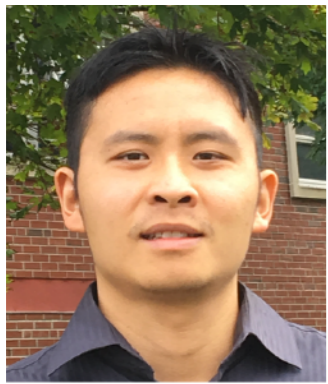


Predicting Institution Hierarchies with Set-Based Models



Derek
Tam



Nicholas
Monath



Ari
Kobren



Andrew
McCallum



UMassAmherst



College of Information
and Computer Sciences



ABSTRACT

Money for Something: The Links between Research Funding and Innovation¹

Federal research funding to universities is often based on a desire to stimulate innovation – so that they spend taxpayer money for “something”. There is growing understanding of the need to change the structure of research funding in order to do so; less is known about the effectiveness of different organizational structures. Yet, as Jones has pointed out, increasing the efficiency with which we transfer knowledge from one generation to the next could have important implications for innovation and productivity growth. In this paper we use new data to examine how the main organizational structure used to train the next generation of scientists and inventors – teams funded by research grants – leads to innovative activity as measured by patents.

JEL Classification: O30, O31, O38

Keywords: UMETRICS, innovation, patents, research policy, teams

Britta Glennon

Carnegie Mellon University

Julia Lane

New York University and IZA

Ridhima Sodhi

New York University

ABSTRACT

Money for Something: The Links between Research Funding and Innovation¹

Federal research funding to universities is often based on a desire to stimulate innovation

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REPORT BRIEF

Enhancing the Effectiveness of Team Science



ENHANCING THE EFFECTIVENESS OF
TEAM SCIENCE

Over the past six decades, as scientific and social challenges have become more complex and scientific knowledge and methods have advanced, scientists have increasingly joined with colleagues in a collaborative research approach referred to as team science. Today, over 90 percent of all publications in science and engineering are co-authored by teams of two or more. Team science has led to scientific breakthroughs that would not otherwise have been possible, such as the discovery of the transistor effect, the development of antiretroviral medications to control AIDS, and confirmation of the existence of dark matter. Emerging research shows that team science can lead to results with greater scientific impact, innovation, productivity, and reach than single-investigator approaches. When team science works, it works very well.

Although team science promises to address

ABSTRACT

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Federal research funding to universities

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REPORT BRIEF

Enhancing the



ENHANCING THE EFFECTIV
TEAM SCIE

RAND Journal of Economics
Vol. 42, No. 3, Fall 2011
pp. 527–554

Incentives and creativity: evidence from the academic life sciences

Pierre Azoulay*

Joshua S. Graff Zivin**

and

Gustavo Manso***

Despite its presumed role as an engine of economic growth, we know surprisingly little about the drivers of scientific creativity. We exploit key differences across funding streams within the academic life sciences to estimate the impact of incentives on the rate and direction of scientific exploration. Specifically, we study the careers of investigators of the Howard Hughes Medical Institute (HHMI), which tolerates early failure, rewards long-term success, and gives its appointees great freedom to experiment, and grantees from the National Institutes of Health (NIH), who are subject to short review cycles, predefined deliverables, and renewal policies unforgiving of failure. Using a combination of propensity-score weighting and difference-in-differences estimation strategies, we find that HHMI investigators produce high-impact articles at a much higher rate than a control group of similarly accomplished NIH funded scientists.

ABSTRACT

Money for Someth Research Funding

Federal research funding to universities

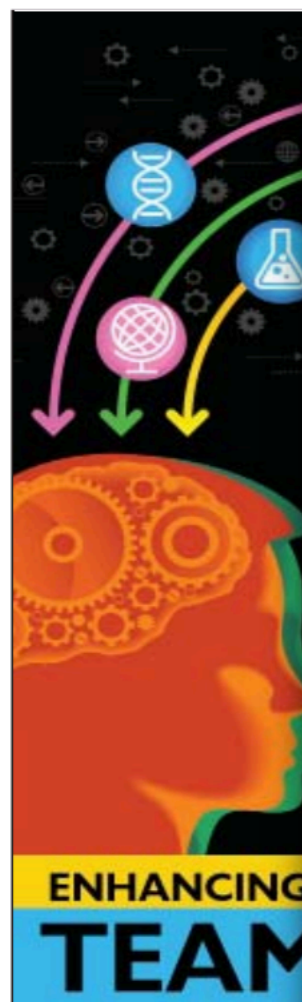
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REPORT BRIEF

Enhancing the



Incentives and creativity: evidence from the academic life sciences

Pierre Azoulay*

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RAND Journal of Economics
Vol. 42, No. 3, Fall 2011
pp. 527–554

Published: 10 June 2015

Mobility: A strategic move

Julie Gould

Nature 522, 245–247(2015) | [Cite this article](#)

246 Accesses | 1 Citations | 78 Altmetric | [Metrics](#)

Short-term upheaval can yield widespread collaborations and long-term resources.

Ecologist Roberto Salguero-Gomez has moved countries six times in the

*singly little about
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and direction of
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uccess, and gives
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renewal policies
and difference-in-
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funded scientists*

