

Intro to Natural Language Processing with Python

`github.com/bonzanini/nlp-tutorial`

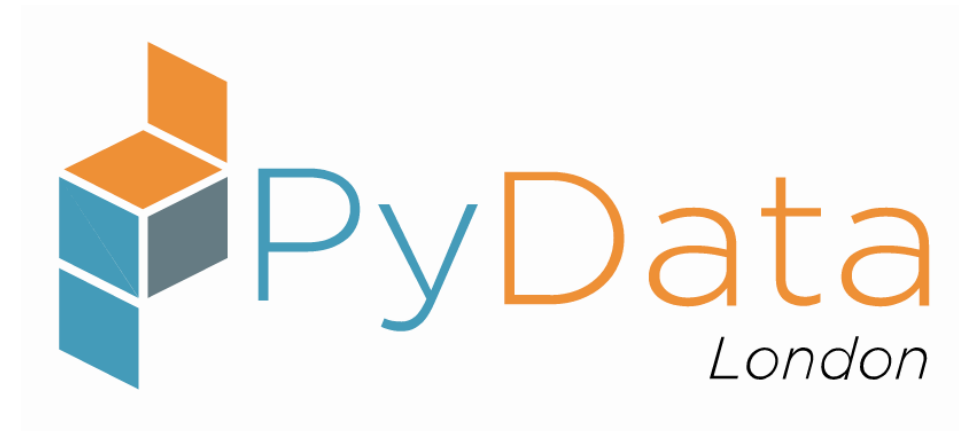
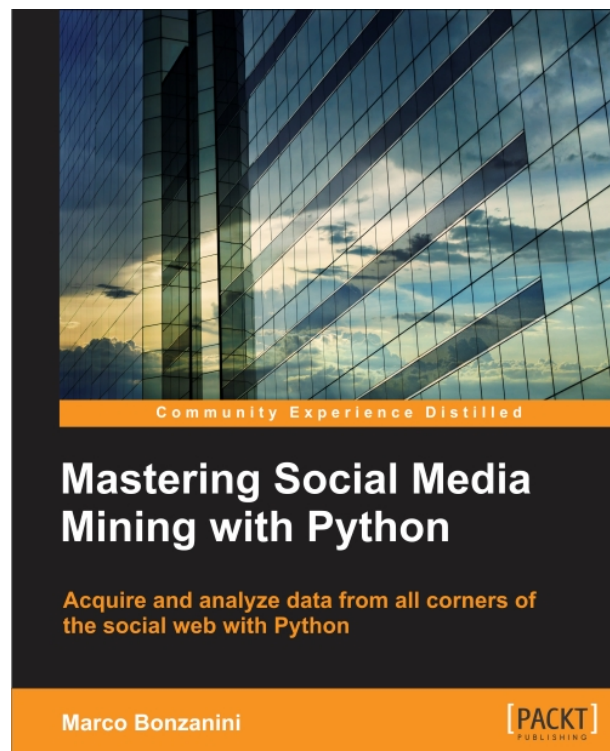


Tutor: **@MarcoBonzanini**
Credits: **@miguelmalvarez**

Nice to Meet You

Marco Bonzanini

Freelance Data Scientist



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Schedule

- Intro & Logistics (10m)
- Environment Set Up (10m)
- Exploring Text Data (1h + ~30m QA)
- Break (16:30 — 17:00)
- Text Classification (1h)
- Bonus Content (15m + 15m QA)

