

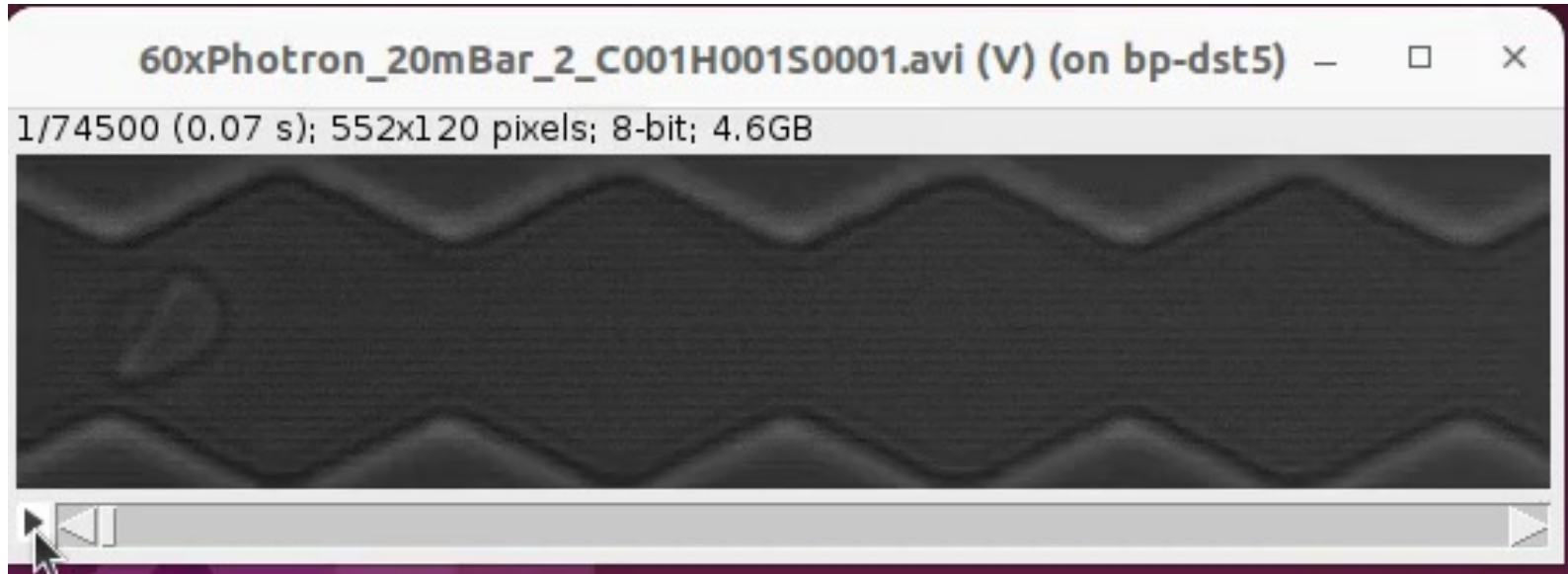
Innovation Through Education Outside the Workplace