Hierarchical Structure of Institutions

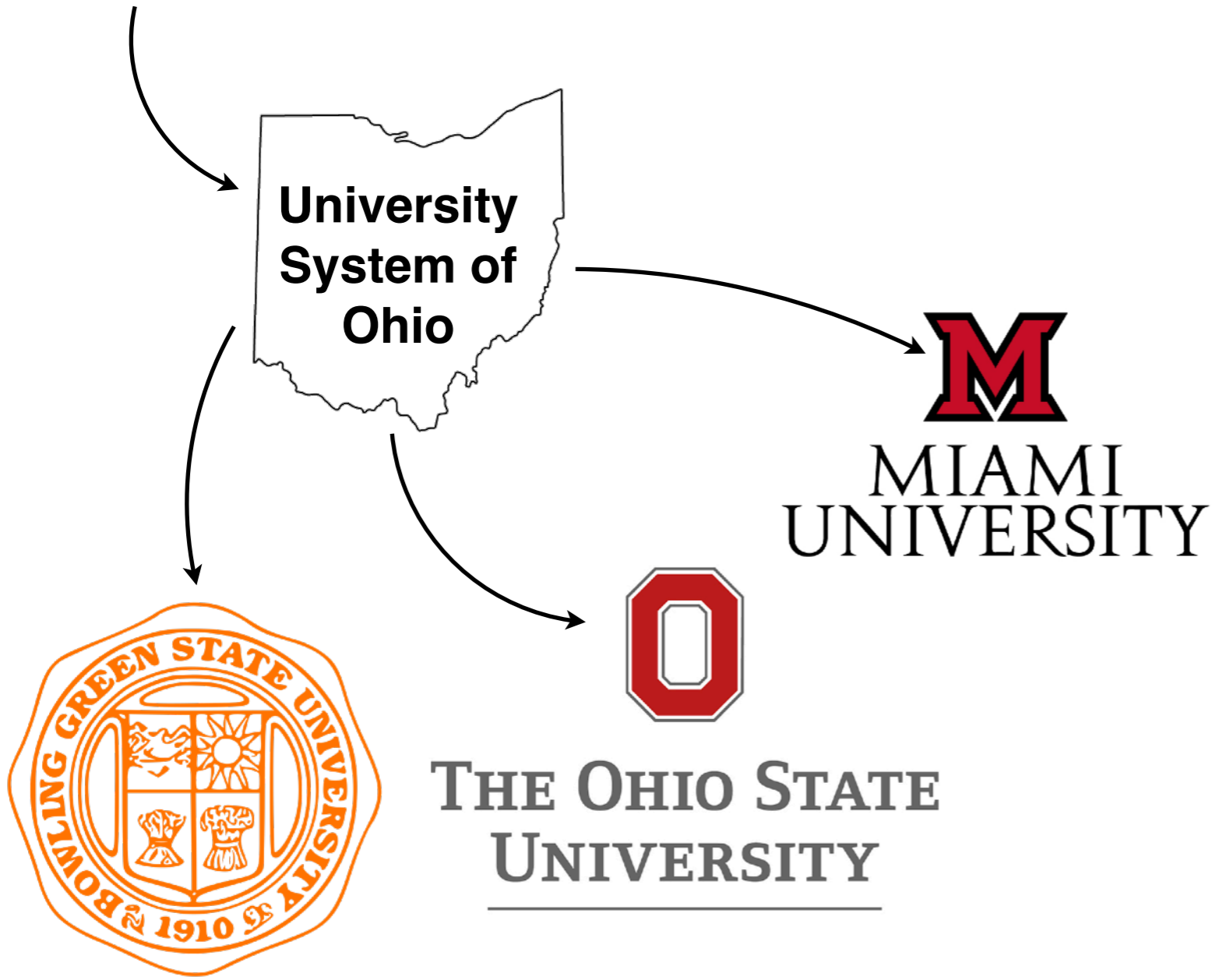
Hierarchical Structure of Institutions



Hierarchical Structure of Institutions



Hierarchical Structure of Institutions



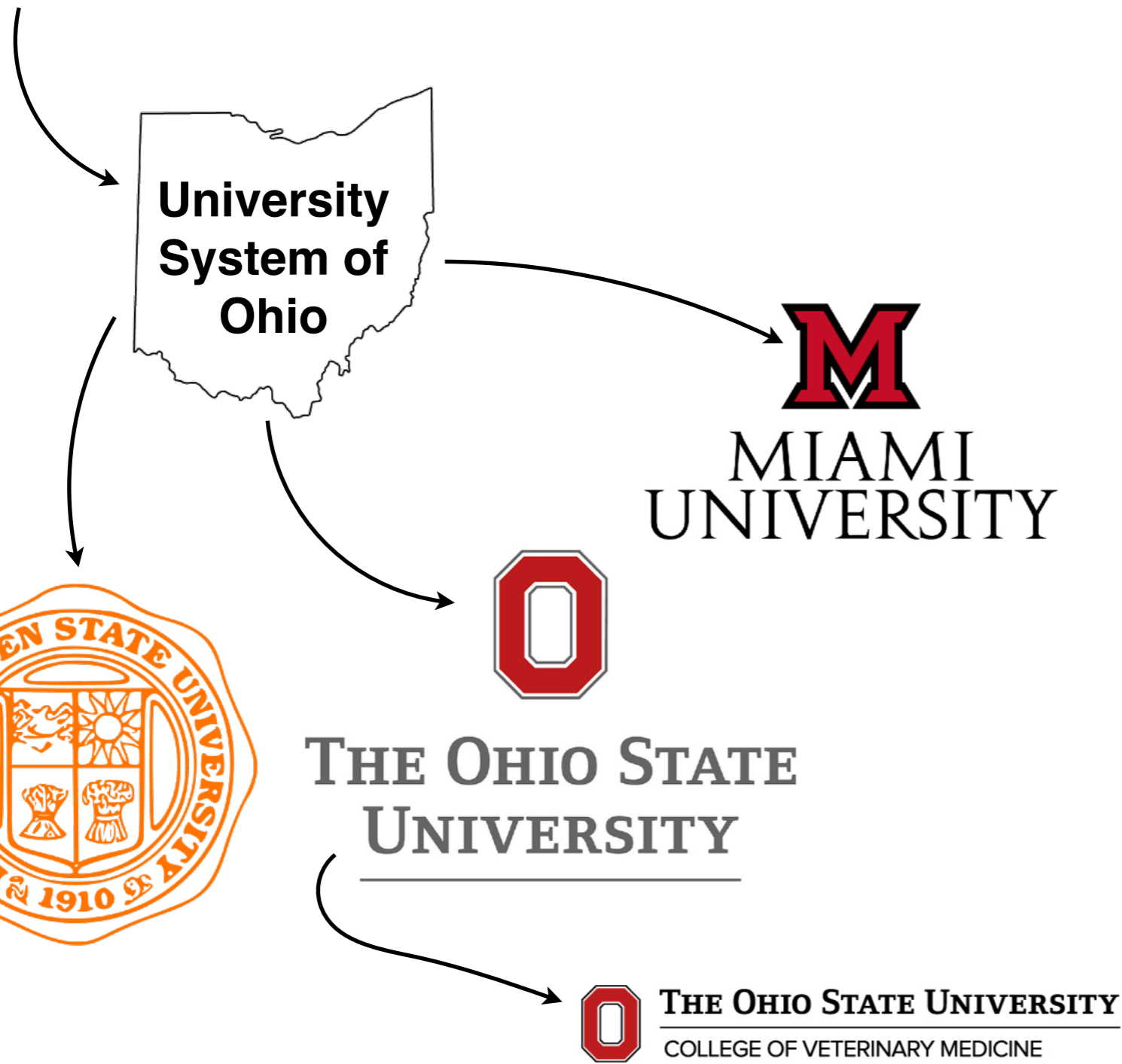
Hierarchical Structure of Institutions



THE OHIO STATE UNIVERSITY

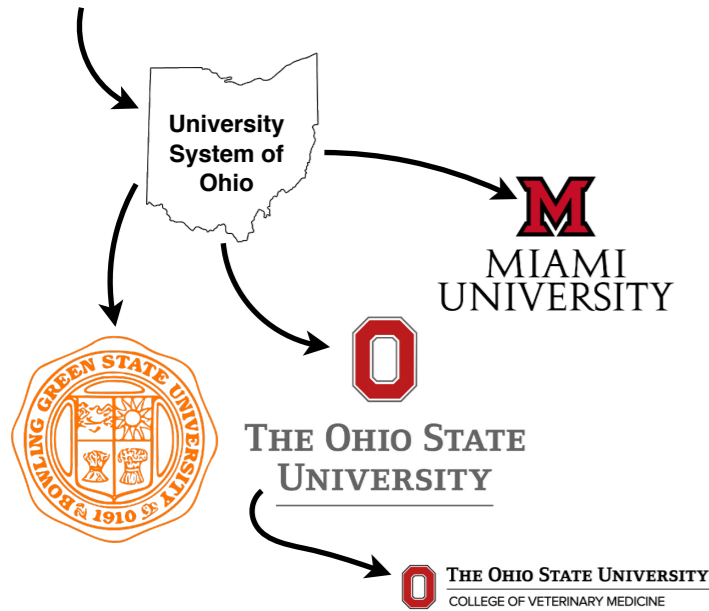


THE OHIO STATE UNIVERSITY
COLLEGE OF VETERINARY MEDICINE



Hierarchical Structure of Institutions

OhioHigherEd
Department of Higher Education



GRID

Global Research Identifier Database

Cataloging the world's research organisations

[DOWNLOAD THE FREE DATABASE](#)

MAKE SENSE OF YOUR INSTITUTIONAL DATA

Capture data accurately



Ensure robust reporting



Disambiguate your data



The Ohio State University

grid.261331.4

REPORT AN ERROR

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Types Education
Established 1870 CE

External links:

Institute Links <http://www.osu.edu/>
Wikipedia http://en.wikipedia.org/wiki/Ohio_State...
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* Preferred ID

