The DELPHI Library: Improving Model Validation, Transparency and Dissemination Through a Centralised Library of Prediction Models

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Abstract. The Deposit, Evaluate and Lookup Predictive Healthcare Information (DELPHI) library provides a centralised location for the depositing, exploring and analysing of patient-level prediction models that are compatible with data mapped to the observational medical outcomes partnership common data model.

Keywords. Prediction Model, Interoperability, communication

1. Introduction

Over the past decade there has been a rapid increase in the number of published clinical prediction models [1], but no similar rise in use within clinical settings. This usage gap is due to multiple reasons including insufficient reporting [2], non-publication of full models, inadequate testing [3] and lack of trust from clinical stakeholders. To improve reporting and model sharing we created the Deposit, Evaluate and Lookup Predictive Healthcare Information (DELPHI) library. A centralised repository where users can upload Patient-Level prediction (PLP) models, performance statistics and complete information on all model design choices. This enables others to explore results, replicate model development and externally validate models downloaded from DELPHI.

2. Methods

We used the interoperability provided by a network of databases mapped to a common data model and the standardised analytical pipeline provided by the PatientLevelPrediction R package [4] to create a database for models. A graphical user interface provides interested parties with a simple method of searching for and evaluating

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prediction models and their validations, as well as uploading and downloading models and results. This is provided as a web application.

3. Results and Discussion

The library is available at: https://delphi.ohdsi.org/

Figure 1. The validation tab detailing the ROC plot and calibration plot along with performance metrics to analyse the selected prediction model.

Researchers are encouraged to explore and upload models to contribute to the library. Figure 1 shows the validation exploration page. The models are searchable by patient cohorts, algorithm type, database used, and developing researcher. Once a model is found, all key model and performance information will be viewable. DELPHI provides a dynamic results exploration environment that is unavailable in other repositories [5]. The main purpose of PLP models is to influence clinical practice. In order to do this the level of trust in the modelling process and the models themselves needs to be improved. Currently, prediction models are spread throughout the scientific literature and often poorly reported. The DELPHI library provides a centralised location to store models and results and makes accessible everything that is needed to assess and implement PLP models. The interactivity of DELPHI provides an extra dimension than is in other similar efforts [5].

4. Conclusions

A centralised, standardised model repository should help improve the searchability, external validation and assessment of prediction models. It is hoped this leads increased trust in and usage of models in clinical practice.

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