

Project Title

ODySSEy : a new Data Science Platform for crunching and harmonizing various sources of data to improve Emergency Department and Radiology services for day to day operations

Project Lead and Members

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Organisation(s) Involved

Singapore General Hospital, Duke NUS, SingHealth

Healthcare Family Group(s) Involved in this Project

Medical, Healthcare Data Science

Applicable Specialty or Discipline

Emergency, Radiology, Data Engineering

Aim(s)

To handle and process medical images, link them with individual electronic medical records for modelling and other advanced techniques.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Additional Information

Singapore Healthcare Management (SHM) Congress - 2nd Prize (Communications) category

Project Category

Technology

Data Analytics, Machine Learning, Artificial Intelligence

Keywords

Clinical Patient Assessment, Radiology Reporting, Specialized Data Platform, Odyssey (On-Premise Data Science And System Explorer Platform), Electronic Medical Records, Clinical Decision Support System, Structured and Un-Structured Data, Machine Learning, Artificial Intelligence (AI)

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ODySSEy : a new Data Science Platform for crunching and harmonizing various sources of data to improve Emergency Department and Radiology services for day-to-day operations

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Background

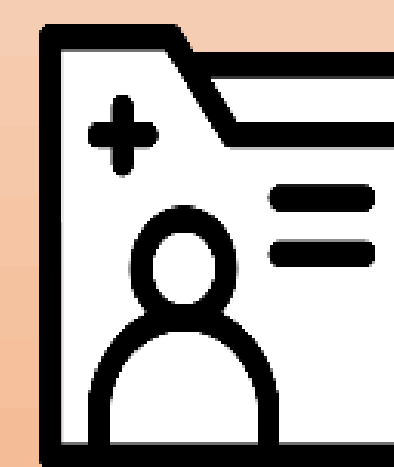
The Emergency Department (ED) faces heavy demand for urgent clinical patient assessments and radiology reporting.



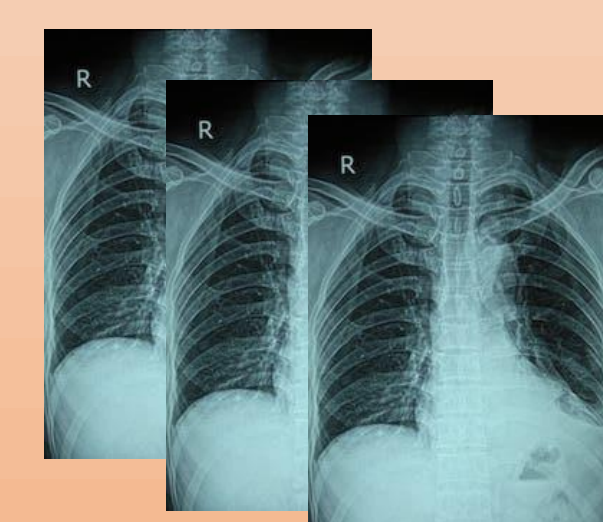
Chronic disease

Methodology

Using structured data (e.g. electronic medical records), there is potential to develop risk scores and predictive modelling using machine learning.



Structured Data

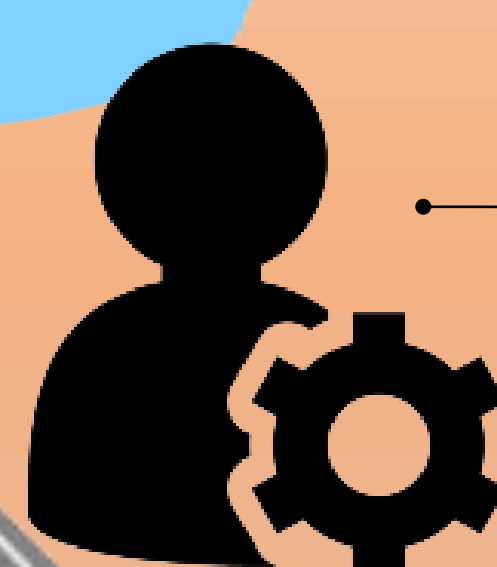


Un-structured Data

The unstructured data (e.g. medical images) can also be interpreted by Artificial Intelligence methods. Interpreting medical images using AI also has potential to improve efficiency and speed up reporting in urgent situations. Both types of data can also be linked and used for multi-modal AI prediction approaches.



Analyst



Data Engineer

Result & Discussion

The data pre-processing and feature engineering has been found to be the main driver of model performance in many machine learning (ML) and artificial intelligence (AI) applications. It is a crucial step in the machine learning pipeline.