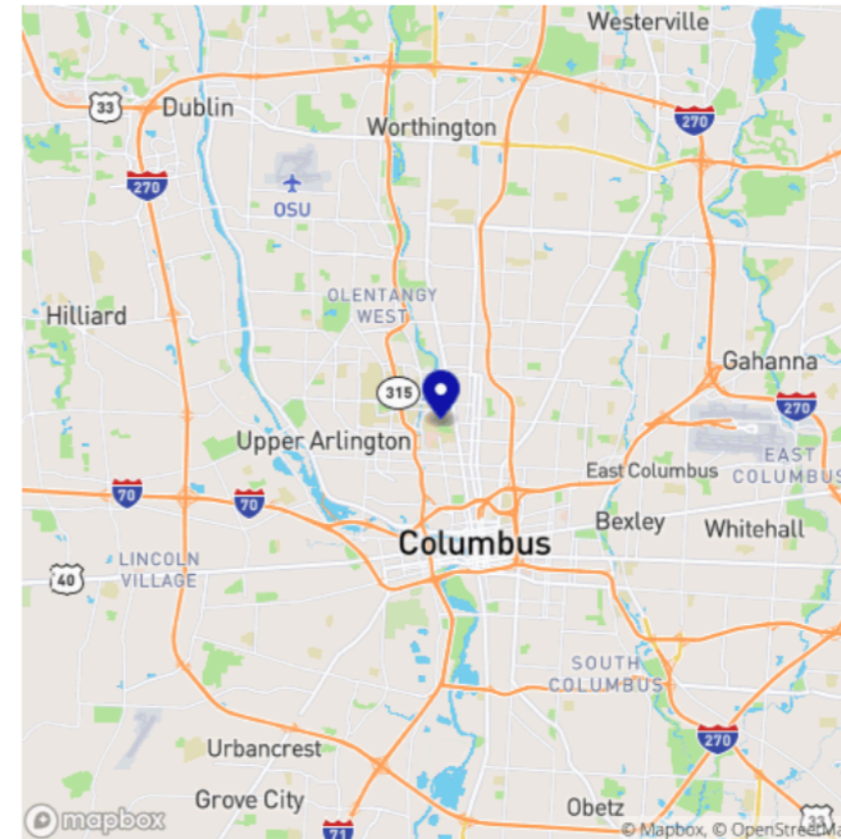
Alternate Labels:

Aliases Ohio Agricultural and Mechanical College
Acronyms OSU
Spanish Universidad Estatal de Ohio
French Université d'État de l'ohio

Relationships:

Parent Institutes [University System of Ohio](#)
Child Institutes [The Ohio State University Newark](#)
[The Ohio State University at Lima](#)
[The Ohio State University at Mansfield](#)
[The Ohio State University at Marion](#)
Related Institutes [James Cancer Hospital](#)
[Nationwide Children's Hospital](#)
[Ohio State University Hospital](#)
[The Ohio State University Wexner Medical Center](#)

Columbus - Ohio - United States

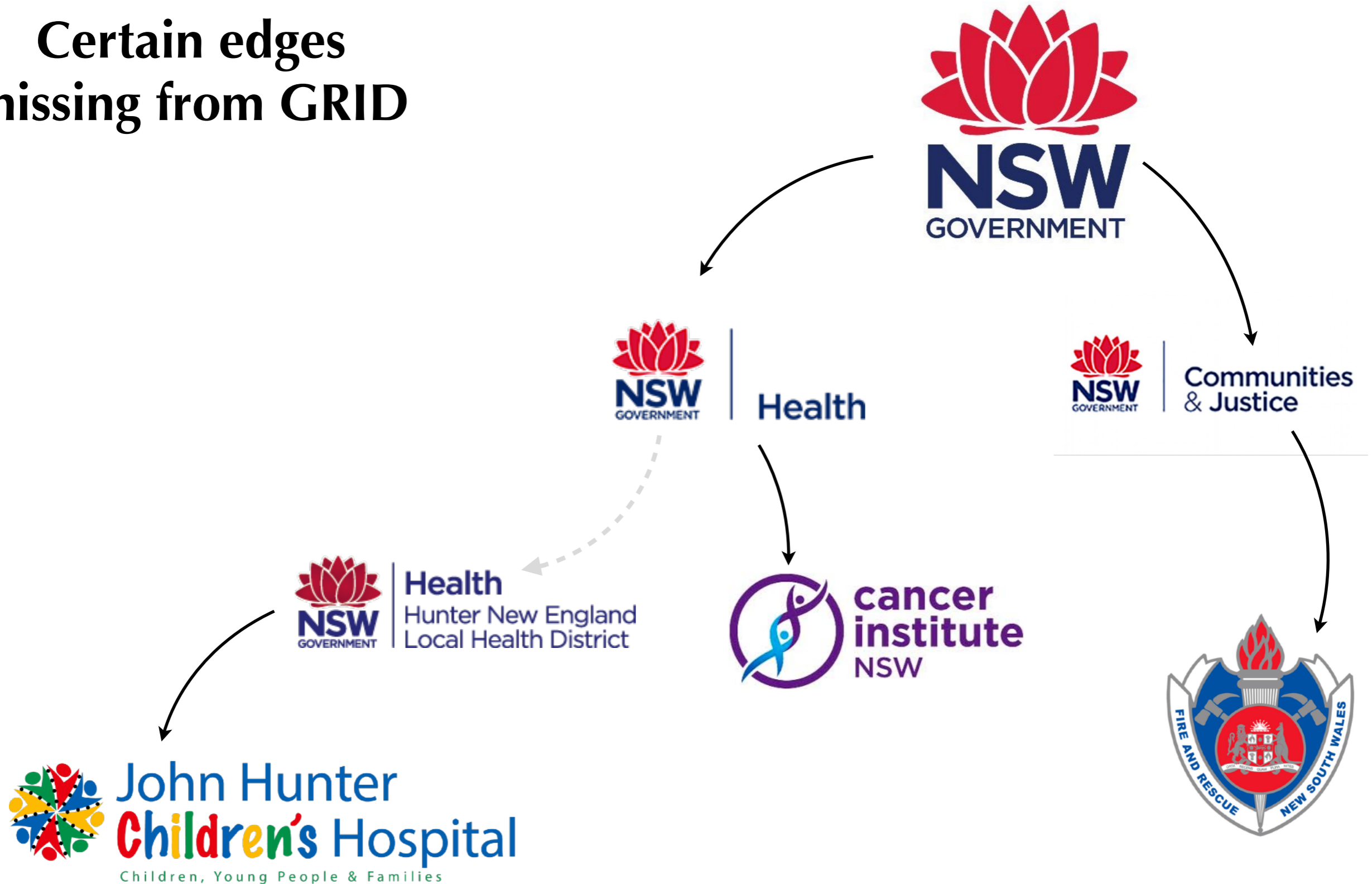


GeoNames

Type	Name	GeoNames Code	GeoNames ID
City	Columbus		4509177
Admin 2 Region	Franklin County	US.OH.049	4512214
Admin 1 Region	Ohio	US.OH	5165418
Country/Territory	United States	US	6252001