Irene Luna
MSc Data Science Apprentice at Roche
PD, Data Sciences

My personal experience

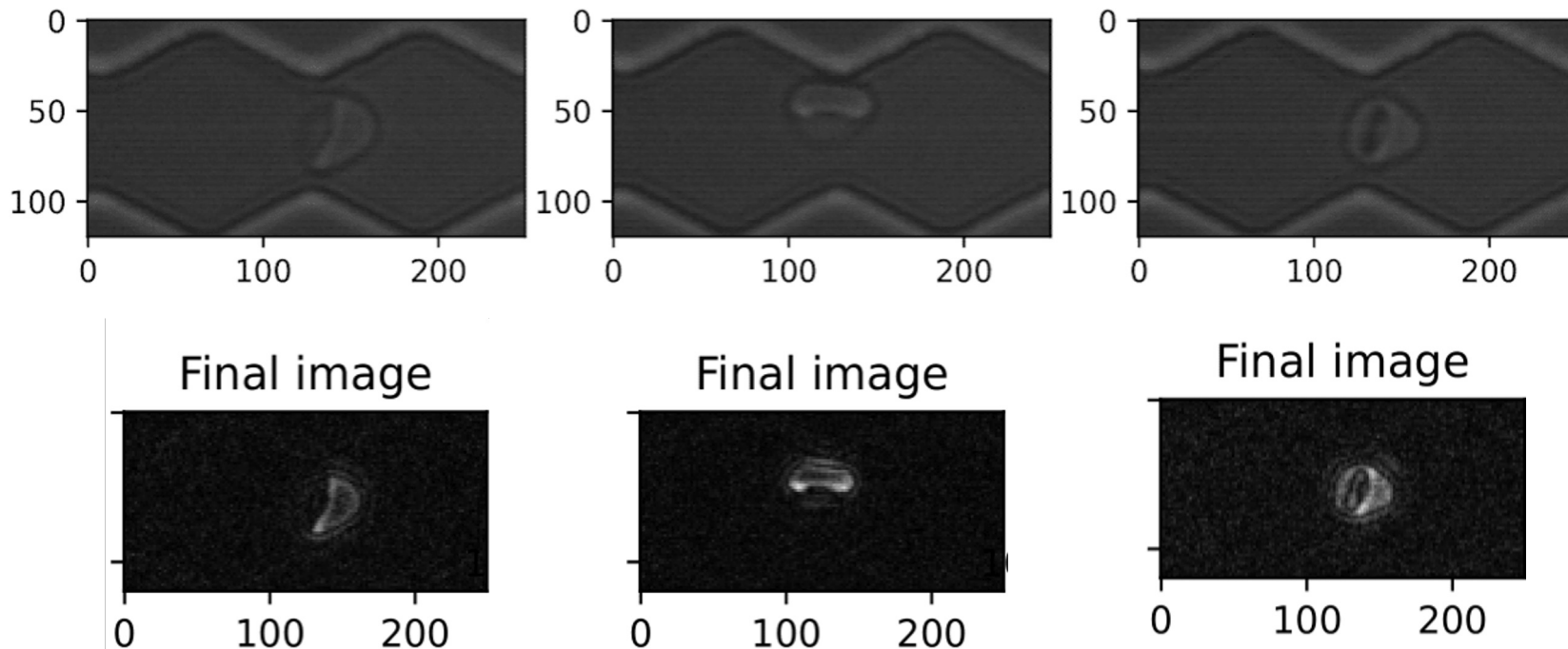
Dissertation project and published paper

“Image Analysis For Micro-Fluidic Cell Sorter Using Machine Learning”



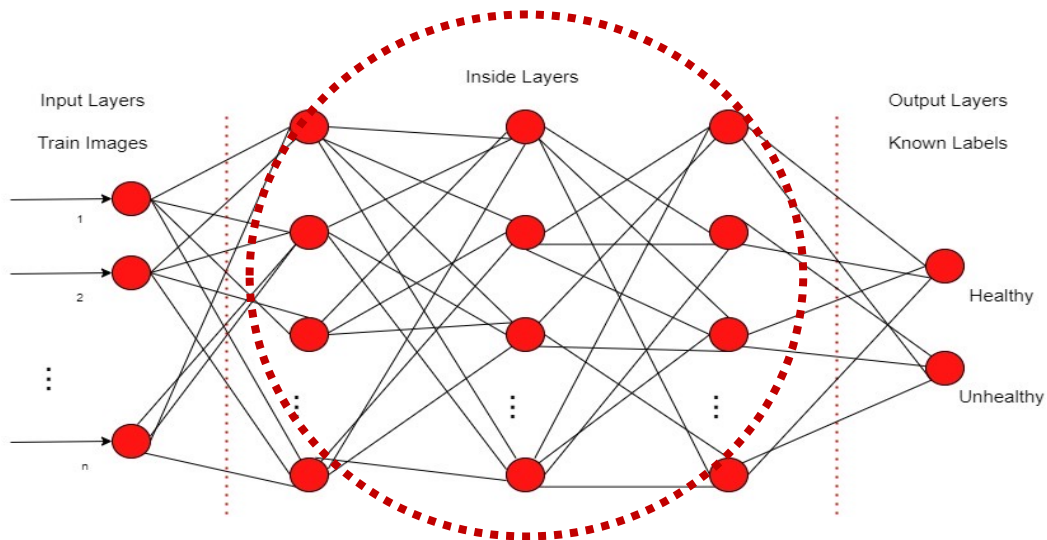
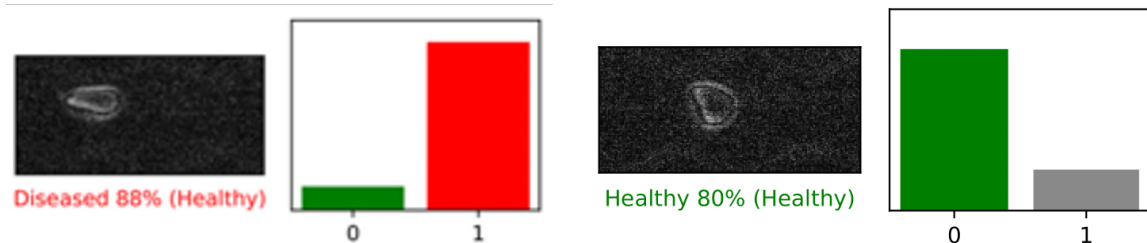
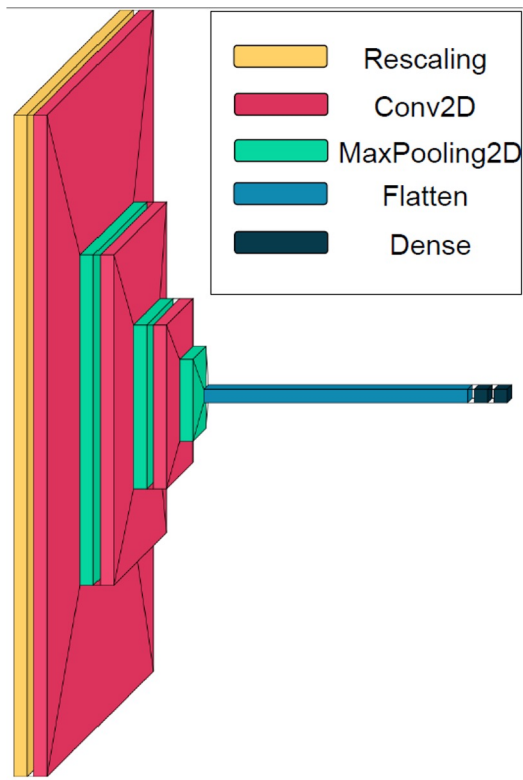
Dissertation project and published paper