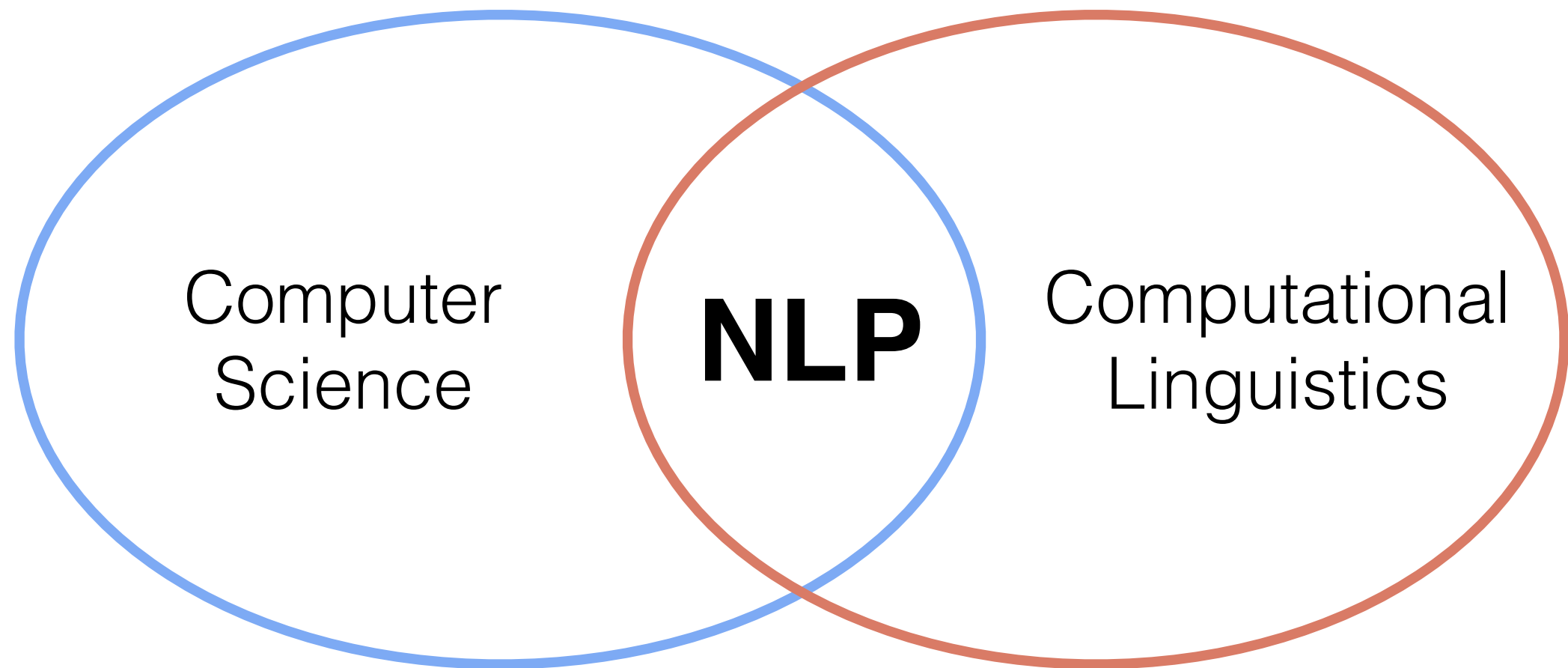
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The Audience (You!)

- Know some Python already?
- Know some NLP already?
- Both / None of the above?

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Natural Language Processing



`github.com/bonzanini/nlp-tutorial`

NLP Goals

Text Data  Useful Information
Actionable Insights

`github.com/bonzanini/nlp-tutorial`

Formal vs Natural

```
SELECT name, address  
FROM businesses  
WHERE business_type = 'pub'  
AND postcode = '50121'
```

VS

Where is the nearest pub?

github.com/bonzanini/nlp-tutorial

NLP Applications

- Text Classification
- Text Clustering
- Text Summarisation
- Machine Translation
- Semantic Search
- Sentiment Analysis
- Question Answering
- Information Extraction

`github.com/bonzanini/nlp-tutorial`

Environment Set Up

- Tested with Python 3.4, 3.5 and 3.6
- Clone the repository:

```
git clone https://github.com/bonzanini/nlp-tutorial  
cd nlp-tutorial
```

Environment Set Up (cont'd)

- Set up virtual environment:

```
virtualenv nlp-venv  
source nlp-venv/bin/activate  
pip install -r requirements.txt
```

Environment Set Up (cont'd)

- Set up virtual environment (alternative):

```
conda create --name nlp-venv python=3.5  
source activate nlp-venv  
pip install -r requirements.txt
```

Environment Set Up (cont'd)

- Download NLTK data:

```
python -m nltk.downloader \
    punkt stopwords reuters
```

Environment Set Up (cont'd)

- Start up Jupyter notebook:

```
jupyter notebook
```

Exploring Text Data

Exercise

What are the most important ingredients in Italian cuisine?

