The Challenges of Replicating the Ferguson Model

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What is the Ferguson model?

➢ An agent-based model
➢ Created by Neil Ferguson in 2005
➢ Originally designed to model influenza
➢ Adapted in 2020 to model Covid-19
➢ Produced results that encouraged enforced UK lockdown
➢ “Thousands of lines of undocumented C (code)”

Why are we replicating it?

Verification of results
Expansion of features
Exploration of replicability

The main challenges of this replication

Documentation
➢ Insufficient reporting in model publications
➢ Difficult to obtain input data
➢ No model specifications

Solutions
➢ Group exploration of available literature
➢ Collection of comparable input data
➢ Calculated estimations for algorithms and features

Performance
➢ Simulating the entire UK is expensive (~66.65 million agents)
➢ Agent model optimisation is often challenging
➢ Faster realizations = Faster results

Solutions
➢ Aggressive optimisation using Cython and profiling
➢ Problem points identified and focused

An overview of our current Replication state

➢ An agent-based model implemented in Python
➢ Models COVID-19 transmission throughout the UK (or sub-sections)
➢ Current goal is version 3.0 (Release)
➢ Aims to be functionally comparable to the original Ferguson model
➢ Currently ~37% to goal

For more information or if you would like to collaborate in this project contact: jake.saunders@manchester.ac.uk