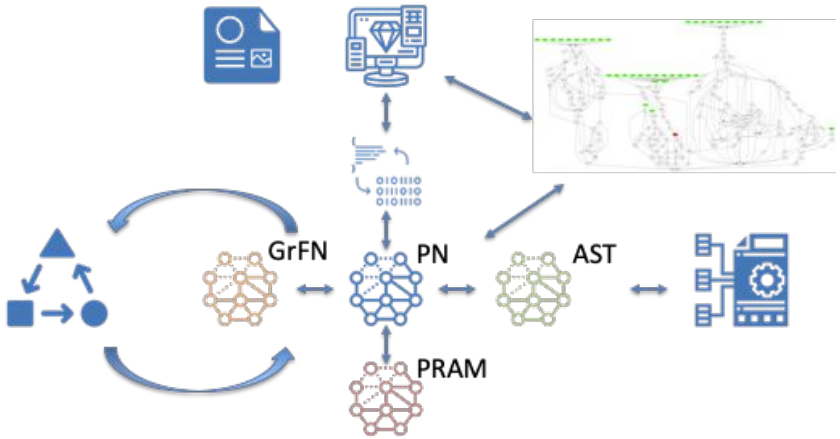
| galois |

Main title: Practical Challenges to Secure Computation

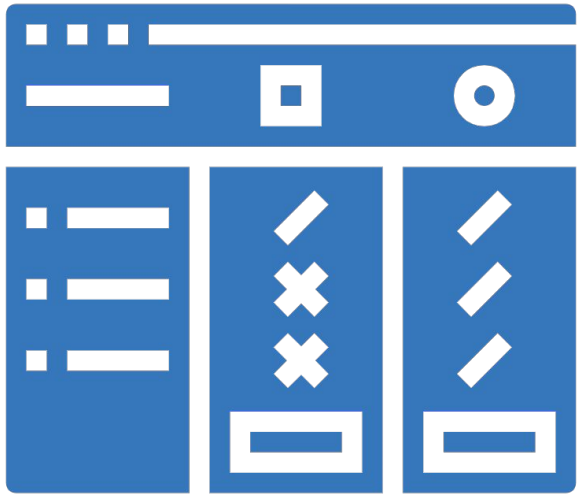
Proposed AMIDOL Structure

- Input endpoints for:
  - Model ingestion
  - Data ingestion
  - Measure ingestion
- Output endpoints for:
  - Output of synthesized code
  - Output of synthesized results for Model:Measure composition.
- IR requests to:
  - Generalize models
  - Compare models to models
  - Compare models to data
  - Run experiments on sets of models and sets of data.



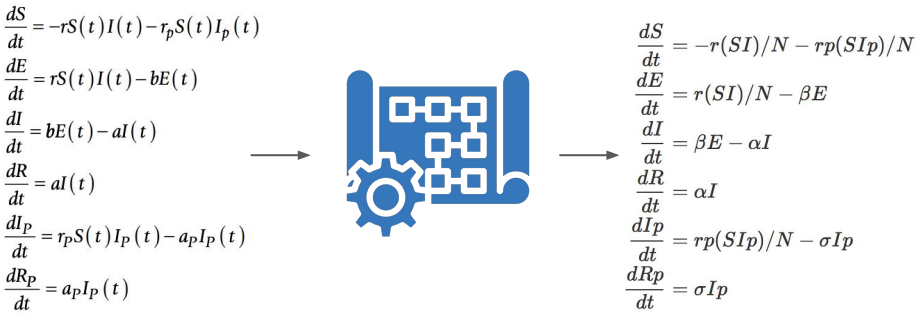
Experimental Interface

- Higher level functionality
  - Model validation/invalidation
    - Model:Data - does the model recapitulate the data?
  - Multi-model comparison with data.
    - Model:Model - how do they differ on a dynamic, measure, basis?
    - Model:Data - does the model recapitulate the data?
    - Model:Model:Data - which fits better?



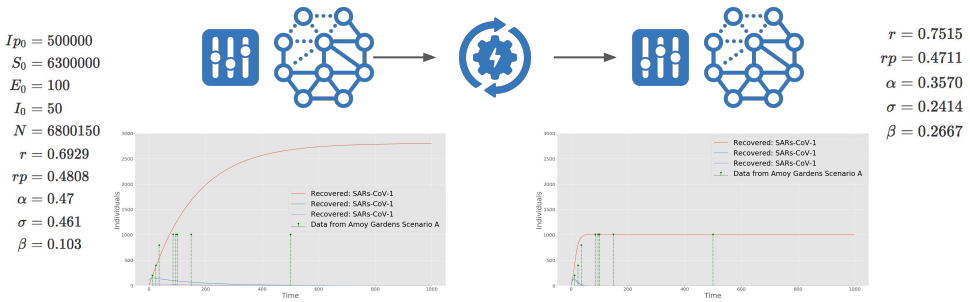
Automated Model Generalization

- Static analysis of models to determine their suitability for generalization.
- Detection of models which fail the principle of **causal modularity**.
- Automated refactoring of models and terms to provide **generalizable** models that have been refactored for **causal modularity**.



Automated Parameter Exploration

- Explore parameterization of models.
- Automated parameter fitting to data.
- Allow for user defined experiments, with multi-objective optimization, indicating priorities in data fitting.



Model Structural Exploration

- Connection point with **GTRI**
- Static analysis, model:model
  A. Identify structural differences
  B. Marry with domain knowledge structure (SNOMED) annotated with previous findings.
- Structural exploration of models
  A. Galois-Internal transformations using annotated ontology
  B. GTRI requested transformations using DPO rule bases
  C. Explore the consequences vs. data and models in structured experiments.
     1. Does the new model fit better or worse?
     2. Use structure as our optimization space, and model measures as our objective function.