KB Completion: Hierarchy Prediction

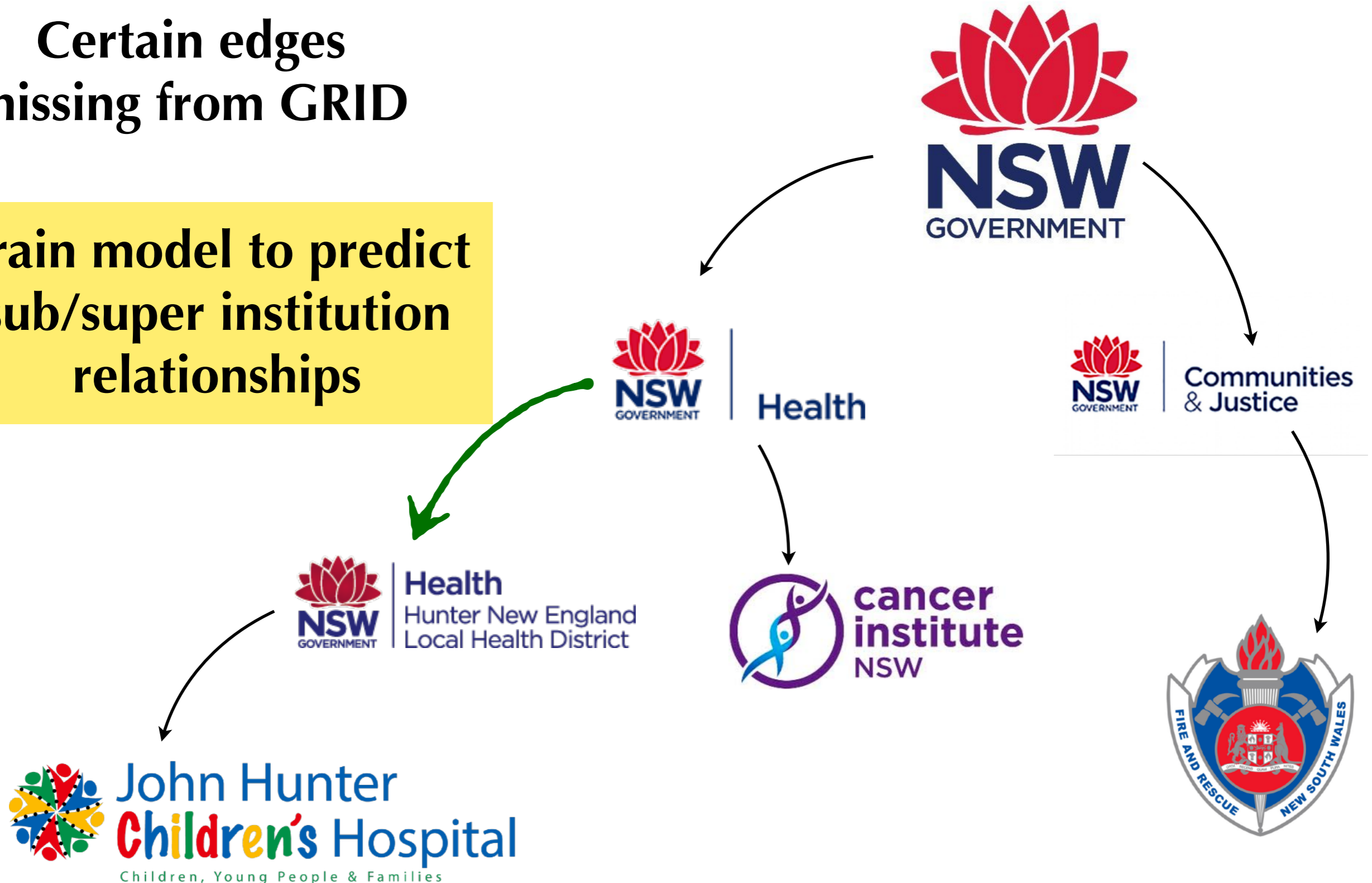
Certain edges
missing from GRID



KB Completion: Hierarchy Prediction

Certain edges
missing from GRID

Train model to predict
sub/super institution
relationships



Our Approach

**Prediction based on
Institution Name Spelling, Location, Type**

**Model Sets of Overlapping / Non-
Overlapping Tokens with Set Transformers**

[Lee et al, 2019]

Proposed Model

The Ohio State University

c

University System of Ohio

p

The
Ohio
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University

The Ohio State University

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University
System
Of
Ohio

University System of Ohio

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The
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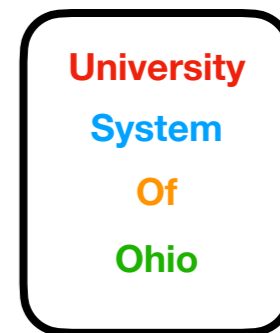
p



C



$C \cap P$



P



The Ohio State University

C



University System of Ohio

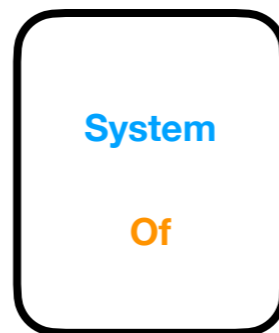
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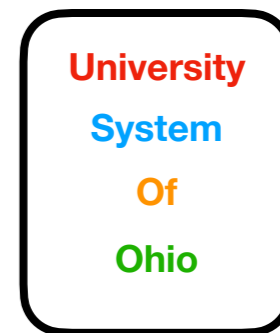
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$C \cap P$



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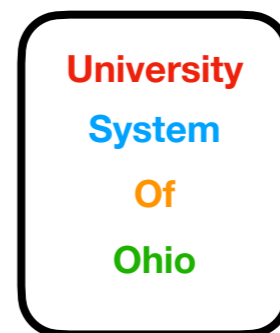


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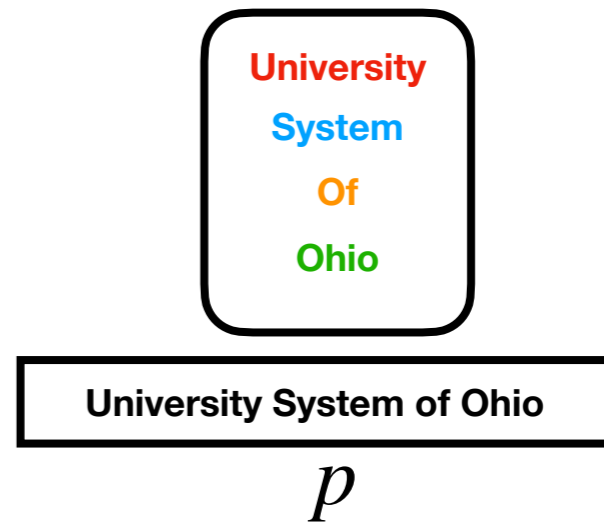
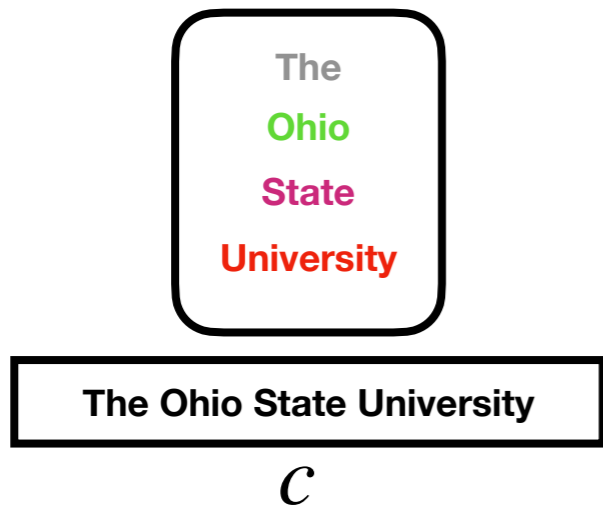
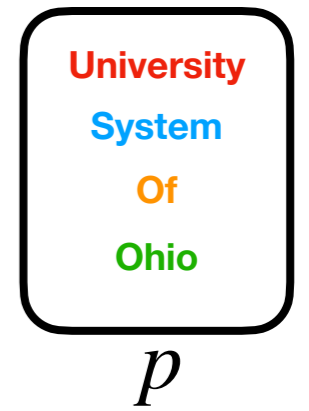
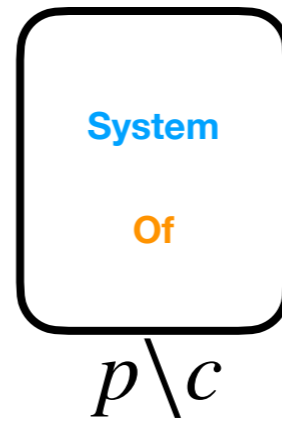
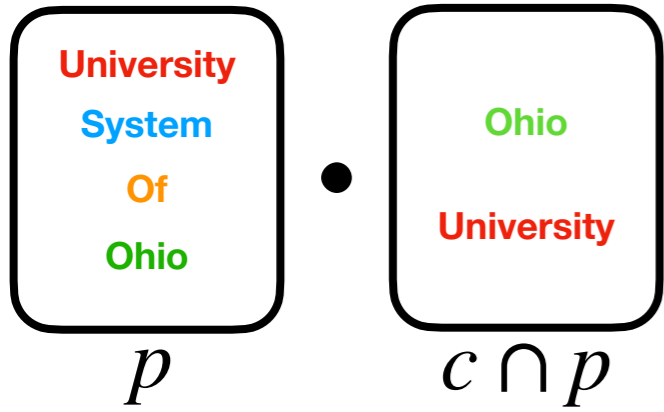
The Ohio State University