recipes_exploratory_analysis.ipynb

Recipe Analysis: Summary

- Tokenisation
- Counting words
- Stop-words
- Normalisation
- Stemming
- n-grams

```
pyconuk_exporatory_analysis.ipynb
```

PyConUK Analysis Summary

- Data visualisation for text
- “This talk will ...”
- TF-IDF

Break

Text Classification

Text Classification

- *“Text categorization (a.k.a. text classification) is the task of assigning predefined categories to free-text documents. It can provide conceptual views of document collections and has important applications in the real world”*

Scholarpedia (Yiming Yang and Thorsten Joachims)

Text Classification

- **Binary:** Only two categories which are mutually exclusive
 - Spam detection, Anomaly detection, Fraud detection, ...
- **Multi-class:** Multiple categories, mutually exclusive
 - Language detection, ...
- **Multi-label:** Multiple categories with the possibility of multiple (or none) assignments.
 - News Categorisation, Marketing profiling, ...

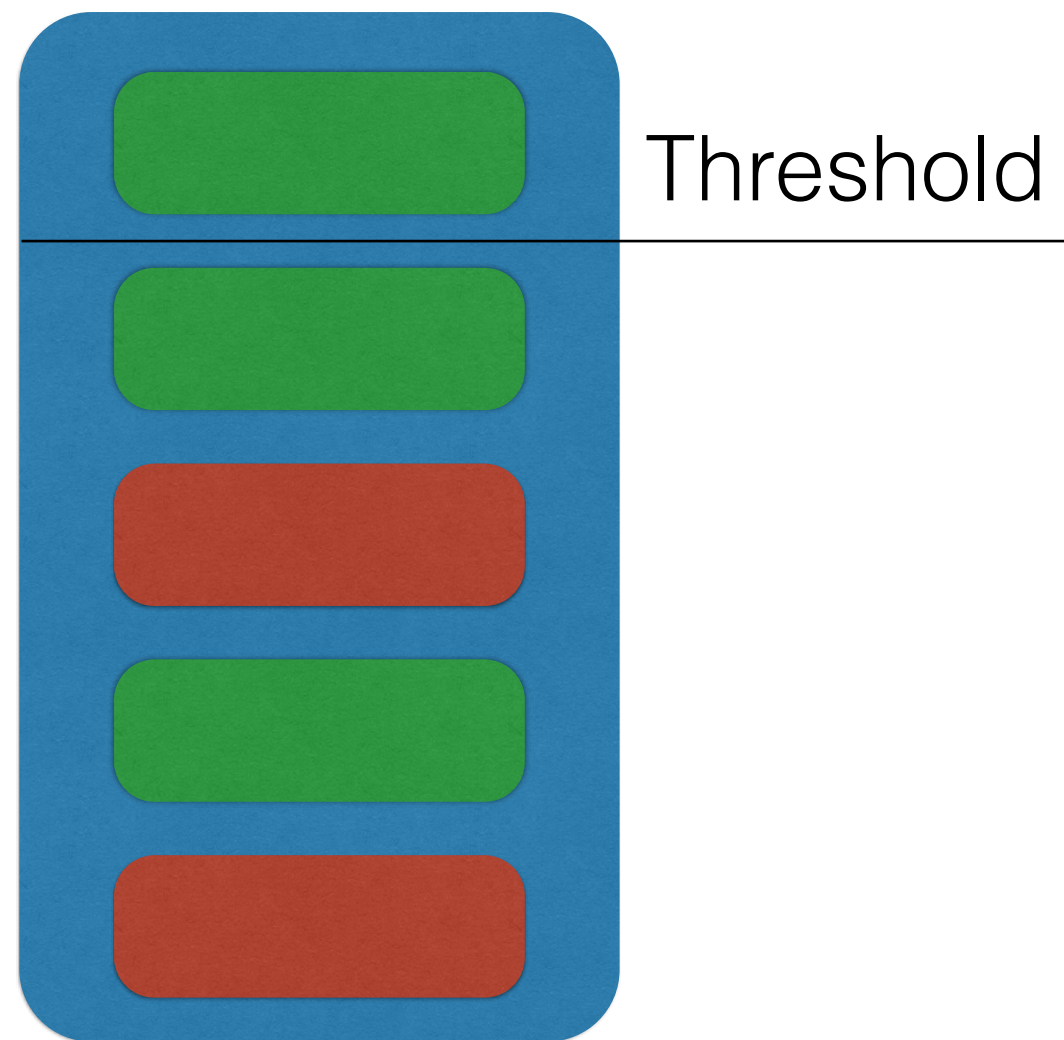
text_classification_Generic.ipynb

Text Classification Evaluation

Text Classification Evaluation

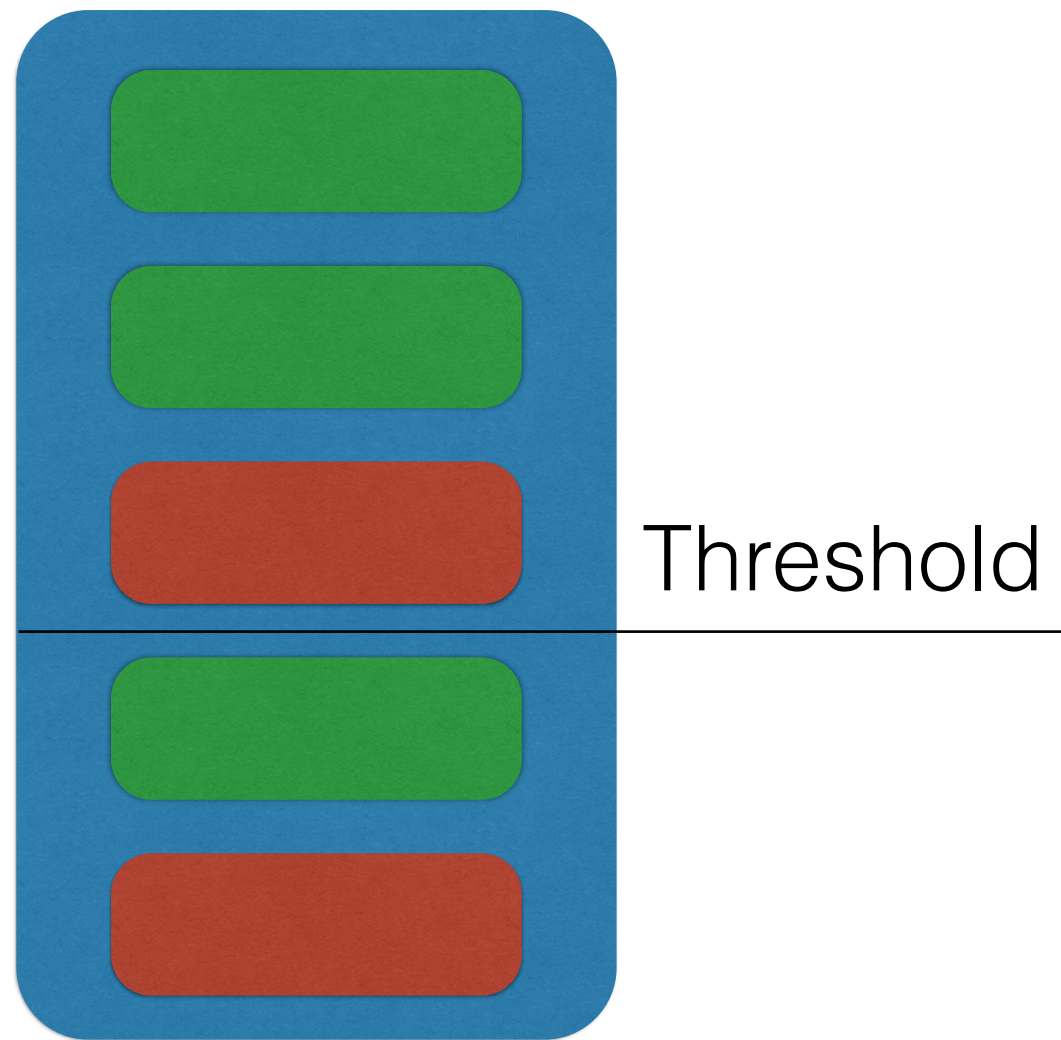
- *“If you cannot measure it, you cannot improve it”.*
Lord Kelvin
- Main metrics for **Text** Classification:
Precision and Recall

