can do monotonous mechanical computations reliably and efficiently. However, as computers cannot think, making a complex decision is certainly not possible for a computer. These machines face trouble in understanding complex real world problems. For instance, can a computer diagnose a disease based on the symptoms the person exhibits? This is why artificial intelligence steps in. It allows the computer to think like human. This paper discuss how software engineering is important to build an artificial indulgence. The requirement of software engineering in AI is for increased modularity, re-use ability and maintainability in the software which has accentuated interest in the object-oriented programming paradigm. In this regard, the approaches to AI, its procedure, and aspects in both dimension has been analyzed. In addition, the field of Distributed Artificial Intelligence (DAI) needs special emphasis on object-oriented multi-agent systems and particularly manufacturing applications. An application of artificial intelligence technology to the implementation of a rapid prototyping method in object-oriented performance design (OOPD) for real-time systems is very important.

**Keywords:** Artificial Intelligence, Natural Intelligence, Object Oriented, Programming Paradigm

---

## 1. Introduction

Object technology today embraces everything from object-oriented languages and engineering methods, object-oriented databases, and distributed communications middleware for the Object Web to the Unified Modeling Language. Within the hyper-ascendant trajectory of the pragmatic employment of computers and software, object-orientation has been a huge benefit and a source of vastly improved usability. Artificial Intelligence is a branch of Science which deals with helping machines find solutions to complex problems in a more human-like fashion. This generally involves borrowing characteristics from human intelligence, and applying them as algorithms in a computer friendly way [1]. A more or less flexible or efficient approach can be taken depending on the requirements established, which influences how artificial the intelligent behavior appears. AI is generally associated with Computer Science, but it has many important links with other

fields such as Mathematics, Psychology, Cognition, Biology and Philosophy, among many others [3]. Our ability to combine knowledge from all these fields will ultimately benefit our progress in the quest of creating an intelligent artificial being. The potential applications of Artificial Intelligence are abundant. They stretch from the military for autonomous control and target identification, to the entertainment industry for computer games and robotic pets [4]. Let's also not forget big establishments dealing with huge amounts of information such as hospitals, banks and insurances, who can use AI to predict customer behavior and detect trends. As you may expect, the business of Artificial Intelligence is becoming one of the major driving forces for research. With an ever growing market to satisfy, there's plenty of room for more personnel. So if you know what you're doing, there's plenty of money to be made from interested big companies!

## 2. Artificial Intelligence (AI) Objectives

- a) Make machines smarter (primary goal):- to implement human intelligence in machines – Creating systems that understand, think, learn, and behave like humans.
- b) To Create Expert Systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.
- c) Understand what intelligence is
- d) Make machines more useful

## 3. Methodology

### 3.1. Approaches to AI

The term “object “emerged almost independently in

Table 1. comparison of artificial intelligence and natural intelligence.

Natural Intelligence	AI
Natural intelligence is creative	More permanent
People use sensory experience directly	Ease of duplication and dissemination
Can use a wide context of experience in different situations	Less expensive
	Consistent and thorough
	Can be documented
	Can execute certain tasks much faster than a human can
	Can perform certain tasks better than many or even most people

### 3.2. Procedures Description

The benefits of object oriented approach emphasis on data rather than procedures, however, to support an explicit representation of the agent program, procedures have been described as first class objects, so that the aspects can easily be reasoned out as performance measures.

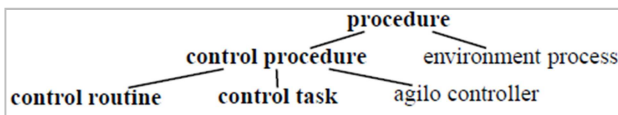


Figure 1. Class hierarchy of procedures.

various branches of computer science. Some areas that influenced the object-oriented paradigm include: system simulation, operating systems, data abstraction and artificial intelligence. Initially, researchers thought that creating an AI would be simply writing programs for each and every function an intelligence performs! As they went on with this task, they realized that this approach was too shallow. Even simple functions like face recognition, special sense, and pattern recognition and language comprehension were beyond their programming skills! They understood that to create an AI, they must delve deeper into natural intelligence first. So the following table shows the approach of AI.

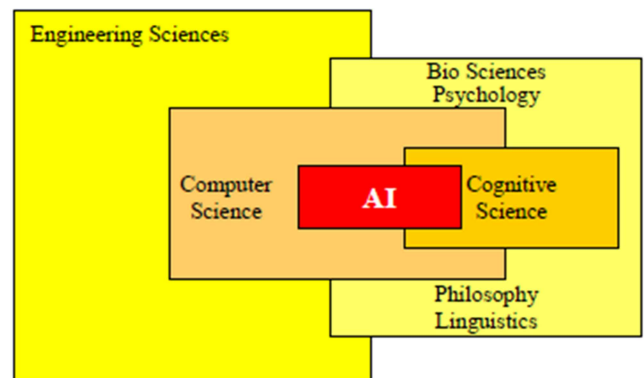


Figure 2. AI & related areas.

