Artificial Intelligence I: Introduction to Data Science and Machine Learning

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Instructors

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Outline

- Python Basics
  - variables, conditionals, loops, data structures, slicing, file I/O, OOP
- Data Science
  - **Numpy:** ndarrays, vectors, matrices, basic linear algebra, data generation, example math functions, array stacking
  - **Pandas:** Series, Dataframes, reading & transforming data, handling missing data
  - **Matplotlib:** data visualization

Outline (16th March)

- Machine learning introduction
- Regression with gradient descent
- Machine learning with **Sklearn**
- Feature selection & importance
- Classication (logistic regression)
- Clustering (K-means)
- Train/test split
- Model comparison & selection
  - Naïve bayes, decision tree, random forest, SVM, grid search
- Classification metrics & confusion matrix
  - TP, TN, FP, TN, F1 score, ROC curve
- Class imbalance

Jupyter Lab (Notebook)

- Client-Server based application
  - Client: web UI (browser)
  - Server: Python runtime (kernel)
- Web based interactive environment for working with data
  - Web page has executable cells (code, markdown and raw)
  - Code cells are sent to Python kernel
  - Results from Python kernel are shown in browser
- Jupyter Lab: Newer, with better UI
- Jupyter Notebook: Classic notebook

Jupyter Lab (Notebook) Architecture

http://remote_ip:8888

Ex: http://localhost:8888

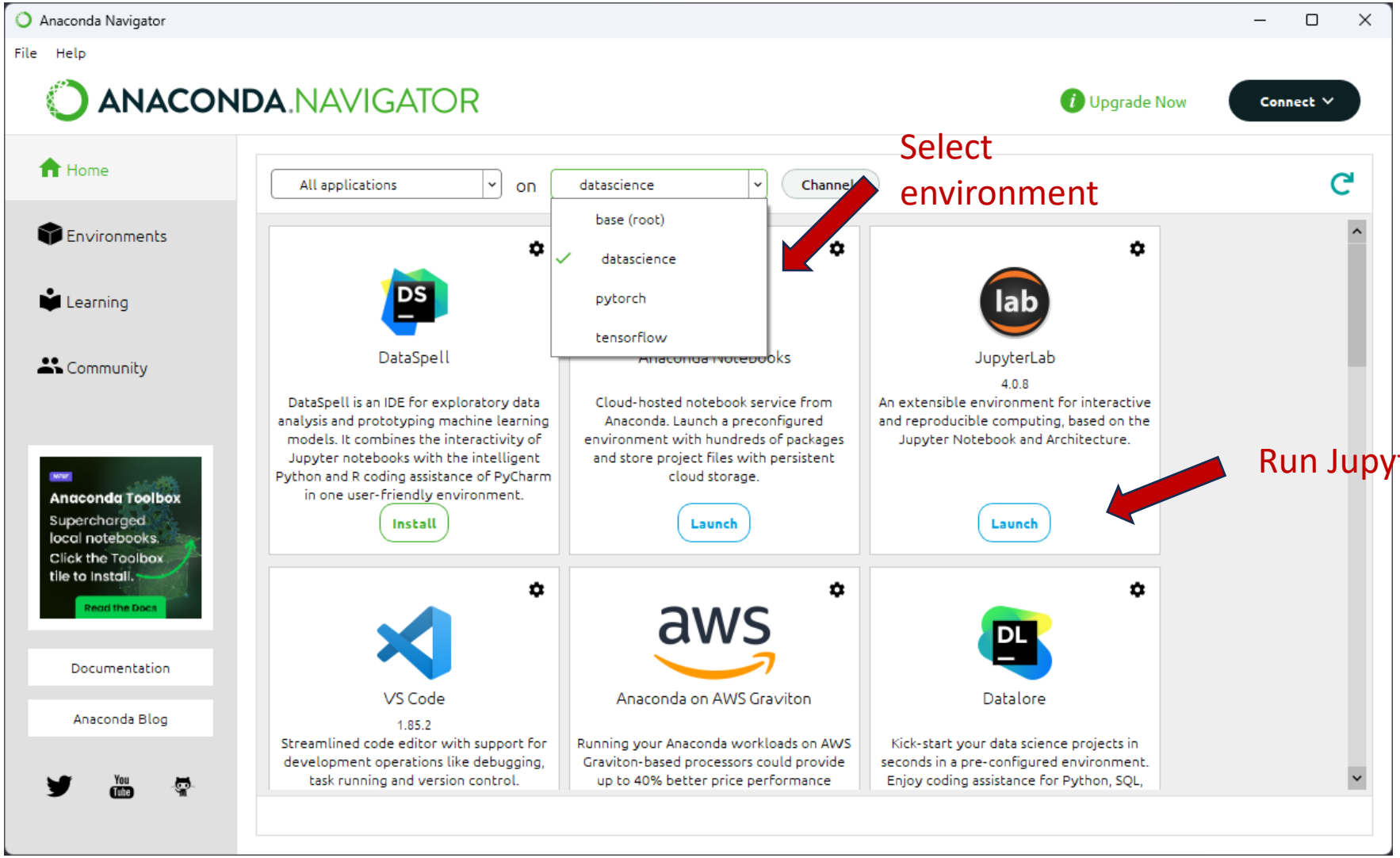
Web UI

Python Kernel

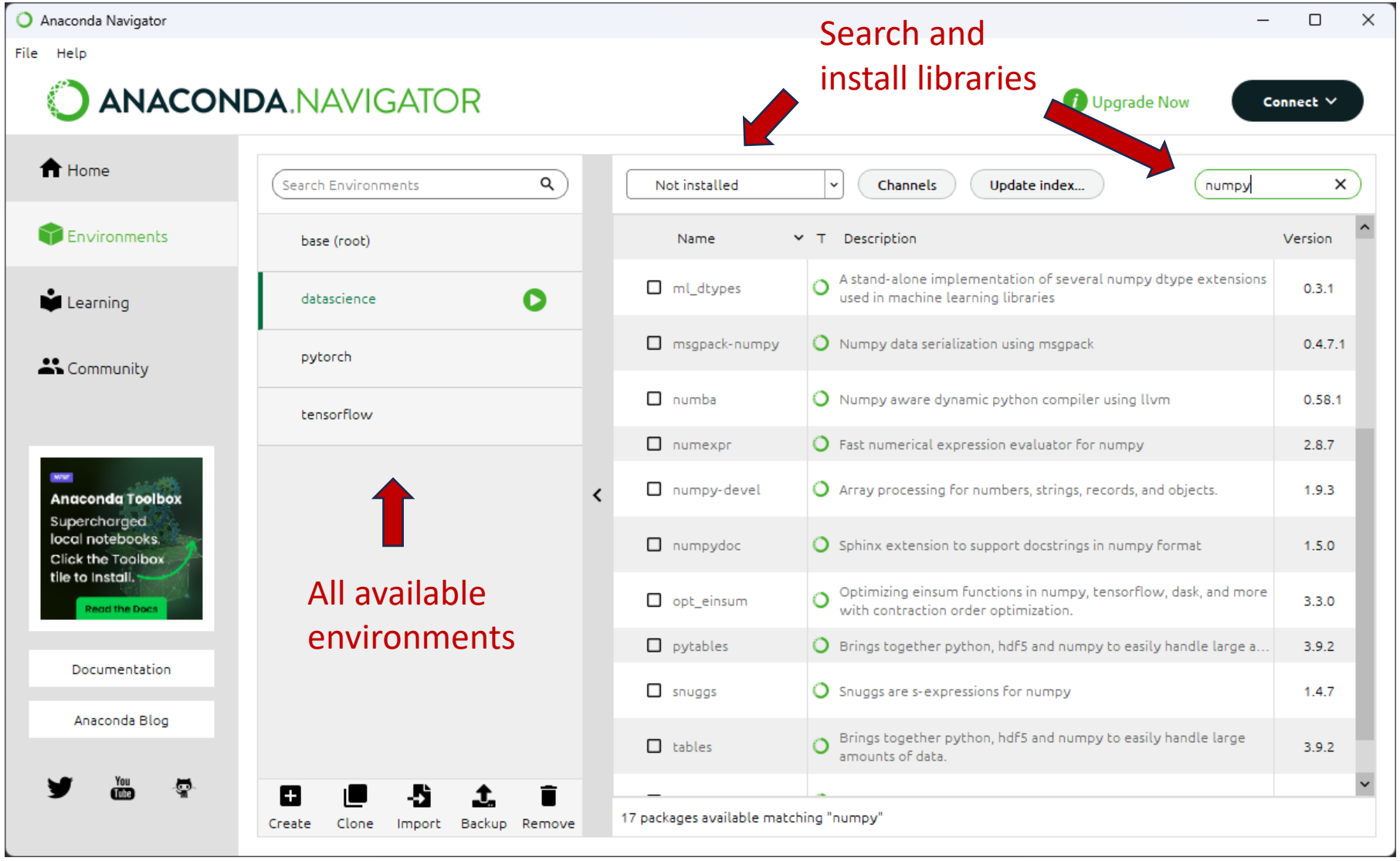
How to Launch Jupyter Lab/Notebook

- With terminal
  - $ cd <working_dir>
  - $ jupyter lab
  - $ jupyter notebook
  - visit http://localhost:8888/ on your browser
- Without terminal
  - Install Anaconda Navigator
  - Launch Jupyter Lab/Notebook from main page
  - (Browser should run automatically)

Anaconda Navigator (Run Jupyter)



Anaconda Navigator (Environments)



Python Environments