Text Classification Evaluation

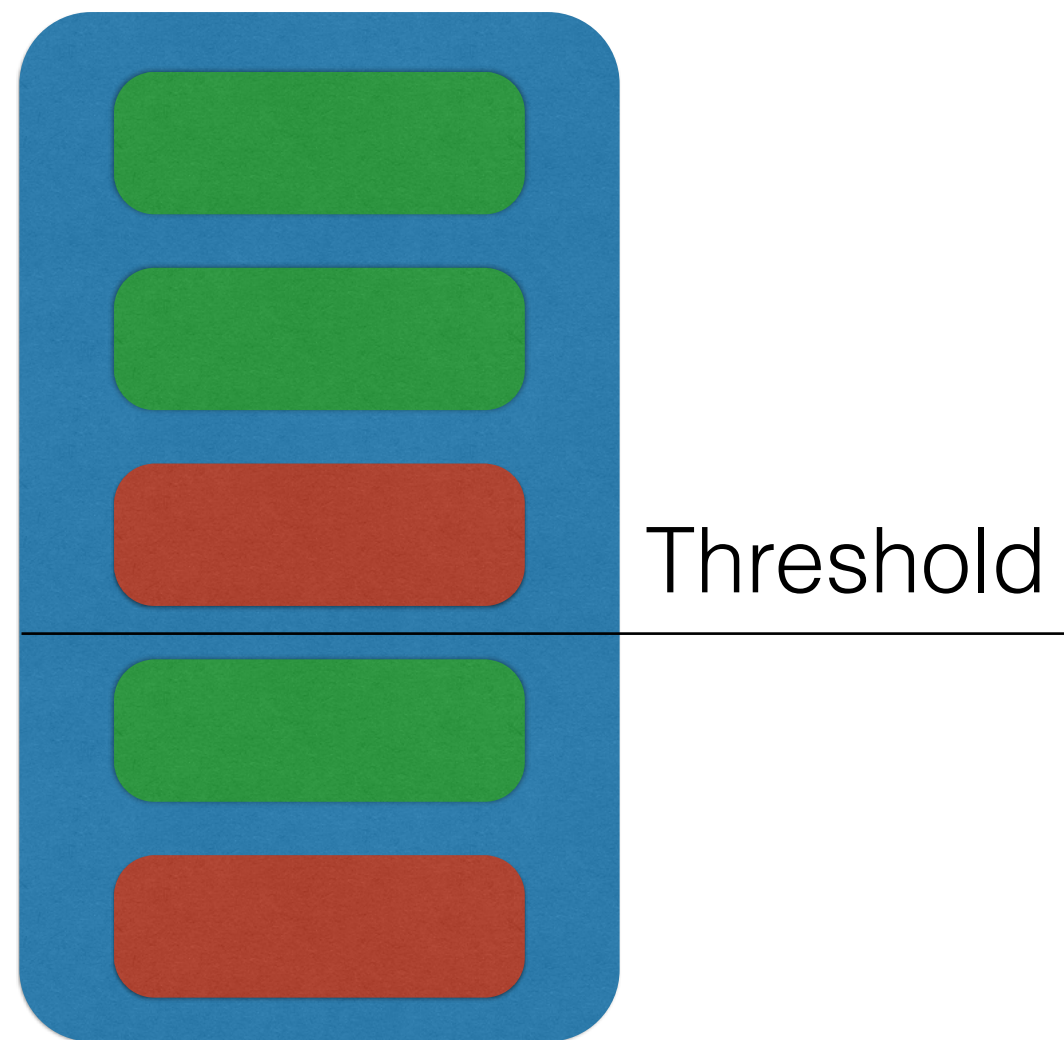


- 1 correct case labelled in the class out of 1 prediction
- 1 correct case labelled out of 3 being correct
- **Precision: 100%**
Recall: 33%

Text Classification Evaluation



Text Classification Evaluation



- 2 correct cases labelled in the class out of 3 predictions
- 2 correct cases labelled out of 3 being correct
- **Precision: 66%**
Recall: 66%

text_classification_Evaluation.ipynb

Classifying a real collection

`text_classification_Reuters.ipynb`

text_classification_Reuters.ipynb

Text Classification Summary

- Types of Classification Problems
- Document Representations: Vectorizers
- Training and predicting
- Evaluation: Precision vs Recall

Questions?

EBMMS50 (ebook 50%)

BMISS15 (paperback 15%)

on packtpub.com

until 15th May

