



# Research question



Problem: involving people in ontology matching

Solution:

- design a captcha tool
- offering simple reclassification tasks
- generated from linked data
- allowing for inferring relations between classes



# Research question



We have different ontologies for the same domain of knowledge

How to find correspondences between ontologies?

Is a tomato a fruit or a vegetable?



# What we have now

Ontology matching needs  
human contributions

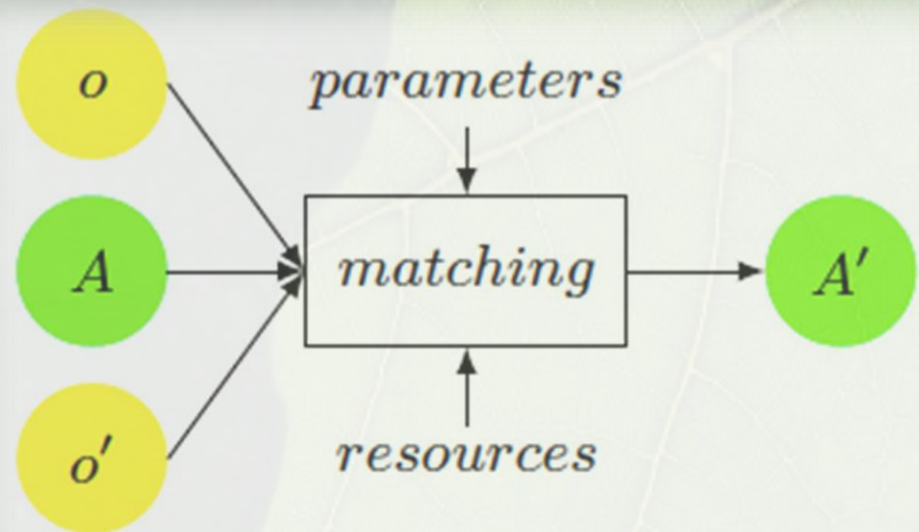
How to match ontology  
with human contributions?

*CrowdMap: Crowdsourcing  
Ontology Alignment with  
Microtasks*



# The Framework

Finding correspondences between two given ontologies,  $o$  and  $o^l$ , returning an alignment ( $A^l$ ), collecting human contributions with microtasks







But...

Finding humans who perform tasks is a hard challenge

They need incentives.

Mechanical Turk: need money...

Game with a purpose: need to be engaging...

# Our Proposal: Access Control Service

Data for free!

Large amount of information!

Sustainable process!

Attractiveness provided by clients!

morning

overlook

Type the two words:



reCAPTCHA™

stop spam.  
read books.

# Our Proposal: OntoCaptcha

## OntoCaptcha

*The Best Captcha, Ever!*



If we talk about **Show**, which of the following elements belong to **Actor** and which not?

