Subject

* In subject part: Need to redefine Alg-E (look at L. Bifano’s thesis)
* In subject part: did not include “management” objective
* In aims and objectives: need to be more precise about the methods used especially in interpretability (but can’t really fill that in right now)
* In both: did not include the possibility of having “real-time” data from the e-POCT results in Tanzania (will know if available soon enough)

Interpretability of e-POCT results for clinicians and validation of the Alg-E platform

This thesis aims to better the interpretability of Machine Learning (ML) models – including black box models – in order to generate results and behaviors that are more easily understood by clinicians and therefore generalize, widen and give more credibility to the use of ML models in the medical field (especially in the precise field of medical diagnostic). Interpretability of ML models will be explored at different levels; at the data level, at the model level and at the output level and will be done through different interpretability and visualization techniques (exploring probabilistic space of the model, intelligent descriptive statistics, confidence intervals for results).

This thesis will also provide a validation test of the Alg-E platform through the use of a dataset pertaining to Ebola infection cases in Tanzania. The models used will be carefully analyzed in order to find insights on a list of important (non-exhaustive) questions) and therefore validate the platform. The models and results themselves will be validated and benchmarked using another set of models and results.

The Alg-E platform is a web-based platform that allows users to upload tabular data in order to output clinical decision algorithms.

The end goal is for clinicians, the end-users, to be able to give criticism concerning the platform and alter it to evolve in that direction.

Aims and objectives

* Review the literature of interpretable methods in the field of ML applied to medicine and other available tools and demonstrate the need for improvement in that domain.
* Manage the Alg-E web platform and ensure integration of different team members’ work into the platform and map the communication and development flows. Notably
* Improve interpretability of the platform results through visualization techniques, understand the clinicians’ requirements for interpretability of data, models and results then implement changes addressing these.
* Validate the platform models using a dataset pertaining to Ebola, then validate the results using another set of models used on the same dataset and finally validate the clinical aspect of results through clinicians’ expertise.

Timeline

Get in touch with clinicians

Build ML model for Ebola dataset

Validate other models for Ebola dataset

Possible

Get in touch with Alg-E team

Research interpretability (finish book + still 3 papers to read, then will be ongoing during the thesis)

Finish reviewing literature

Take notes + write results on these in an organized (not totally formal) way

Write the thesis

Issue with the platform need to check what is happening: probably wsl2 ubuntu subsystem port occupied in windows supersystem ? otherwise everything runs smooth on wsl2, on windows nothing works (2 issues: 1 package is not available on windows, there are workaround but they are filthy, and another package is also sort of not available under the same version).