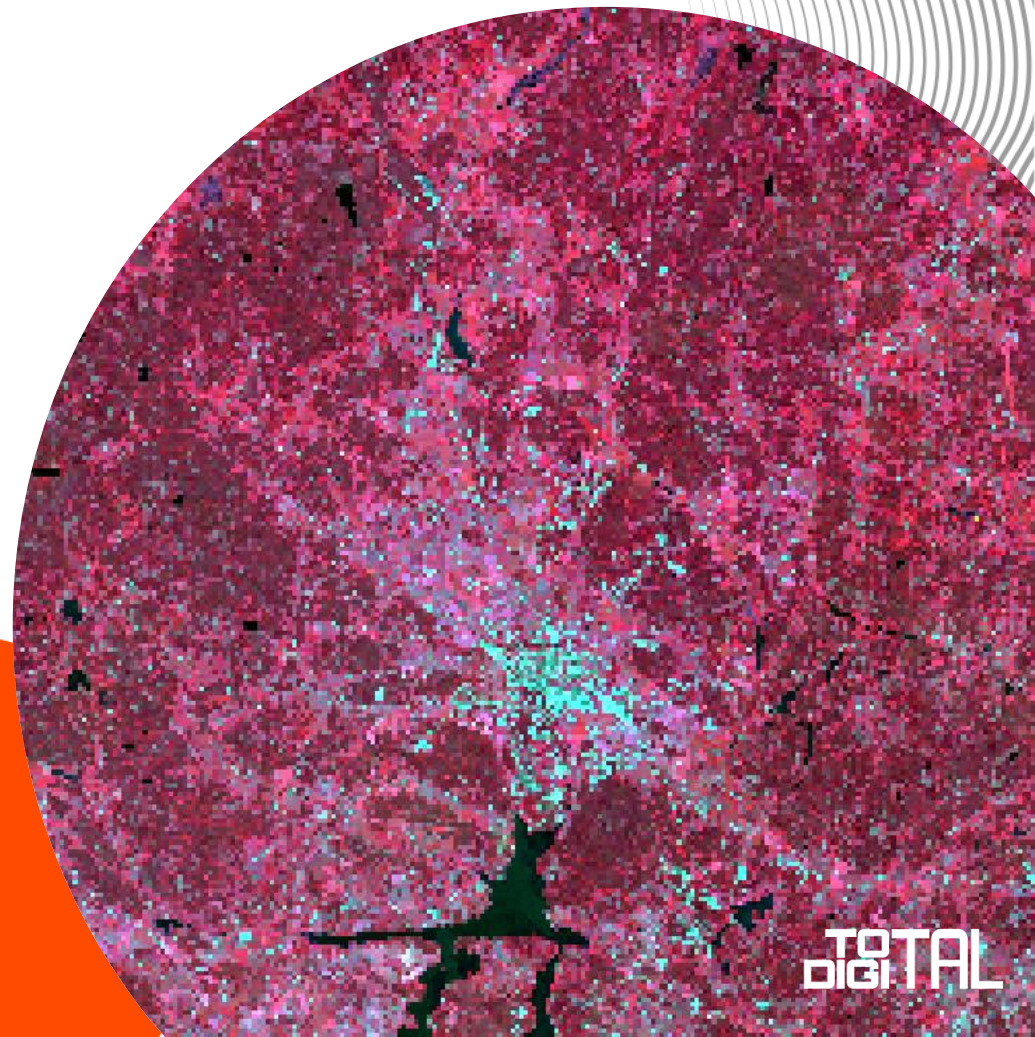
Beyond the Syntax Wars

Uniting Python and R for risk management



Us at Total Digital

- Founded in 2018
- Specialists in maintenance systems with a focus on IBM Maximo/AI and GIS/Remote sensing
- Experienced consultants
- We offer in-depth knowledge in a number of domains

Read more at totaldigital.se

What is this workshop all about?

