

# Java & AI

## Introduction

In this article, we'll go over an overview of Artificial Intelligence (AI) libraries in Java.

Since this article is about libraries, we'll not make any introduction to AI itself. Additionally, theoretical background of AI is necessary in order to use libraries presented in this article.

AI is a very wide field, so we will be focusing on the most popular fields today like Natural Language Processing, Machine Learning, Neural Networks and more. In the end, we'll mention few interesting AI challenges where you can practice your understanding of AI.

## 2. Expert Systems

### 2.1. Apache Jena

[Apache Jena](#) is an open source Java framework for building semantic web and linked data applications from RDF data. The official website provides a detailed tutorial on how to use this framework with a quick introduction to RDF specification.

### 2.2. PowerLoom Knowledge Representation and Reasoning System

[PowerLoom](#) is a platform for the creation of intelligent, knowledge-based applications. It provides Java API with detailed documentation which can be found on this [link](#).

## 2.3. d3web

[d3web](#) is an open source reasoning engine for developing, testing and applying problem-solving knowledge onto a given problem situation, with many algorithms already included. The official website provides a quick introduction to the platform with many examples and documentation.

## 2.4. Eye

[Eye](#) is an open source reasoning engine for performing semi-backward reasoning.

## 2.5. Tweety

[Tweety](#) is a collection of Java frameworks for logical aspects of AI and knowledge representation. The official website provides documentation and many examples.

# 3. Neural Networks

## 3.1. Neuroph

[Neuroph](#) is an open source Java framework for neural network creation. Users can create networks through provided GUI or Java code. Neuroph provides API documentation which also explains what neural network actually is and how it works.

## 3.2. Deeplearning4j

[Deeplearning4j](#) is a deep learning library for JVM but it also provides API for neural network creation. The official website provides many tutorials and simple theoretical explanations for deep learning and neural networks.

## 4. Natural Language Processing

### 4.1. Apache OpenNLP

[Apache OpenNLP](#) library is a machine learning based toolkit for the processing of natural language text. The official website provides API documentation with information on how to use the library. Here is an [Introduction to Apache OpenNLP](#).

### 4.2. Stanford CoreNLP

[Stanford CoreNLP](#) is the most popular Java NLP framework which provides various tools for performing NLP tasks. The official website provides tutorials and documentation with information on how to use this framework.

## 5. Machine Learning

### 5.1. Java Machine Learning Library (Java-ML)

[Java-ML](#) is an open source Java framework which provides various machine learning algorithms specifically for programmers. The official website provides API documentation with many code samples and tutorials.

### 5.2. RapidMiner

[RapidMiner](#) is a data science platform which provides various machine learning algorithms through GUI and Java API. It has a very big community, many available tutorials, and an extensive documentation.

### 5.3. Weka

[Weka](#) is a collection of machine learning algorithms which can

be applied directly to the dataset, through the provided GUI or called through the provided API. Similar as for RapidMiner, a community is very big, providing various tutorials for Weka and machine learning itself.

## 5.4. Encog Machine Learning Framework

[Encong](#) is a Java machine learning framework which supports many machine learning algorithms. It's developed by Jeff Heaton from Heaton Research. The official website provides documentation and many examples.

# 6. Genetic Algorithms

## 6.1. Jenetics

[Jenetics](#) is an advanced genetic algorithm written in Java. It provides a clear separation of the genetic algorithm concepts. The official website provides documentation and a user guide for new users.

## 6.2. Watchmaker Framework

[Watchmaker Framework](#) is a framework for implementing genetic algorithms in Java. The official website provides documentation, examples, and additional information about the framework itself.

## 6.3. ECJ 23

[ECJ 23](#) is a Java based research framework with strong algorithmic support for genetic algorithms. ECJ is developed at George Mason University's ECLab Evolutionary Computation Laboratory. The official website provides extensive documentation and tutorials.

## 6.4. Java Genetic Algorithms Package (JGAP)

[JGAP](#) is a genetic programming component provided as a Java framework. The official website provides documentation and tutorials.

## 6.5. Eva

[Eva](#) is a simple Java OOP evolutionary algorithm framework.

# 7. Automatic programming

## 7.1. Spring Roo

[Spring Roo](#) is a lightweight developer tool from Spring. It's using AspectJ mixins to provide separation of concerns during round-trip maintenance.

## 7.2. Acceleo

[Acceleo](#) is an open source code generator for Eclipse which generates code from EMF models defined from any metamodel (UML, SysML, etc.).

# 8. Challenges

Since AI is very interesting and popular topic, there are many challenges and competitions online. This is a list of some interesting competitions where you can train and test your skills:

- [Kaggle](#)
- [Angry Birds AI Competition](#)
- [AI Games](#)
- [Battlecode](#)
- [Vindinum](#)

## 9. Conclusion

In this article, we presented various Java AI frameworks which can be used in everyday work.

We also saw that AI is a very wide field with many frameworks and services – all of which can make your applications better and more innovative.

[Reference : AI and JAVA](#)