## 4. Result and Discussion

AI is the study of the computations that make it possible to perceive, reason, and act. AI differs from most of psychology because of its greater emphasis on computation, and it differs from most of computer science because of its greater emphasis on perception, reasoning, and action. As a field of academic study, many AI researchers reach to understand intelligence by becoming able to produce effects of intelligence: intelligent behavior. One element in AI’s methodology is that progress is sought by building systems that perform: synthesis before analysis. It is not the aim of AI to build intelligent machines having understood natural intelligence, *but* to understand natural intelligence by building intelligent machine. For example, artificial intelligences (AI) and expert system are some application built using OOP techniques [5, 6]. AI can be defined as the attempt to get real machines to behave like the ones in the movies[7, 8].

In other hand, SE’s main concern is the efficient and effective development of high-quality and mostly very large software systems. The goal is to support software engineers and managers in order to develop better software faster with (intelligent) tools and methods. Since its beginning several research directions developed and matured in this broad field. *Project Engineering* is concerned with the acquisition, definition, management, monitoring, and controlling of software development projects as well as the management of risks emerging during project execution. Methods from *Requirements Engineering* are developed to support the formal and unambiguous elicitation of software requirements from the customers, to improve the usability of the systems, and to establish a binding and unambiguous definition of the resulting system during and after software project definition. The research for *Software Design & Architecture* advances techniques for the development, management, and analysis of (formal) descriptions of abstract representations of the software system as well as required

tools and notations (e.g., UML) [2, 9, 10].

## 5. Conclusion

Artificial Intelligence is about making machines intelligent, while software engineering is the activity of defining, designing and deploying some of the most complex and challenging systems mankind has ever sought to engineer. Though software engineering is one of the most challenging of all engineering disciplines, it is often not recognized as such, because software is so well concealed. Software engineering is almost similar to object oriented software development tools. Since everything in artificial intelligence was performed in the behalf of the system itself i.e there is no interactive entity or interface that enable the object to interact with the system; So from the above two aspects and the approach, we can conclude artificial intelligence would have a better significance in a real time sharing, if it include (uses) the concept of object oriented. Because OO can enable it to analyze, design, manage and abstract from a real world and make easily understandable and usable. The coupling of artificial intelligence-AI and Object-oriented methodology applied for the construction of the model-based decision support system is designed for support the strategic decision making lead to the achievement of optimal path towards market economy from the central planning situation in China. To meet user's various requirements, a series of innovations in software development have been carried out, such as system formalization in an object-oriented paradigm for problem solving automation and techniques of modules intelligent cooperation, hybrid system of reasoning, connectionist framework utilization, etc. This is known as *integration technology*.

---

## References

- [1] Decision Support Systems and Intelligent Systems, Efraim Turban and Jay E. Aronson 6th ed, 2001.
- [2] Mumolo, E.; *et al*, "Object oriented design of a mobile robot using UML," *Information Technology Interfaces, 2001. ITI 2001. Proceedings of the 23rd International Conference on* , vol., no., pp. 473- 478 vol.1, 19-22 June 2001.
- [3] Kindler, E.; Krivy, I. "Object-Oriented Simulation of systems with sophisticated control." *International Journal of General Systems*. p. 313-343, 2011.
- [4] P. C. Chen. "A Climate Simulation Case Study." In *Proceedings of Visualization '93*, pages 397-401, IEEE Computer Society Press, Los Alamitos, CA, 1993.
- [5] <http://www.buzzle.com/articles/applications-of-artificial-intelligence.html>.
- [6] <http://www.learningwithrobots.com/textbook/PDFs/WholeThing.pdf>.
- [7] von Mayrhauser, A., Walls, J., & Mraz, R. T Sleuth: A Domain Based Testing Tool. In *Proceedings of the International Test Conference* (pp. 840-849). Washington, DC: IEEE Computer Society, 1994.
- [8] Wappler, S., & Schieferdecker, I "Improving evolutionary class testing in the presence of non-public methods". In *Proceedings of the Twenty second IEEE/ACM International Conference on Automated Software Engineering* (pp. 381-384), Atlanta, Georgia. New York: ACM Press, 2007.
- [9] American Management Association 601 Broadway New York, New York 10019 Visit the American Management Association and AMACOM on-line at <http://www.amanet.org>.
- [10] Robert Feldt, Francisco G. de Oliveira Neto, and Richard Torkar "Ways of Applying Artificial Intelligence in Software Engineering" RAISE'18, May 2018, Gothenburg, Sweden.