In this case, the researchers can use a common key field (e.g. accession no) to link structured data (ED) and un-structured data (CXR) for creating or transforming some new features. That is a turning point of the data preparation processes to provide good quality variables for the next stage in modelling.

Outcome

By doing so, the researchers can improve the accuracy of the model. It will save a lot of processing time in A&E. Good feature engineering can be the difference between a poor model and a fantastic one!

ODySSEy

A specialised data platform (ODySSEy, On-premise Data Science and System Explorer Platform) is required to handle and process medical images, link them with individual electronic medical records for modelling and other advanced techniques. The data needs to be placed in a trusted and secured data platform for researchers and stakeholders such as trusted third parties, data engineers and data scientists to access in order to develop useful clinical decision support systems. This data platform for healthcare researchers in SingHealth that has been designed to serve this purpose.



Emergency Medicine Consultant



Diagnostic Radiologist



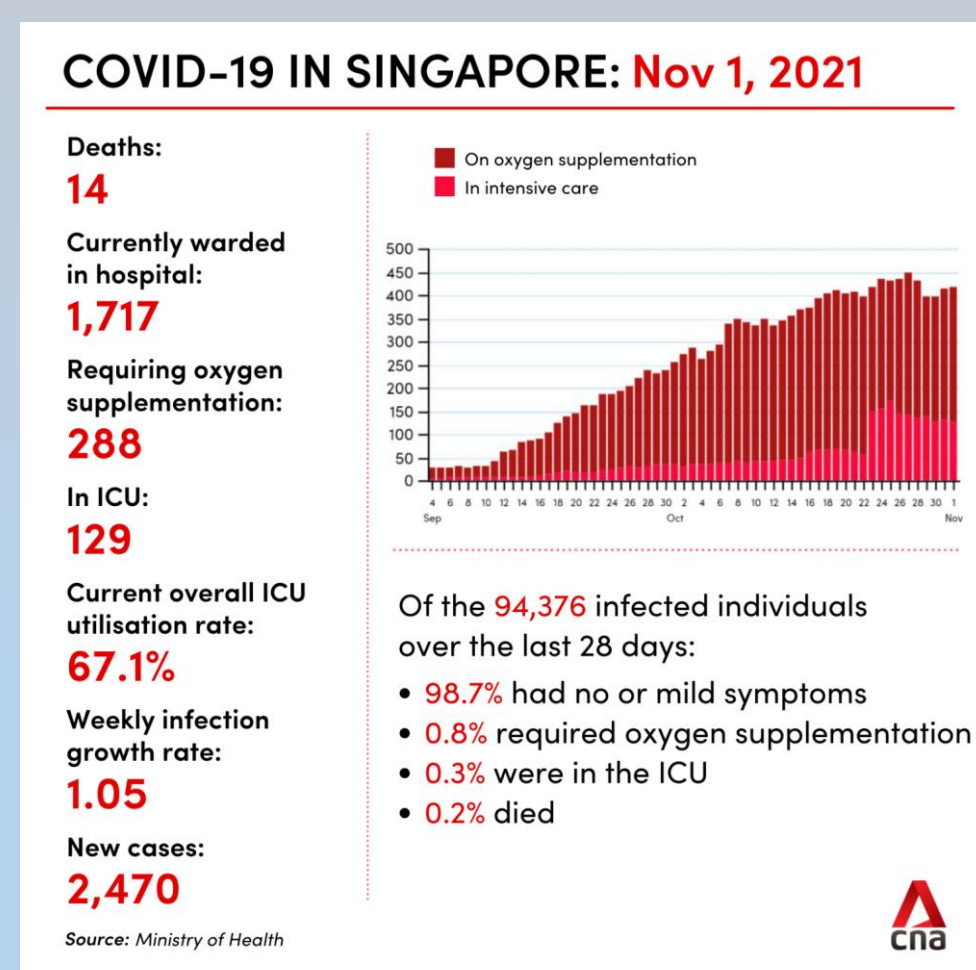
Data Scientist

Collaboration

The clinical scientists and researchers feature a case study using Chest X-Rays (CXR) linked with ED data to pilot a workflow for clinical decision support in the ED.

Interdisciplinary

Good features selection makes the subsequent modelling step easy and the resulting model more capable of completing the desired task.



Conclusion

The clinical scientists saw an urgent need to use our health system for day-to-day operation. The accurate forecast of emergency patient appointment scheduling decisions. They whole-system response was in order to protect and to save lives. Patient-Clinician communication becomes more effective and makes fast decision.



data to support our health system's support as well as current COVID-19 situation. flow is of great importance to optimize realized how important a comprehensive, the health system from being overwhelmed