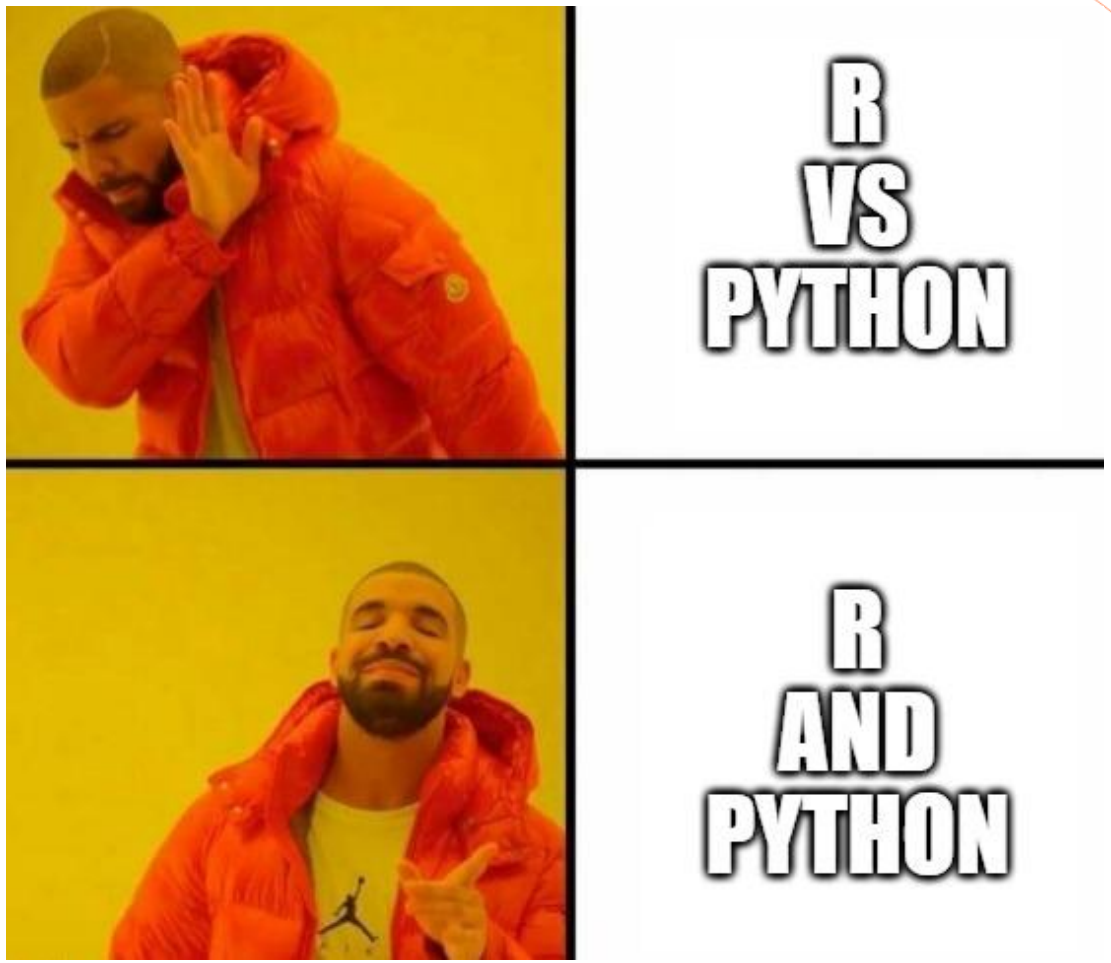
This is a workshop about tools, workflows and confidence-building.

We will learn how to:

- Work seamlessly with both Python and R
- Handle and visualize remote sensing data
- Train and interpret a basic machine learning model
- Connect remote sensing with demographic data using statistics

