

POLITECNICO DI TORINO

Master of Science in Computer Engineering

Master Degree Thesis

**Neurological Consequences of  
COVID-19**



**Politecnico  
di Torino**

**Supervisors**

Dr. Sacco Alessio

Dr. Marchetto Guido

Dr. Vito De Feo

Dr. Cristina Del Prete

**Candidate**

Otabek Fayziev

---

ACADEMIC YEAR 2024/2025



# Abstract

This thesis was developed within a collaborative project between the University of Essex and Politecnico di Torino and focuses on strengthening the digital infrastructure of the Happy Again platform (<https://happyagain.essex.ac.uk/>). The platform is a web-based research tool designed to investigate the long-term neurocognitive consequences of COVID-19 by collecting behavioural and cognitive markers through online tasks and questionnaires. It enables the assessment of attention, perception, response timing, and cognitive processing in individuals experiencing post-COVID conditions.

The work presented in this thesis involved coordinated development across backend and frontend components to improve system stability, data integrity, and research reproducibility. On the backend, Docker-based containerization was introduced to ensure consistent deployment, the configuration architecture was refactored, APIs and data models were updated, new cognitive and timing indicators (including task-specific `lc_flag` values) were integrated, and robustness of registration and email delivery workflows was enhanced. On the frontend, the administrative data-export module was restructured, unified pipelines for processing task results were implemented, new timing-based and derived metrics were added, and multiple optimizations were applied to improve reliability and performance.

These developments reinforced the platform as a reliable and scalable research environment, enabling more structured and accurate data collection and supporting ongoing investigations into the neurological impact of COVID-19 and future applications in cognitive monitoring and rehabilitation.