Frame Acquisition



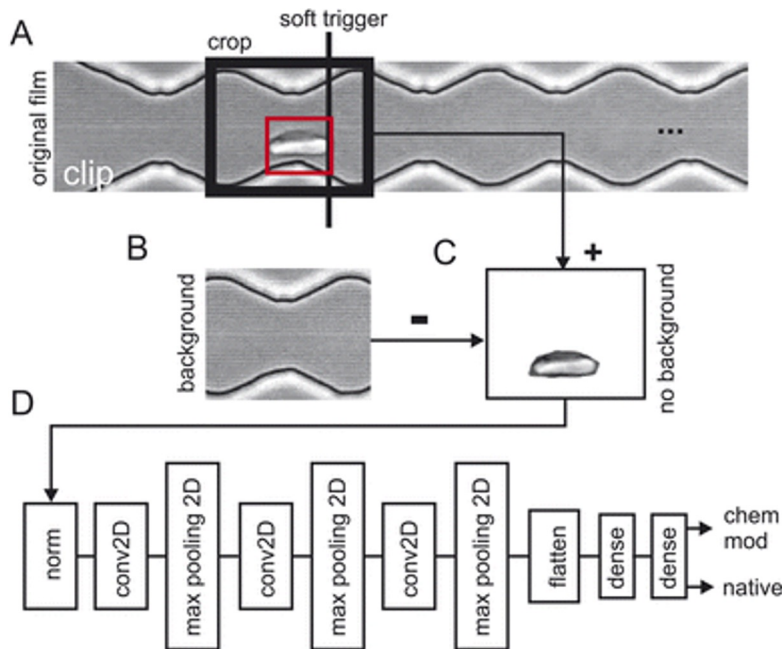
Dissertation project and published paper

ML Model development



Dissertation project and published paper

Final Output and publication



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AI based image analysis of red blood cells in oscillating microchannels†

Andreas Link, , Irene Luna Pardo, , Bernd Porr and Thomas Franke *

The flow dynamics of red blood cells *in vivo* in blood capillaries and *in vitro* in microfluidic channels is complex. Cells can obtain different shapes such as discoid, parachute, slipper-like shapes and various intermediate states depending on flow conditions and their viscoelastic properties. We use artificial intelligence based analysis of red blood cells (RBCs) in an oscillating microchannel to distinguish healthy red blood cells from red blood cells treated with formaldehyde to chemically modify their viscoelastic behavior. We used TensorFlow to train and validate a deep learning model and achieved a testing accuracy of over 97%. This method is a first step to a non-invasive, label-free characterization of diseased red blood cells and will be useful for diagnostic purposes in haematology labs. This method provides quantitative data on the number of affected cells based on single cell classification.

