

Predicting patient sensitivity to pharmacogenomic drugs, using EHR data

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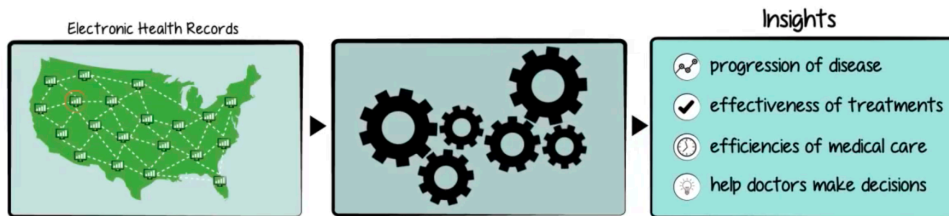
& Snowflake Associate Team



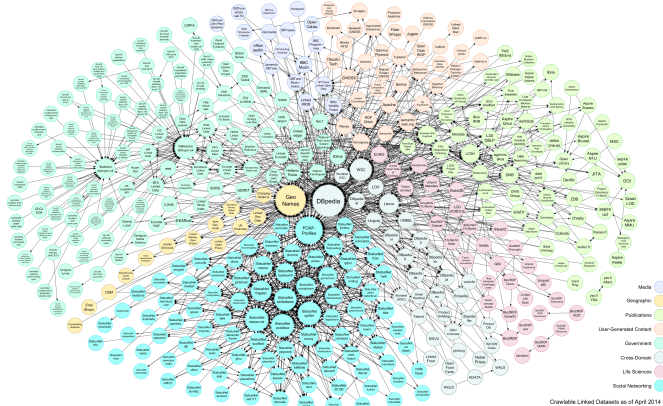
The Snowflake Inria associate team



- Shah lab@Stanford
 - Analysis of EHR data



- Dumontier lab@Stanford
 - Semantic Web applications in life sciences



- Orpailleur@Inria NGE
 - Symbolic data mining & knowledge guided knowledge discovery

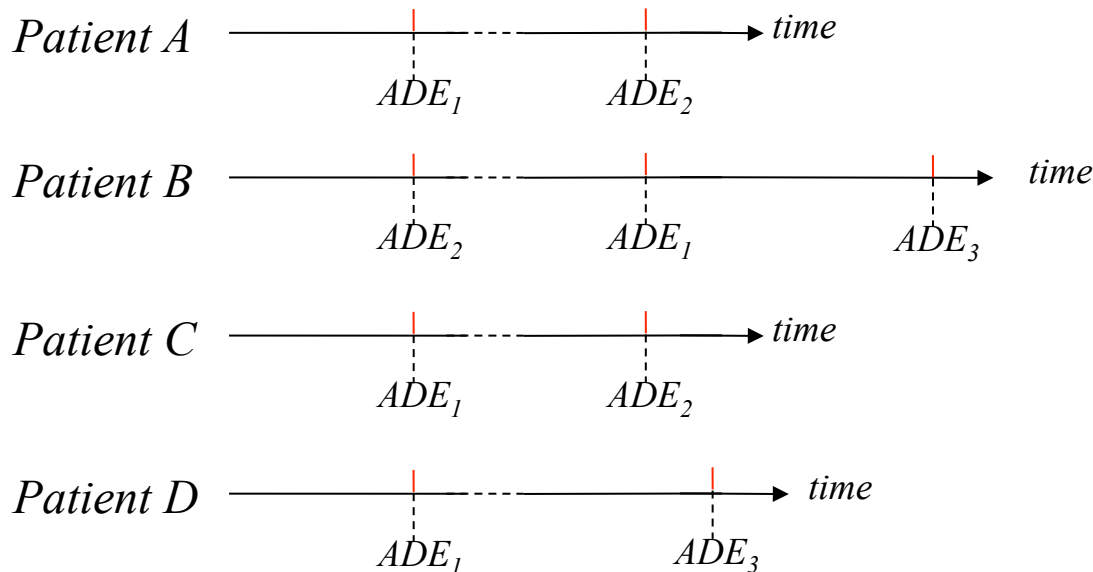
Objectives of Snowflake

- Studying **variability in drug response** using EHRs
- And how **symbolic data mining** approaches can help

*Identifying co-occurring ADEs
in EHRs*

Co-occurring ADEs in EHRs

- ADEs are Adverse Drug Events
- Aim: Finding several ADEs that are frequently co-occurring in patients



$$\text{Support}(\{ADE_1, ADE_2\}) = 3/4$$

Why this is hard?

