Imperial College London

Applying Data Science
Wildfire project

Released: 21/03/2022 at 9:00 GMT
Deadline: 25/03/2022 at 16:00 GMT

MINI PROJECT

- Available data (described in the next slide):

Ferguson_fire_train

Ferguson_fire_test

Ferguson_fire_background

Ferguson_fire_obs

Ferguson wildfire (2018), source google

- Using this data answer the 2 questions described in the next slides.

- SUBMIT **2 NOTEBOOKS** ANWERING THE TWO QUESTIONS.

The **deadline** is Friday 25 February 2022 at 16:00 (UK time)

If you have any questions, please ask them in General channel on MS Teams

MINI PROJECT

- ❑ Model data (already pre-processed):
  - Ferguson_fire_train: training data

Source:

https://drive.google.com/file/d/11S0uXpT6rHOsph1OsMu5cGRNG4ieSjLW/view?usp=sharing

  - Ferguson_fire_test: similar to Ferguson_fire_train with different simulations

Source:

https://drive.google.com/file/d/1K3q1g3gfacK7RL6VLHnRmK1QGEykws_m/view?usp=sharing

Ferguson_fire_background: model data you will use for the data assimilation:

Source:

https://drive.google.com/file/d/1DUvPaEnFTT1hQOHy0SHAZxfoKnxQKMid/view?usp=sharing

- ❑ Satellite data (already pre-processed):

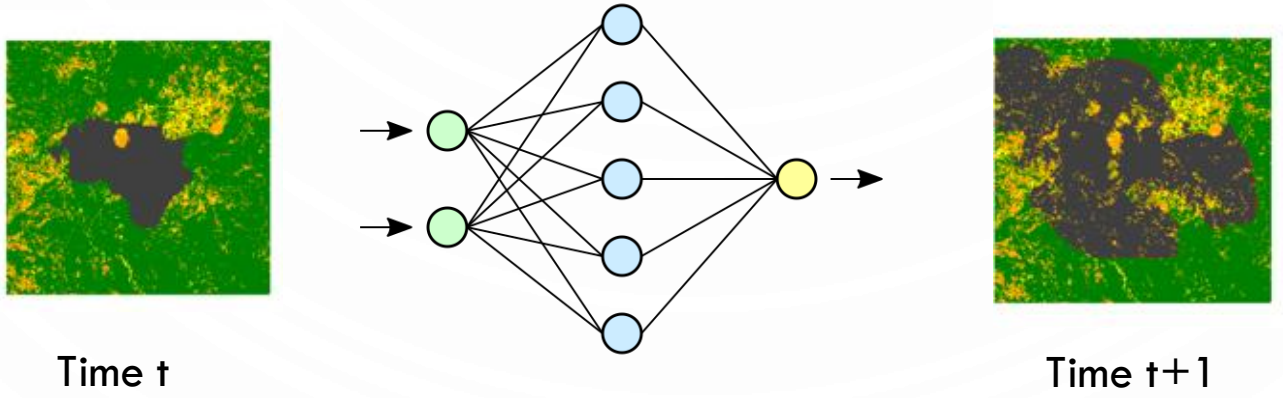
Ferguson_fire_obs: Observation data at different days after ignition (only one trajectory)

Source:

https://drive.google.com/file/d/1pK7W082NEpS5rL7e5_MbHmY_51mliu9N/view?usp=sharing

MINI PROJECT: QUESTIONS

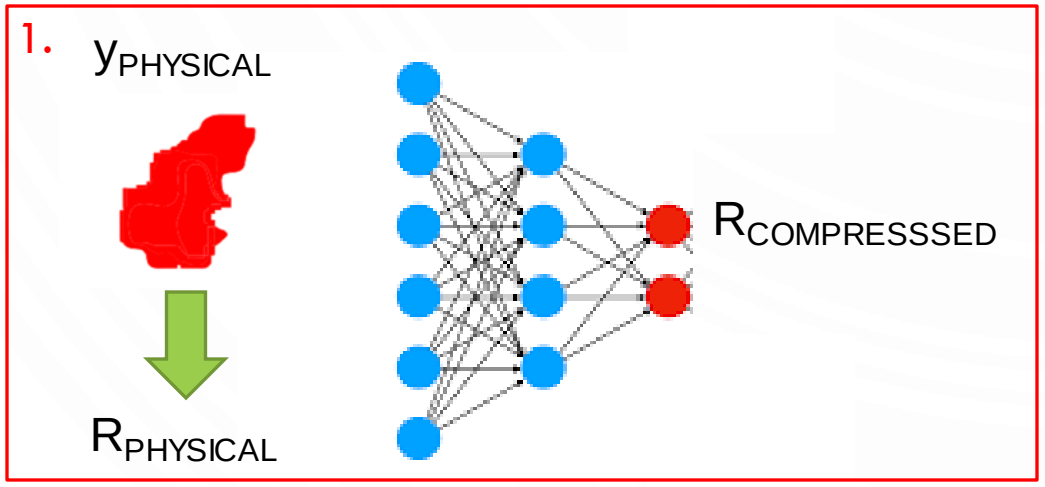
- QUESTION 1 **(PREDICTION)**
  - Use a neural network to train a forecasting model.
  - Use the model data for training (Ferguson_fire_train) and test the model using the model data for testing (Ferguson_fire_test).
  - Submit both the code and MSE (as a CSV file) for the forecasting.

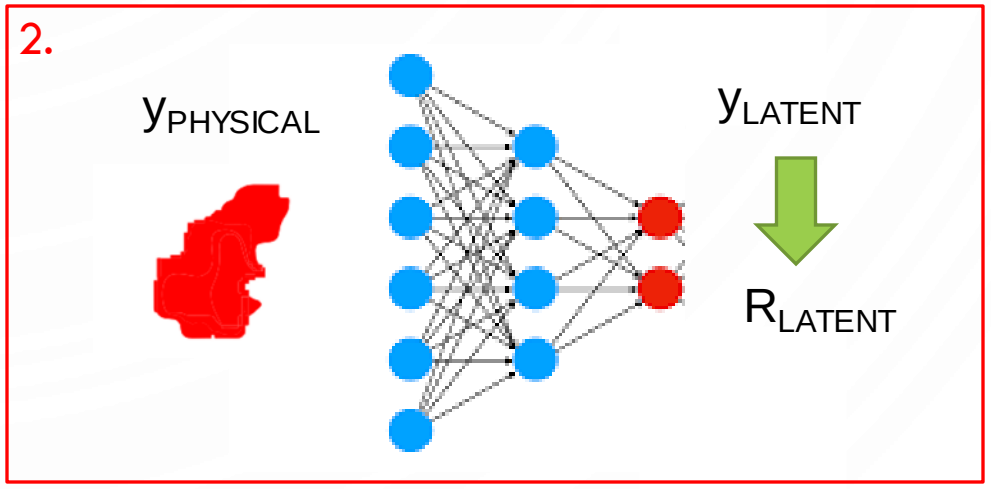


Note: You can use any neural network! You may choose to use more than one and compare them.

MINI PROJECT: QUESTIONS

- QUESTION 2 **(CORRECTION)**
  - Compute the error covariance matrix for the satellite data (Ferguson_fire_obs), *i.e.* the matrix R in the data assimilation model.
  - Then, perform **data assimilation** in a reduced space using the satellite data and the background data (Ferguson_fire_background) and submit both code and MSE (as a CSV file).
  - There are two strategies:
    1. **compute R in the physical space and then compress it**
    2. **compress the data and compute R in the compressed space**





Note: in the folder with the background files, you will have the model data already selected in time steps corresponding to the observations.