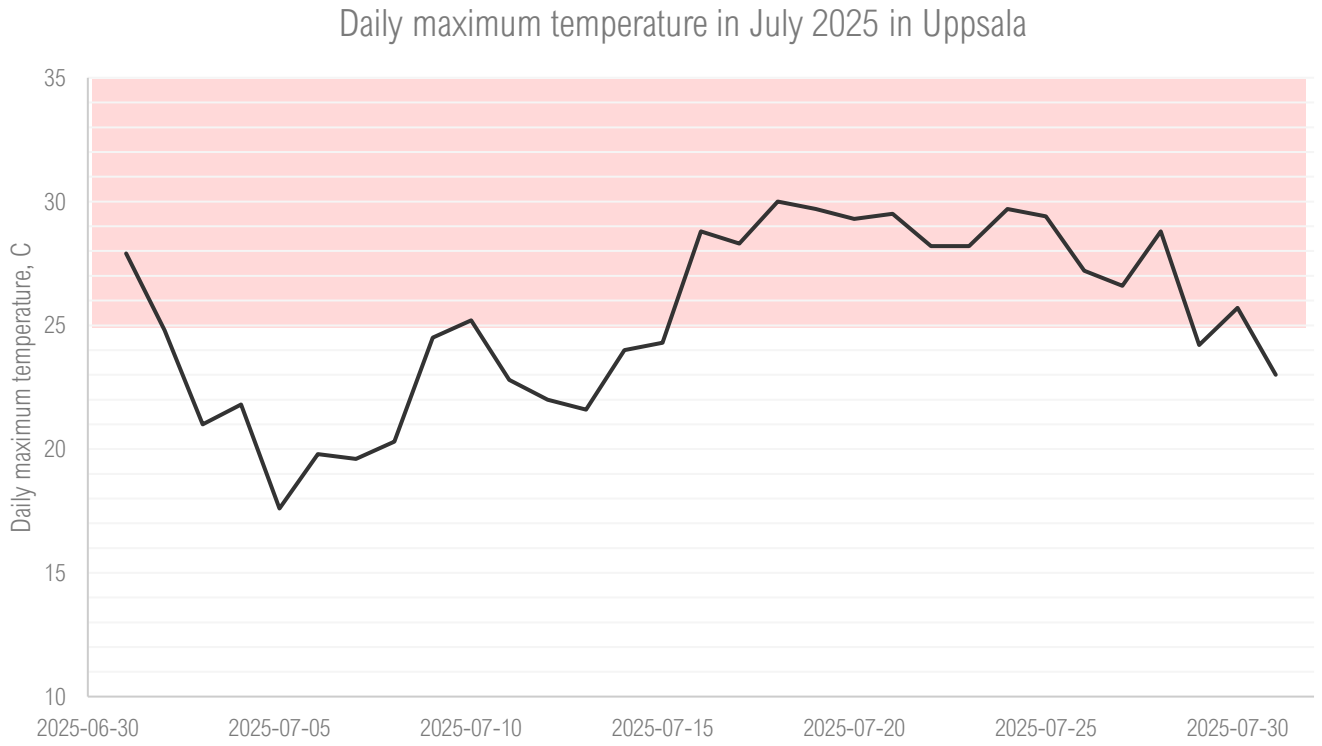
Why combine Python and R?

- Sometimes the best or only package is in the other language
- Collaboration becomes easier
- It can be fun!



Case Study:
Monitoring heatwave development in Uppsala

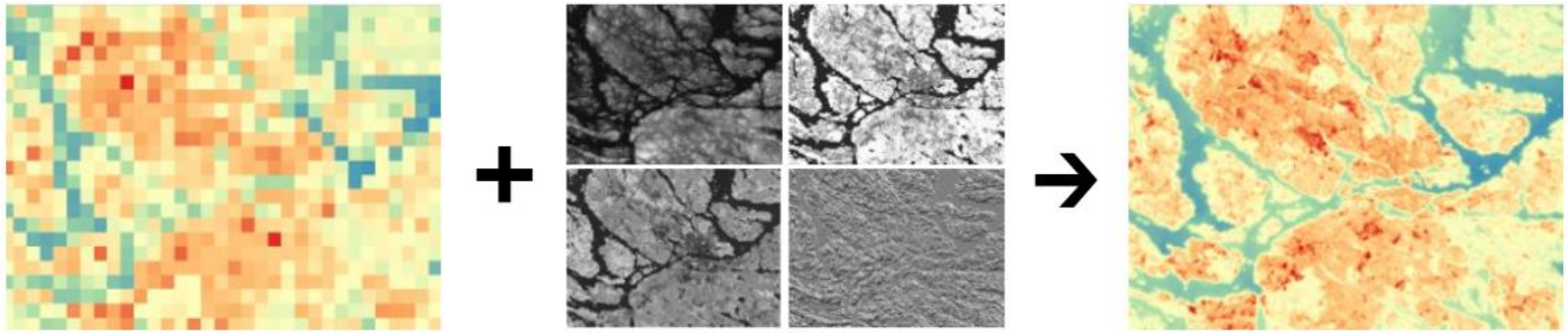
- Last summer we had a heatwave in Uppsala!
  - 13 days consecutively with temperatures over 25°C



Seeing how the heatwave unfolded across space lets us pinpoint hotspots and understand who might be affected.

Problem: No single sensor gives us what we need!

- High resolution satellites can give detailed temperature maps, but not often enough
- Daily satellites give frequent temperature but not detailed enough to see differences within the city



So, to understand how a heatwave unfolded across Uppsala, we need to combine spatial detail and temporal frequency. We employ a technique called downscaling!

What we are going to do

Create a higher resolution LST map

- We want to make a map of land surface temperature on a day that high resolution data doesn't exist.
- But we do have:
  - Daily coarse-resolution MODIS temperature
  - High resolution environmental predictors (Sentinel-2, elevation model)
- We will use a simple downscaling approach to estimate temperature at a finer spatial resolution.

Explore potential heat vulnerability using SCB statistics

- Once we have a temperature map, we combine it with population statistics from SCB.
- This helps us see where high temperatures overlap vulnerable populations.

So, let’s get started!

Link to GitHub repo with workshop code