Introduction to the Apprenticeship

Overview of the Apprenticeship

- MSc in Data Science at the University of Exeter
- 1-2 modules per semester
- 4 working days and 1 study day a week
- Graded on coursework
- 3 year long



University
of Exeter

Apprenticeship Coursework Showcase

Twitter Data Analysis

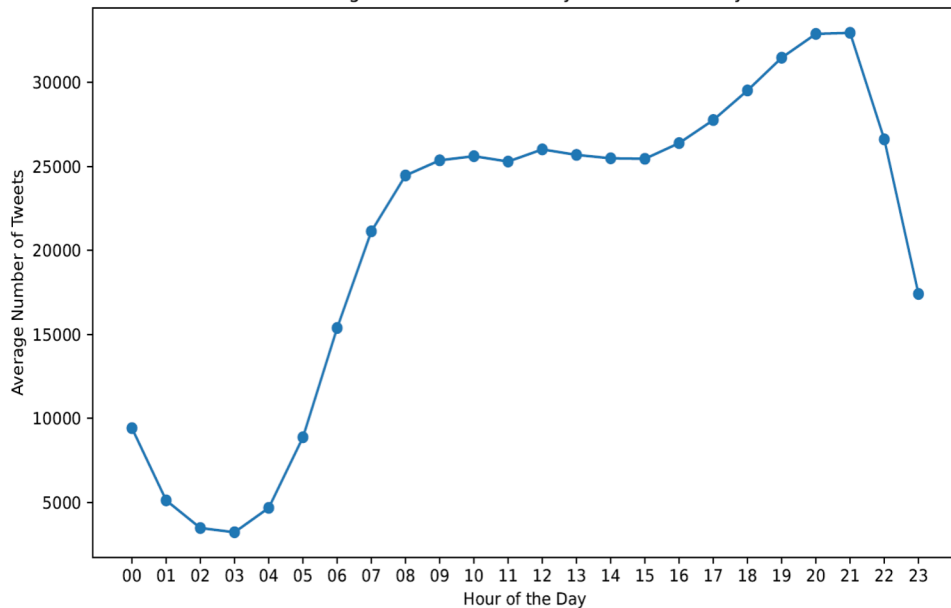
- Coursework dataset with 14 million tweets in JSON file format
- I created a database from the JSON file

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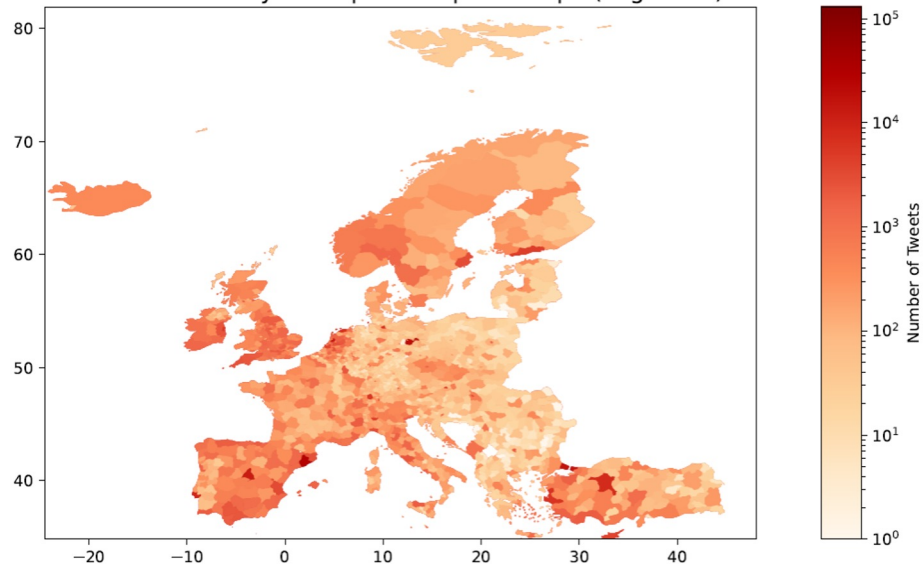
Apprenticeship Coursework Showcase

Twitter Data Analysis Outputs

Average Number of Tweets by Hour on Weekdays



Twitter Activity Choropleth Map in Europe (Log Scale)