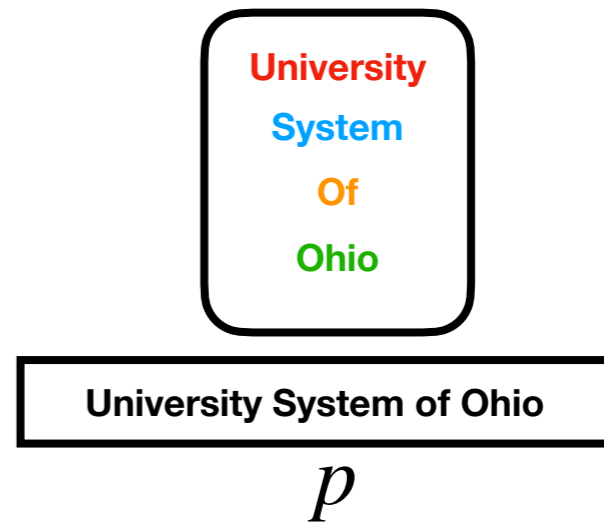
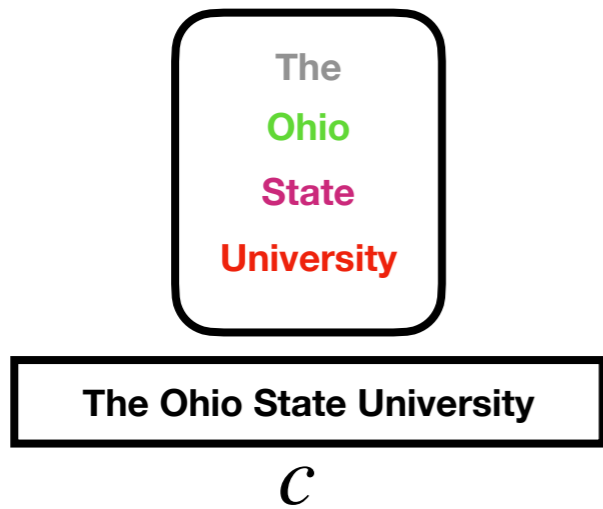
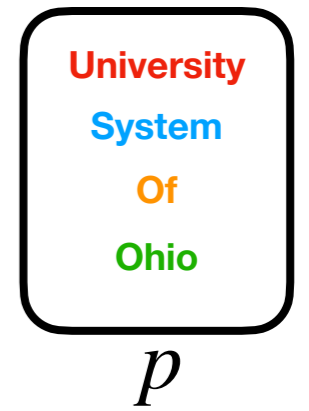
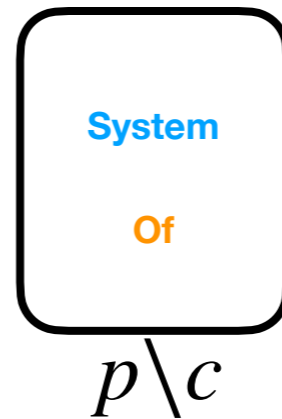
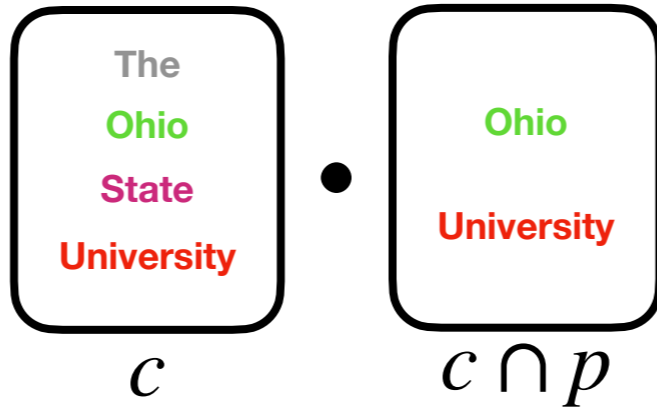
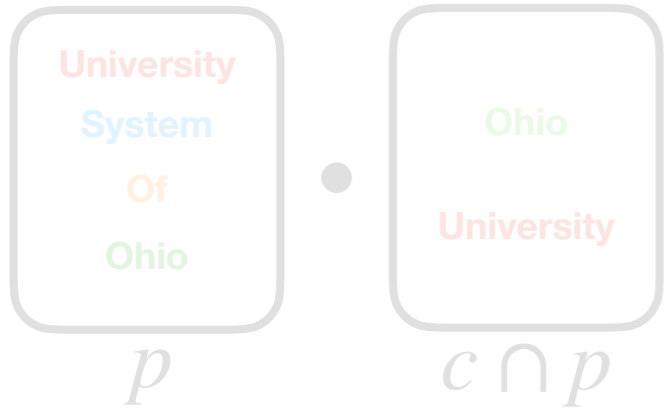
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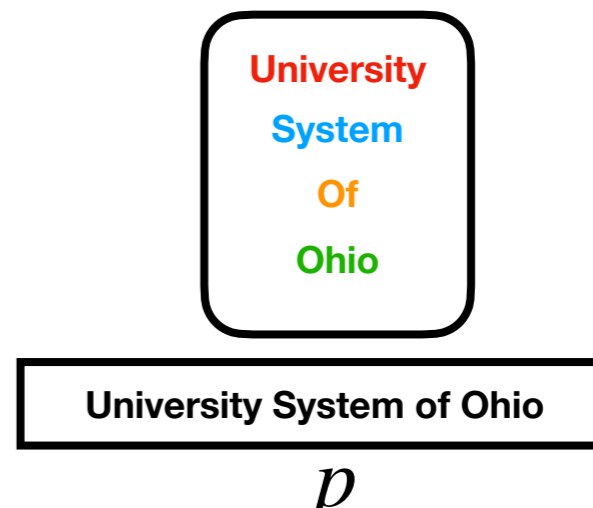
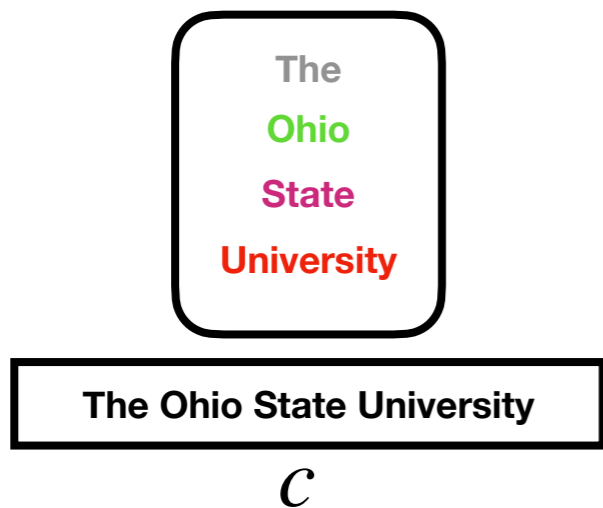
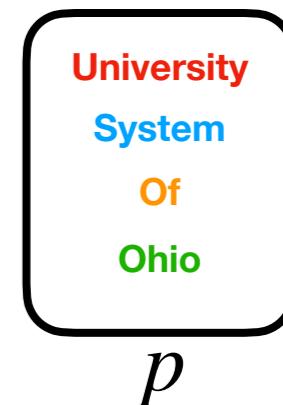
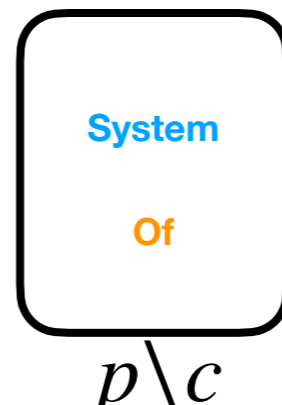
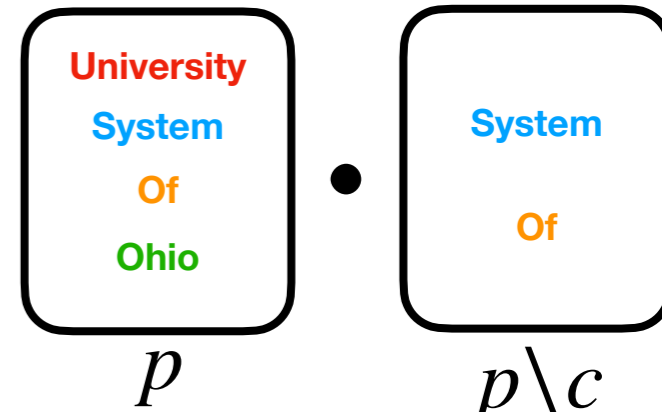
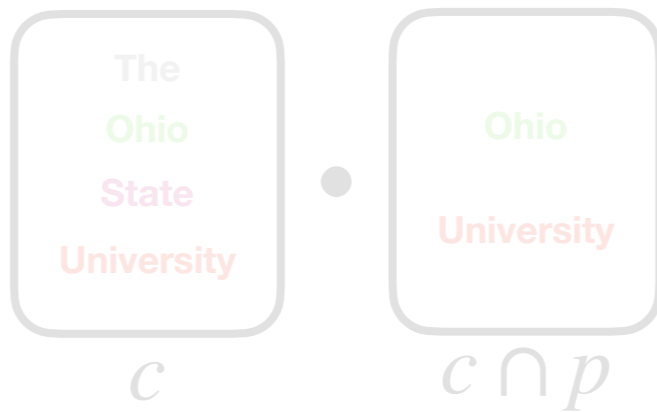
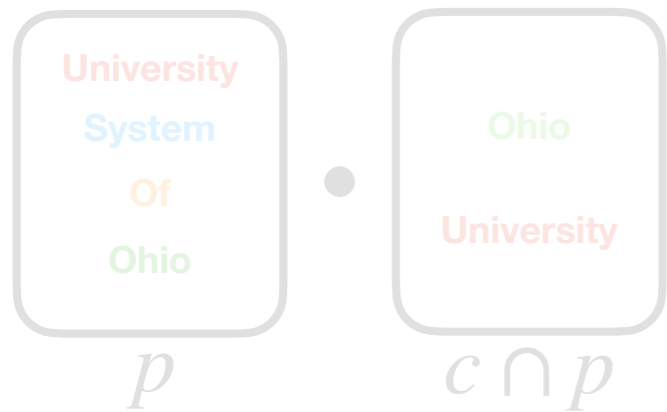


