

Project Title	AI for COVID Prognostication
Supervisors	Md Zakir Hossain & Khandaker Asif Ahmed
Address	Building 801, Cnr of Dickson Way and, N Science Rd, Acton ACT 2601
Telephone	0470171019
Email	zakir.hossain@anu.edu.au

Lead discipline (please select one)

- | | |
|--|--|
| <input type="checkbox"/> Nursing and Midwifery | <input type="checkbox"/> Health Economics |
| <input type="checkbox"/> Allied Health | <input checked="" type="checkbox"/> Biostatistics |
| <input type="checkbox"/> Medicine | <input type="checkbox"/> Value-based Healthcare |
| <input type="checkbox"/> Pre-clinical | <input type="checkbox"/> Epidemiology |
| <input type="checkbox"/> Health Policy | <input type="checkbox"/> Other |

Outline of the project 250 words max

The COVID pandemic has a devastating impact on the health and well-being of global population. There are numerous COVID detection and diagnosis tools available, but there is a scarcity for prognosis tool, which can minimise community transmission of this highly contagious disease. Different physiological (X-ray, CT scan, cough audio signals) and multi-omics (DNA, RNA, and protein data) dataset of COVID patients available on public repositories – which can be utilised for both detection and prognostication. Our recent AI model on cough audio showed good accuracy (~94%) to detect COVID patient from non-covid, regardless of having COVID related symptoms or not and showed potential implementation in health industry. Moreover, in case of DNA methylation-based omics dataset, our in-house model showed great capability (~87%) to measure the levels of COVID severity. Current project aims to identify relevant gaps in the online datasets by collecting, analysing, and comparing different omics datasets related to COVID. Finally, it will offer an AI model to identify a reliable COVID dataset for measuring disease prognosis.

Proposed research methods

- Collect omics datasets from publicly available (e.g. – NCBI) repositories.
- Measure reliability of the different dataset using statistical models.
- Develop an AI model for detecting COVID.
- Propose a multi-modal prognostic tool for COVID prognostication.
- Future directives to deploy as an easy-to-use, computational inexpensive tool.

Preferred study discipline being undertaken by the student

Computer Science, Bioinformatics, Biomedical science, Health-informatics

Benefits to the student and to the department

Student: Students will get hands-on experience on disease-related datasets and processing, and evaluation of different AI models for disease prognosis.

Department: Health department will be benefited by getting a well-annotated and confidential COVID dataset for future study and state-of-the-art pre-clinical prognosis tool, which can be improvised for other respiratory diseases.

Alignment with Government Research Priorities 100w max

Proposed study aligns well with the government research priority, namely health. The study will generate well-annotated and reliable datasets for health care services and researchers. The developed AI models for COVID prognostication will address potential health threats at both individual and population levels, and will indicate an easy-to-use pre-clinical tool to improve communal well-being by minimising disease transmission within the community.

Department within ACT Health Directorate / Canberra Health Services where the student will be based

Canberra hospital

Please submit form to preclinical.research@act.gov.au