INTELLIGENT SYSTEMS

(Part One – Software Installation)

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Objective:

In this short course (tutorial) we are going to build a java web application that uses a python machine learning classification model, using Web Service and Web Sockets.

Note: This is the first part of the tutorial.

Software Requirements:

Bellow there is the list of the required software to build and run Intelligent Web Application.

Programming languages:

- Java Development Kit 8 + (JDK)
- Python 3.5 +

Integrated Development Environment (IDE):

- Eclipse 4.9 (Java)
- Spyder IDE (Python)

Web Application Server

- WildFly 14
- Flask Microframework 1.0.2

Databases

- MongoDB (NoSQL)
- PostgreSQL (Object-Relational Database)

1. Software Installation:

In this document, you will find the URL, web pages of the required software for this tutorial. The installation process is very simple, the most of the time consisting in unzip a file or click in the next button. If you have problems with the installation process search the web or send me an email explaining your problem (Please begin the the subject with the word YACHAY).

1.1 Programming Languages

1.1.1 Enterprise Web Programming Language

Java Programming Language

Java is a general-purpose computer-programming language that is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of computer architecture. As of 2016, Java is one of the most popular programming languages in use, particularly for client-server web applications, with a reported 9 million developers [1].

Java SE Development Kit 11

The Java™ Platform, Standard Edition Development Kit (JDK™) is a development environment for building applications, and components using the Java programming language.

The Java SE Development Kit 11 can be installed in different operating systems:

https://www.oracle.com/technetwork/java/javase/downloads/jdk11-downloads-5066655.html

Java SE Development Kit 11.0.1

You must accept the Oracle Technology Network License Agreement for Oracle Java SE to download this software.

Thank you for accepting the Oracle Technology Network License Agreement for Oracle Java SE; you may now download this software.

Product / File Description	File Size	Download
Linux	147.4 MB	jdk-11.0.1_linux-x64_bin.deb
Linux	154.09 MB	jdk-11.0.1_linux-x64_bin.rpm
Linux	171.43 MB	jdk-11.0.1_linux-x64_bin.tar.gz
macOS	166.2 MB	jdk-11.0.1_osx-x64_bin.dmg
macOS	166.55 MB	jdk-11.0.1_osx-x64_bin.tar.gz
Solaris SPARC	186.8 MB	jdk-11.0.1_solaris-sparcv9_bin.tar.gz
Windows	150.98 MB	jdk-11.0.1_windows-x64_bin.exe
Windows	170.99 MB	jdk-11.0.1_windows-x64_bin.zip

1.1.2 Machine Learning Programming Language

Python

Python is an interpreted programming language whose philosophy emphasizes a syntax that favors a readable code.

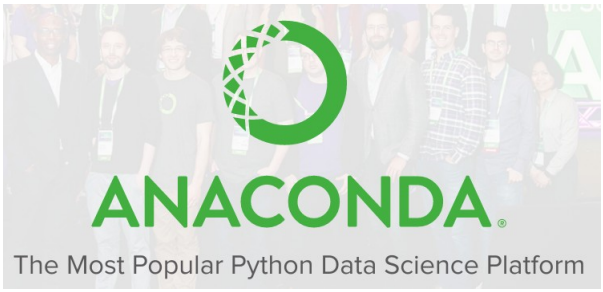
It is a multi-paradigm programming language, since it supports object orientation, imperative programming and, to a lesser extent, functional programming. It is an interpreted language, it uses dynamic typing and it is multiplatform.

It is managed by the Python Software Foundation. It has an open source license, called the Python Software Foundation License, 3 which is compatible with the GNU General Public License as of version 2.1.1, and incompatible in certain previous versions [2].

Python Software Foundation

The mission of the Python Software Foundation is to promote, protect, and advance the Python programming language, and to support and facilitate the growth of a diverse and international community of Python programmers [3].

Anaconda Distribution

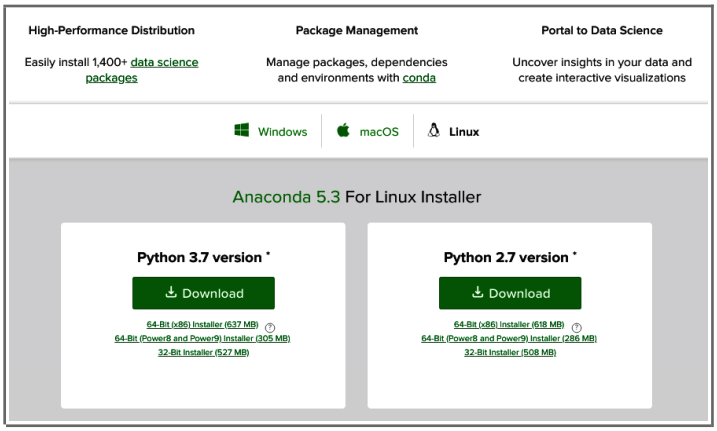


Anaconda Distribution 5 is a free, easy-to-install package manager, environment manager and Python distribution with a collection of 1,000+ open source packages with free community support. Anaconda is platform-agnostic, so you can use it whether you are on Windows, macOS or Linux [4].