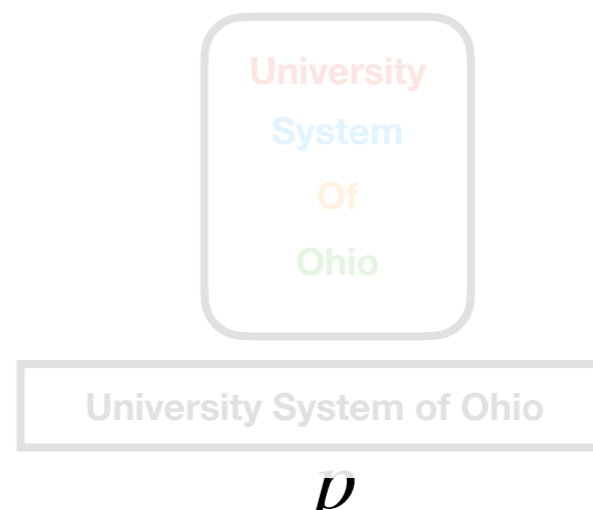
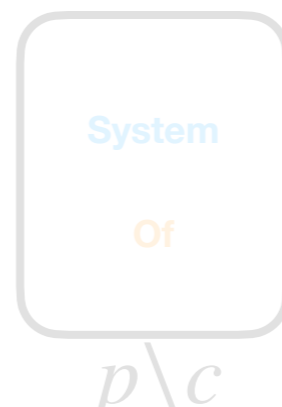
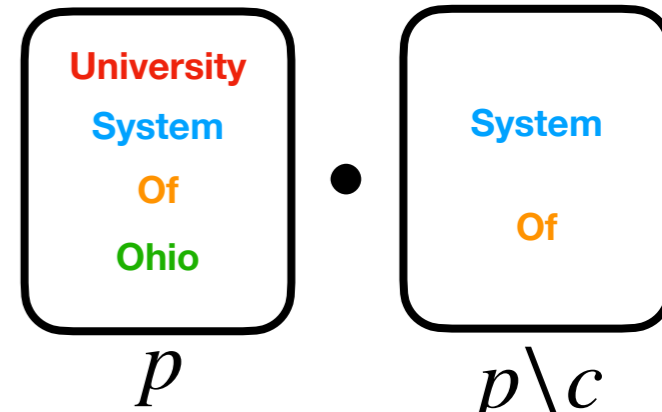
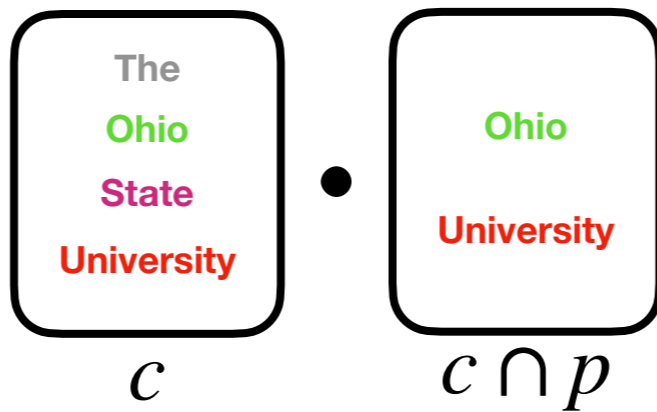
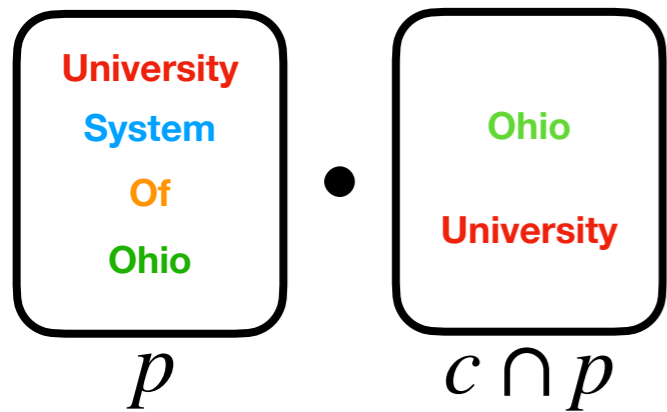
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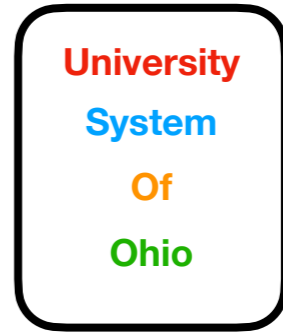
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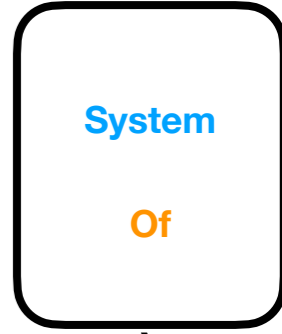
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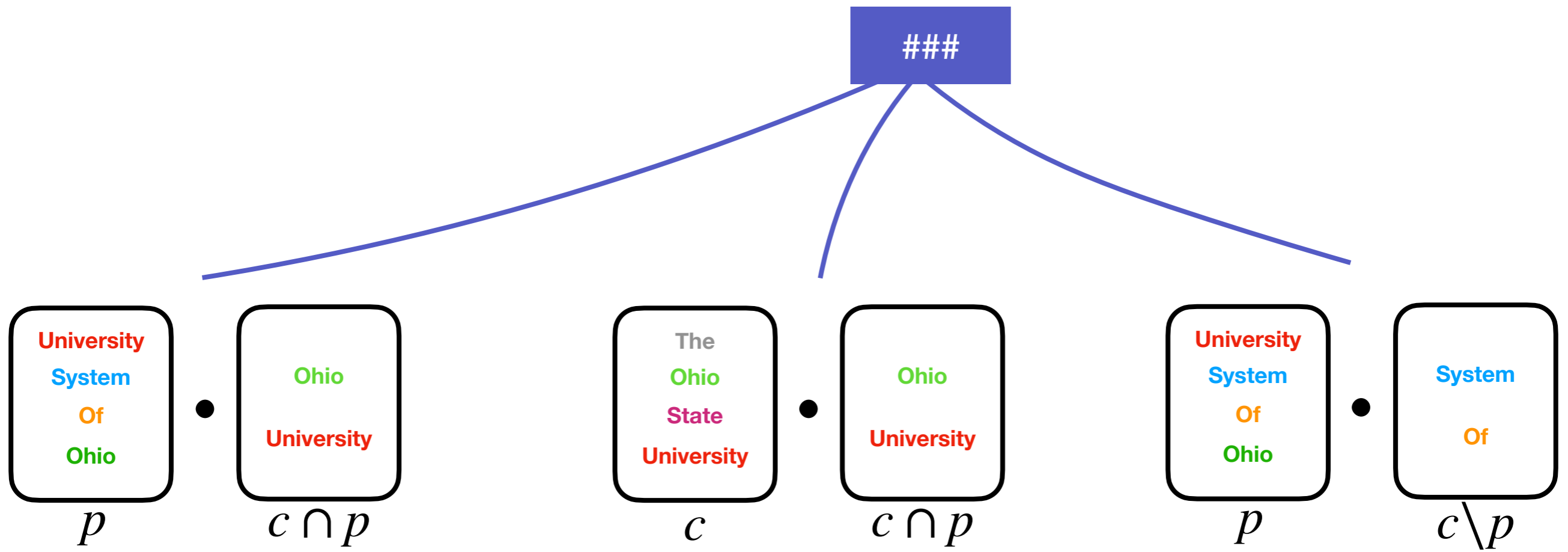
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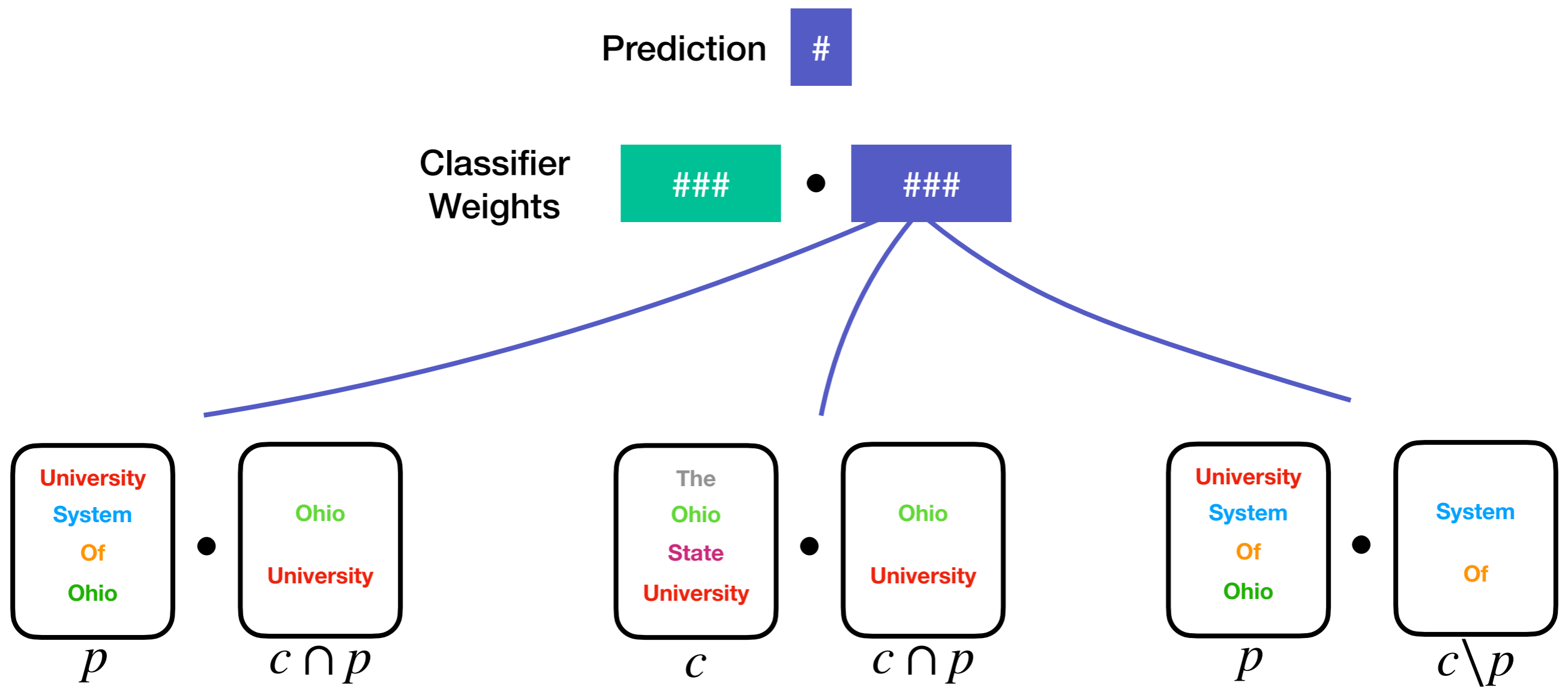