Importance and Application of Learning

Importance of continuous learning

01

Thinking Outside the Box

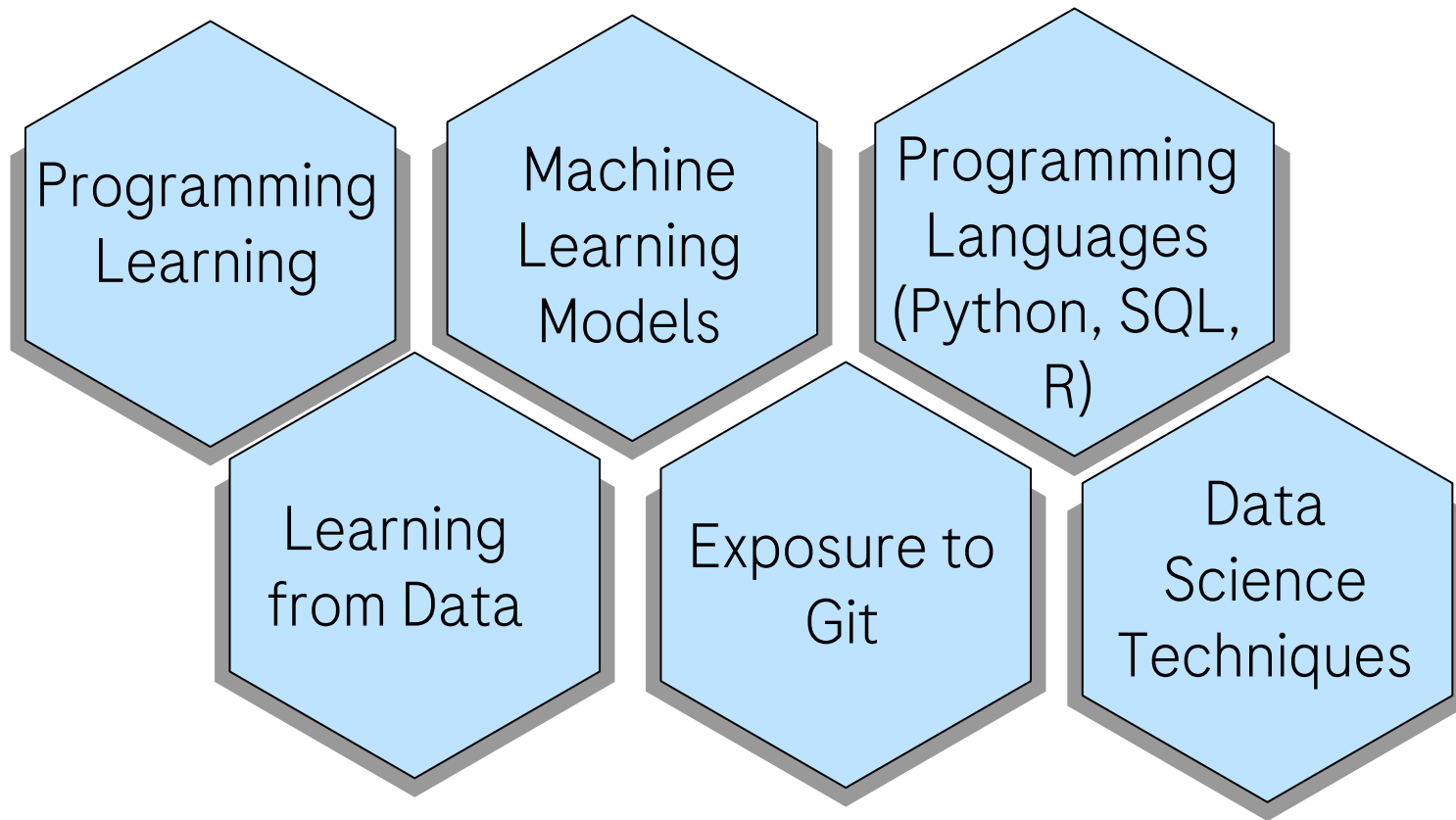
03

Proactive in Acquiring Skills

02

Enhanced Skill Set

Using Learned Skills: Sharing My Professional Journey



Key Takeaways



Sharing my Journey and Adaptability



Impact on Innovation



Collaboration and Knowledge Sharing

Thanks for listening!

Contact Details:

irene.luna@roche.com

Doing now what patients need next

Appendix

Dissertation Project Video

```
irene@bp-dst5: ~/Machinelearning-Tensorflow-HealthyCellD...  
ireneluna22@ireneluna22:~$ ssh -X irene@bp-dst5.eng.gla.ac.uk  
irene@bp-dst5.eng.gla.ac.uk's password:  
irene@bp-dst5:~$ cd /home/irene/Machinelearning-Tensorflow-HealthyCellDetector  
irene@bp-dst5:~/Machinelearning-Tensorflow-HealthyCellDetector$ python train.py  
-w -max
```