**Lab # 10**

**TO UNDERSTAND MACHINE LEARNING THROUGH IMPLEMENTING TIC-TAC-TOE GAME IN CLISP**

**Objective:**

* Introduction to Machine Learning
* Understanding Tic-Tac-Toe game in the context of Machine Learning

**Lab Related Theory:**

**Machine Learning**

Machine learning is a science of getting computers to act without being explicitly programmed. In the past decade , machine learning has given us self-driving cars , practical speech recognition, effective web search and vastly improved understanding of human genome. Machine learning is so passive today that you probably use it dozens of time a day without knowing it. Many researchers also think it as the best way to make progress towards human level AI

**Evolution of Machine Learning:**

Because of new computing technologies, machine learning today is not like machine learning of the past. It was born from pattern recognition and the theory that computers can learn without being programmed to perform specific tasks; researchers interested in artificial intelligence wanted to see if computers could learn from data. The iterative aspect of machine learning is important because as models are exposed to new data, they are able to independently adapt. They learn from previous computations to produce reliable, repeatable decisions and results. It’s a science that’s not new – but one that has gained fresh momentum.

**What's required to create good machine learning systems?**

* Data preparation capabilities.
* Algorithms – basic and advanced.
* Automation and iterative processes.
* Scalability.
* Ensemble modeling.

**Application areas of Machine Learning**

* Financial services
* Health care
* Oil and gas
* Government
* Marketing and sales
* Transportation

**Machine Learning methods:**

* Supervised learning
* Un supervisied learning
* Semi supervised learning
* Reinforcement learning
* Machine Learning in gaming

**Machine learning in gaming:**

Computer scientists have been testing the abilities of machine learning in video games for over 60 years. In 1949, Claude Shannon published a research paper titled “[**Programming a Computer for Playing Chess**](http://vision.unipv.it/IA1/ProgrammingaComputerforPlayingChess.pdf).” Shannon’s paper estimated that chess has more than 10^120 possible positions. Even today’s supercomputers would find it impossible to solve chess problems with brute force instead of playing against their opponents.

By 1997, IBM had developed a computer called Deep Blue that managed to defeat world chess champion Garry Kasparov in a six-game match. This was the first time that AI had beaten a human in chess.

More recently, AI researchers introduced machine learning to “Super Smash Bros.,” a hand-to-hand fighting game that features some of Nintendo’s most popular characters. The researchers introduced four rules about the game’s goals, strategies, tactics, and chains of button presses to see how the AI would perform.

Machine learning has already shown humans how impressive artificial intelligence can become when given enough time to train itself. In the near future, researchers may use video games to teach AI how to perform all manner of tasks and recognize objects that exist in the world.

**LAB EXERCISE**

Q1. Write a code of tic-tac-toe program in CLISP using AI machine learning concepts.

Q2. Write a report on your program titled Machine Learning in Tic-Tac-Toe game. Describe features of your program in the report.

**Learning Outcomes:**

In this lab we implement a Machine learning. Understanding Tic-Tac-Toe game in the context of Machine Learning