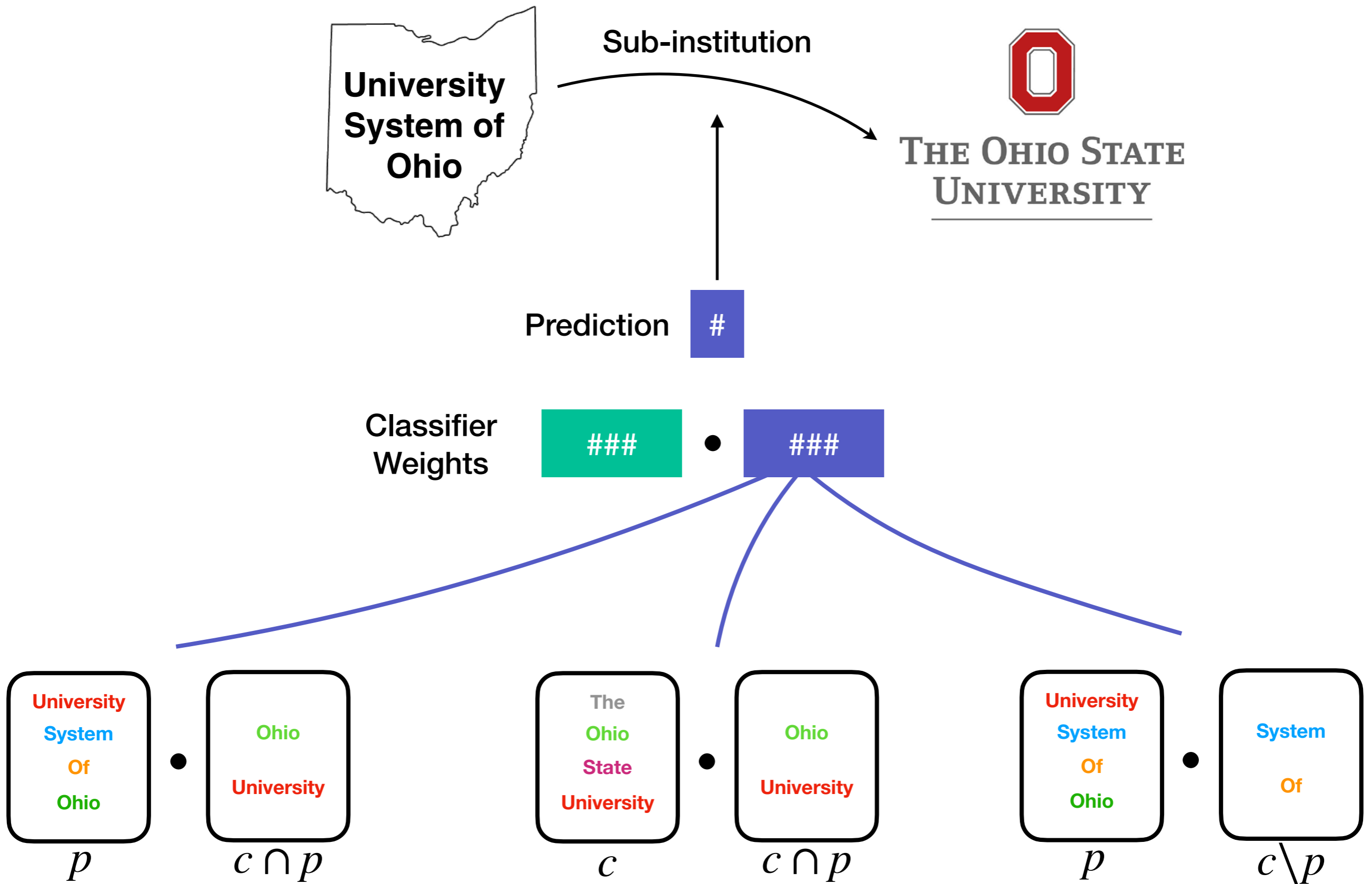
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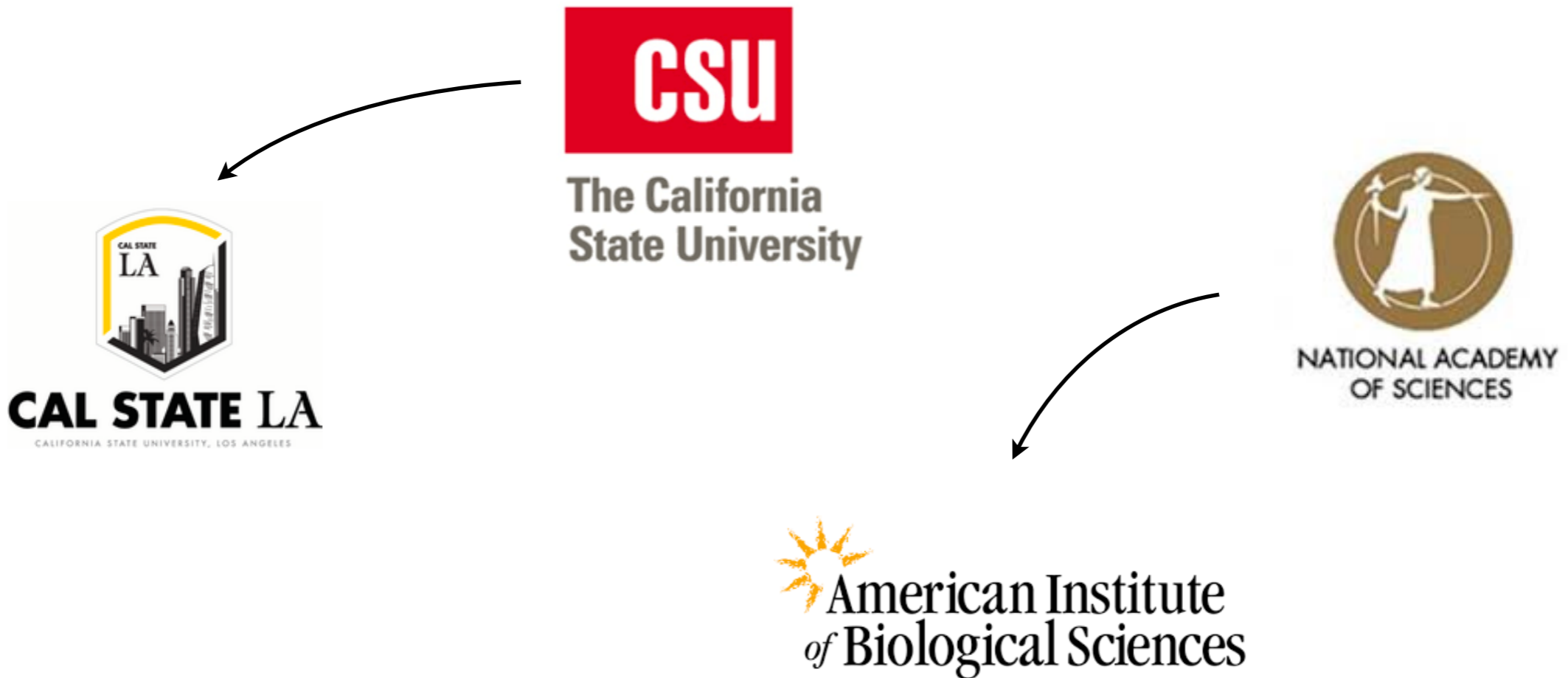
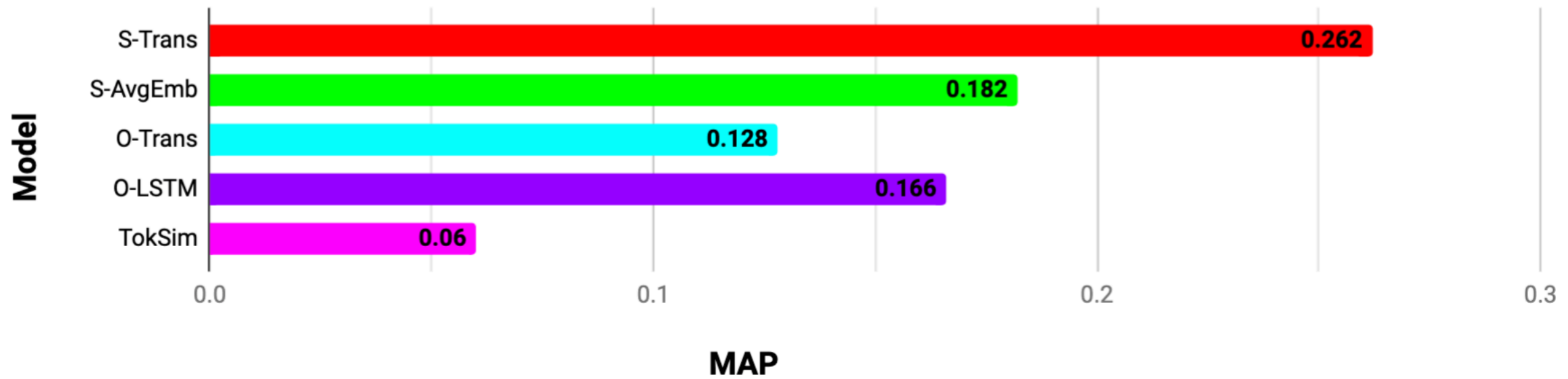
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