PYTHON FOR FOREST & WOOD SCIENTISTS

Dr. Akin AKINNAGBE
Lead Data Scientist, Waipareira, New Zealand

TABLE OF CONTENT

1. Introduction

- Python is a general-purpose programming language that is becoming ever more popular for data science.

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- PYTHON VS R: *Which is better?*

PYTHON:

- Open source
- Robust online user support
- Web scrapping
- Natural language processing
- Machine learning
- Deep learning

R:

- Open source
- Robust online user support
- Data wrangling
- Statistical learning (modelling)
- Data visualization
- Spatial data analysis

remote sensing
MDPI

Article

Forest Damage Assessment Using Deep Learning on High Resolution Remote Sensing Data

Zayd Mahmoud Hamdi [1,2], Melanie Brandmeier [1,*] and Christoph Straub [3]

1   Department Science and Education, Esri Deutschland, Ringstr. 7, 85402 Kranzberg, Germany
2   Technical University of Munich, 21 Arcisstraße, 8033 Munich, Germany
3   Department of Information Technology, Bavarian State Institute of Forestry,
     Hans Carl-von-Carlowitz-Platz 1, 85354 Freising, Germany
*   Correspondence: m.brandmeier@esri.de

check for updates

NRC Research Press

REVIEW

Application of machine-learning methods in forest ecology: recent progress and future challenges

Zelin Liu, Changhui Peng, Timothy Work, Jean-Noel Candau, Annie DesRochers, and Daniel Kneeshaw

- **Ahmed, O. S., Franklin, S. E., Wulder, M. A., & White, J. C. (2015). Characterizing stand-level forest canopy cover and height using Landsat time series, samples of airborne LiDAR, and the Random Forest algorithm. ISPRS Journal of Photogrammetry and Remote Sensing, 101, 89-101.**

- **García-Gutiérrez, J., Martínez-Álvarez, F., Troncoso, A., & Riquelme, J. C. (2015). A comparison of machine learning regression techniques for LiDAR-derived estimation of forest variables. Neurocomputing, 167, 24-31.**

- **Stojanova, D., Panov, P., Gjorgjioski, V., Kobler, A., & Džeroski, S. (2010). Estimating vegetation height and canopy cover from remotely sensed data with machine learning. Ecological Informatics, 5(4), 256-266.**

2. Practically Applying Python in Our Forestry & Wood Science Research

- *What would you do with Python?*

- Before applying Python (or even R), you must have chosen the appropriate statistical tool, or machine learning algorithm adequate enough to answer your research question(s)

2. Practically Applying Python In Our Forestry & Wood Science Research

- **Installing Python**
  - I recommend Python installation from the [Anaconda distribution](#) of Python (individual edition), which includes nearly every Python package

- **Running Python Scripts**
  - I recommend use of jupyter notebook (already installed if python is installed from Anaconda distribution)
  - I also recommend running Python from Rstudio (good for those switching between R & Python)

2. Practically Applying Python in Our Forestry & Wood Science Research

- **Start learning the Python basics for Data Science**
  - **Import python libraries useful for your task**
    - pandas (to import and manipulate dataframes)
    - beautifulsoup (for web scraping)

  - **Import your data**
    - *Which file format (i.e. csv, excel, json, xml, text etc)?*

  - **Any data cleaning?**

  - **Use Python to implement your algorithm**

- Get a good laptop or desktop (8GB RAM minimum)
- Get connected to internet
- google.com and stackoverflow.com are useful search engines. "*Google answereth all things*"
- Look for python codes that applied your algorithms
- Adapt and modify the codes to your work
- Never give up on errors: take your error messages to google & stackoverflow

4. Running Python Scripts

- **Running Python Scripts From Jupyter & RStudio**
  - **Jupyter**
    - Open Anaconda Navigator
    - Click on Juypter
  - **Rstudio**
    - Open RStudio
    - Install *reticulate* package from CRAN
    - Load *reticulate* library
    - If necessary, point R to python location on your machine
    - https://blog.rstudio.com/2018/03/26/reticulate-r-interface-to-python/
    - https://bookdown.org/yihui/rmarkdown-cookbook/eng-python.html

Is Web Scraping Legal ?

Legal

Illegal

- *What is web scraping?*

  - Data extraction from websites

  - Useful materials

    - realpython.com - https://realpython.com/lessons/web-scraping-bs-overview/

    - Youtube

- *Steps to webscraping*

  - Install python

  - Install/ import all libraries to be used

  - Understand HTML tags

  - Check websites for terms & conditions

  - Website layout may change. So, revisit to adjust your code

THANK YOU