With over 6 million users, the open source Anaconda Distribution is the fastest and easiest way to do Python and R data science and machine learning on Linux, Windows, and Mac OS X. It's the industry standard for developing, testing, and training on a single machine [5].

The Anaconda distribution can be download from the official site:

https://www.anaconda.com/download/



Source: https://www.anaconda.com/download/#linux

Choose the **Python 3.7** version installer depending on your operating system (windows, macOS, Linux) and platform (64-Bit or 32-Bit).

Anaconda is one of the most used python distributions, it contains the more important Machine Learning (ML) libraries, and additionally it includes the IDE spyder.

Note: It is possible to develop this tutorial without a specialized IDE such as Spyder.

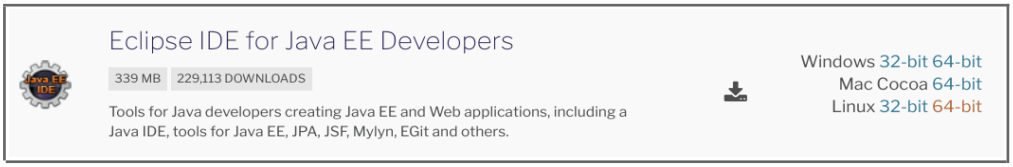
1.2 Integrated Development Environment (IDE)

1.2.1 Eclipse

Eclipse is an integrated development environment (IDE) used in computer programming, and is the most widely used Java IDE. It contains a base workspace and an extensible plug-in system for customizing the environment. Eclipse is written mostly in Java and its primary use is for developing Java applications, but it may also be used to develop applications in other programming languages via plug-ins, including Ada, ABAP, C, C++, C#, COBOL, D, Fortran, Haskell, JavaScript, Julia, Lasso, Lua, NATURAL, Perl, PHP, Prolog, Python, R, Ruby (including Ruby on Rails framework), Rust, Scala, Clojure, Groovy, Scheme, and Erlang. It can also be used to develop documents with LaTeX (via a TeXlipse plug-in) and packages for the software Mathematica. Development environments include the Eclipse Java development tools (JDT) for Java and Scala, Eclipse CDT for C/C++, and Eclipse PDT for PHP, among others [6].

The eclipse IDE can be downloaded from this url:

https://www.eclipse.org/downloads/packages/



You must select the Eclipse IDE for java EE Developers to develop Web applications.

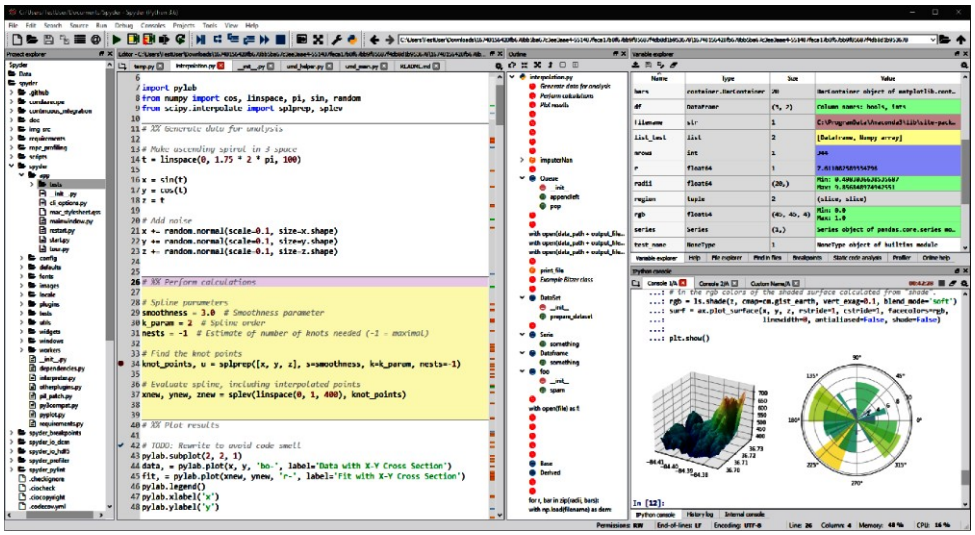
1.2.2 Spyder IDE

Spyder is a powerful scientific environment written in Python, for Python, and designed by and for scientists, engineers and data analysts. It offers a unique combination of the advanced editing, analysis, debugging, and profiling functionality of a comprehensive development tool with the data exploration, interactive execution, deep inspection, and beautiful visualization capabilities of a scientific package [7].

Beyond its many built-in features, its abilities can be extended even further via its plugin system and API. Furthermore, Spyder can also be used as a PyQt5 extension library, allowing developers to build upon its functionality and embed its components, such as the interactive console, in their own PyQt software.