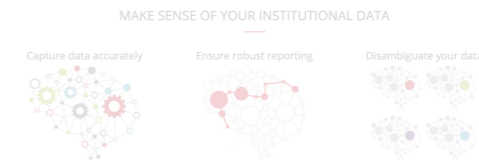
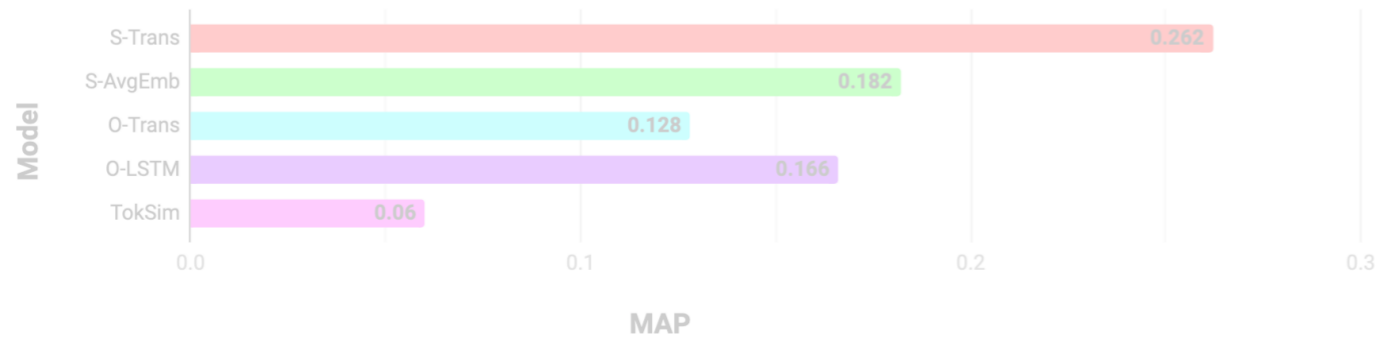




Predicting Super Institution Performance



Summary



Code: https://github.com/iesl/instituion_hierarchies