- Manifestation of ADE may differ
- Reporting of ADE may differ
- ADE are not that frequent

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=> Generalization may help!

Knowledge engineering

Formal Concept Analysis

(warfarin, bleeding ulcer)

(anticoagulant, bleeding ulcer)

(warfarin, bleeding)

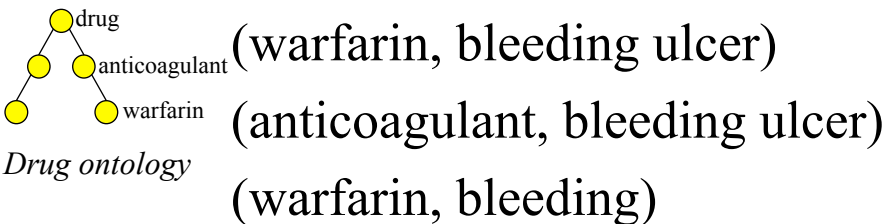
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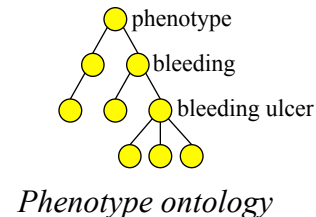
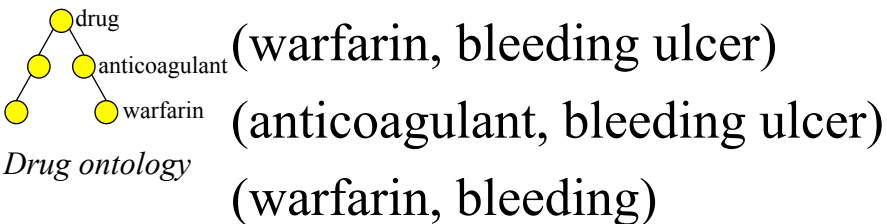
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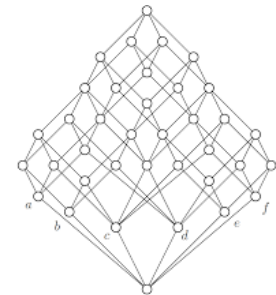
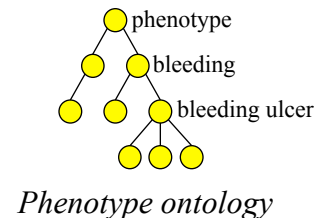
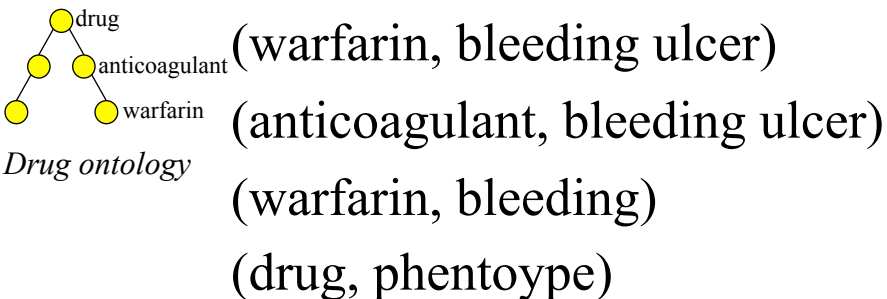
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- Co-occurring ADEs project
 - Lead by Gabin Personeni, 3rd year PhD student
 - 3 month stay of Gabin@Stanford
 - Funded by the *France-Stanford Center for Indisciplinary Studies* & Inria
 - Preliminary results : *Phenoday@ISMB* 2016

Many perspectives for the Snowflake AT

What?

- More data
 - Experiment with EHRs that include genetic data
 - and lab results
- Implementation of personalized medicine
- Experiment with French EHRs
- Include more sophisticated learning

How?

- ANR PractiKPharma (2016-2019) with French Hospitals
 - Enlarging the consortium
 - involving new students
- Renewal of the Snowflake Inria AT (2017-2019) this year

Thanks to

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- Snowflake AT
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 - Amedeo Napoli
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 - Nigam Shah
 - Malika Smail-Tabbone
 - Yannick Toussaint



- Other collaborators
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 - Marie-Dominique Devignes
 - Clément Jonquet
 - Bastien Rance