The Spyder IDE was installed with your the Anaconda distribution. The official web site is:

https://www.spyder-ide.org/



1.3 Database

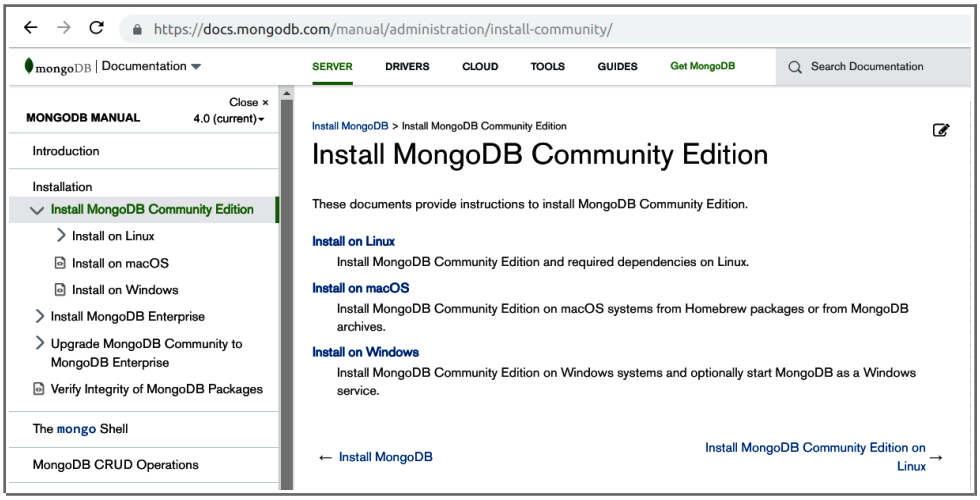
1.3.1 NoSQL Database (NO Relational)

MongoDB

MongoDB is a free and open-source NoSQL document database used commonly in modern web applications [8].

You can install MongoDB in different operating systems:

https://docs.mongodb.com/manual/administration/install-community/



Windows: https://docs.mongodb.com/manual/tutorial/install-mongodb-on-windows/

Linux (Ubuntu): https://docs.mongodb.com/manual/tutorial/install-mongodb-on-ubuntu/

1.3.2 Relational Database (PostgreSQL)

PostgreSQL

PostgreSQL is a powerful, open source object-relational database system with over 30 years of active development that has earned it a strong reputation for reliability, feature robustness, and performance [9].

Pre-built binary packages are available for a number of different operating systems (Linux, macOS, Windows):

https://www.postgresql.org/download/

1.4 Web Application Server

1.4.1 WildFly (Java)

WildFly is a flexible, lightweight, managed application runtime that helps you build ***amazing*** applications [10].

Modern Web

WildFly supports the latest standards for web development. Web Socket support allows your applications the ability to use optimized custom protocols and full-duplex communication with your backend infrastructure. This is particular useful in communicating with mobile devices.

As web applications have evolved to become more client oriented with rich dynamic JavaScript, data access over the web has become critical. WildFly supports the latest standards for REST based data access, including JAX-RS 2, and JSON-P.

The WildFly server can be downloaded as a zip file format from its web page:

http://wildfly.org/downloads/

Version	Date	Description	License	Size	Format
14.0.1.Final	2018-09-05	Java EE Full & Web Distribution	LGPL	171 MB	ZIP

To install the WildFly web application server, unzip the downloaded file, an rename it as wildfly in lowercase.

1.4.2 Flask Microframework (Python)

Flask is a microframework for Python based on Werkzeug, Jinja 2 and good intentions. And before you ask: It's BSD licensed! [11].

The flask microframework can be installed from a terminal with this command:

```
$ pip install Flask
```

2. REFERENCES

[1] “Java (programming language).” [Online]. Available: https://en.wikipedia.org/wiki/Java_(programming_language). [Accessed: 27-Oct-2018].

[2] “Python.” [Online]. Available: https://es.wikipedia.org/wiki/Python. [Accessed: 27-Oct-2018].

[3] “Python Software Foundation | Python Software Foundation.” [Online]. Available: https://www.python.org/psf/. [Accessed: 27-Oct-2018].

[4] “Anaconda Documentation — Anaconda 2.0 documentation.” [Online]. Available: https://docs.anaconda.com/. [Accessed: 27-Oct-2018].

[5] “What is Anaconda? - Anaconda.” [Online]. Available: https://www.anaconda.com/what-is-anaconda/. [Accessed: 27-Oct-2018].

[6] “Eclipse (software).” [Online]. Available: https://en.wikipedia.org/wiki/Eclipse_(software). [Accessed: 27-Oct-2018].

[7] “Spyder Website.” [Online]. Available: https://www.spyder-ide.org/. [Accessed: 27-Oct-2018].

[8] “How to Install MongoDB on Ubuntu 18.04 | DigitalOcean.” [Online]. Available: https://www.digitalocean.com/community/tutorials/how-to-install-mongodb-on-ubuntu-18-04. [Accessed: 27-Oct-2018].

[9] “PostgreSQL: The world’s most advanced open source database.” [Online]. Available: https://www.postgresql.org/. [Accessed: 27-Oct-2018].

[10] “About · WildFly.” [Online]. Available: http://wildfly.org/about/. [Accessed: 27-Oct-2018

[11] “Welcome | Flask (A Python Microframework).” [Online]. Available: http://flask.pocoo.org/. [Accessed: 27-Oct-2018].