*Click to chose or X to discard and replace.*

*Sofia Loren*

X

*Kurt Gödel*

X

*Jimi Hendrix*

X

*Madonna*

X

↺ Reset

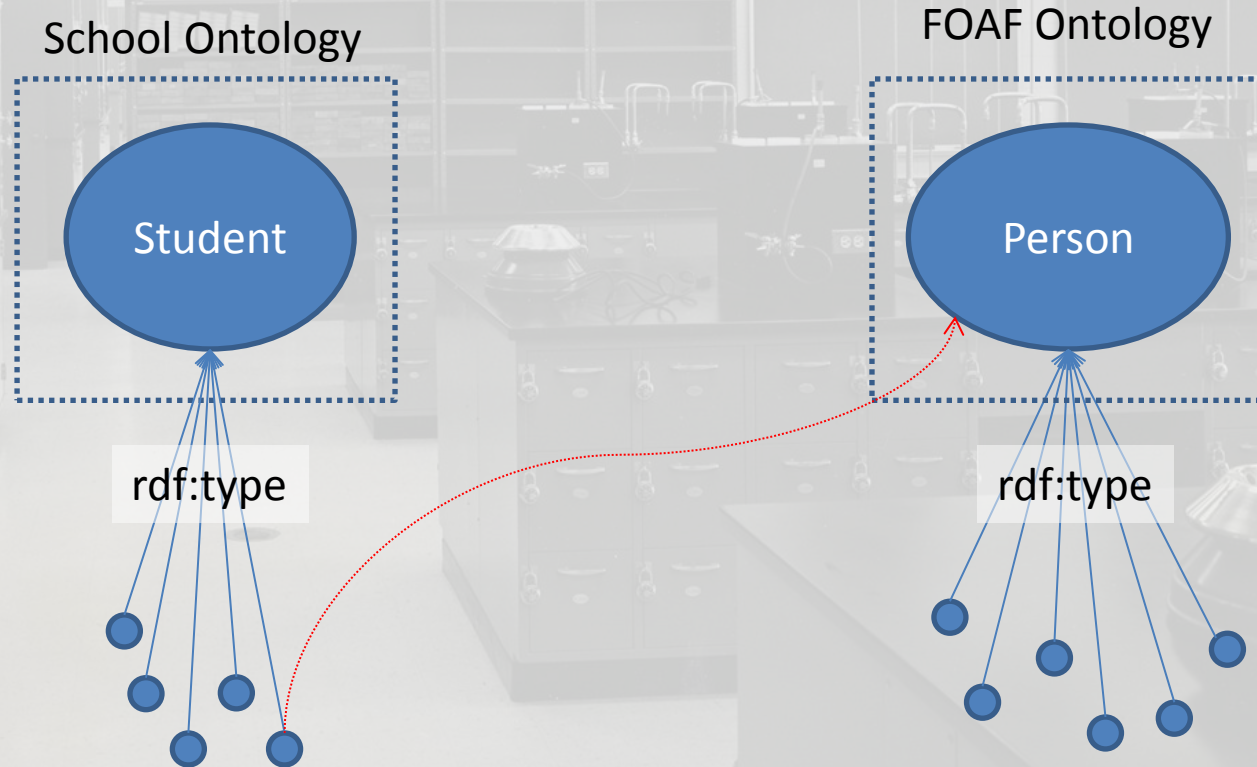
🔊 Sound

? Help



# Task design: entity reclassification

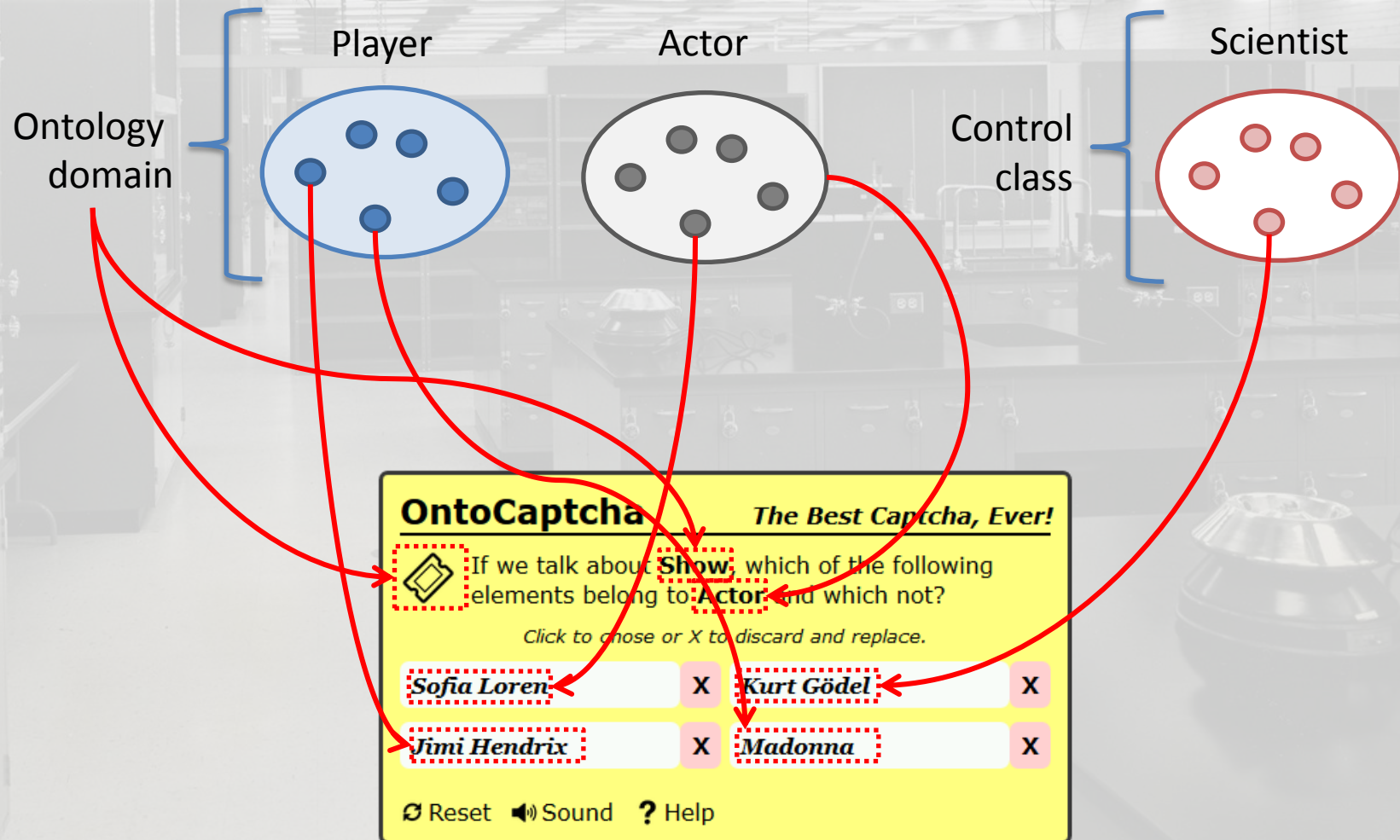
Automated generator of reclassification tasks





# Design: from tasks to OntoCaptcha

## Building a task for OntoCaptcha





# How does OntoCaptcha work?

4 clicks without errors to solve it

## OntoCaptcha

*The Best Captcha, Ever!*



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X

*Madonna*

X

↺ Reset



Sound



Help



# How does OntoCaptcha work?

Click to change domain

Context and user aware!

## OntoCaptcha

*The Best Captcha, Ever!*



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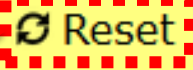
X

*Jimi Hendrix*

X

*Madonna*

X



Reset



Sound

? Help

Click to change task



# How does OntoCaptcha work?

Click to choose an «actor»

## OntoCaptcha

*The Best Captcha, Ever!*



If we talk about **Show**, which of the following elements belong to **Actor** and which not?

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X

*Madonna*

X

↺ Reset   🔊 Sound   ? Help



# How does OntoCaptcha work?

Options are replaced after being used

## OntoCaptcha

*The Best Captcha, Ever!*



If we talk about **Show**, which of the following elements belong to **Actor** and which not?

*Click to chose or X to discard and replace.*

**Sylvester Stallone**

X

**Kurt Gödel**

X

**Jimi Hendrix**

X

**Madonna**

X

↺ Reset



Sound



Help



# How does OntoCaptcha work?

Positive associations

## OntoCaptcha

*The Best Captcha, Ever!*



If we talk about **Show**, which of the following elements belong to **Actor** and which not?

*Click to chose or X to discard and replace.*

*Silvester Stallone*

X

*Kurt Gödel*

X

*Jimi Hendrix*

X

*Madonna*

X

↺ Reset



Sound



Help



# How does OntoCaptcha work?

Negative associations

## OntoCaptcha

*The Best Captcha, Ever!*



If we talk about **Show**, which of the following elements belong to **Actor** and which not?

*Click to chose or X to discard and replace.*

*Silvester Stallone*

X

*Kurt Gödel*

X

*Jimi Hendrix*

X

*Madonna*

X

↺ Reset



Sound

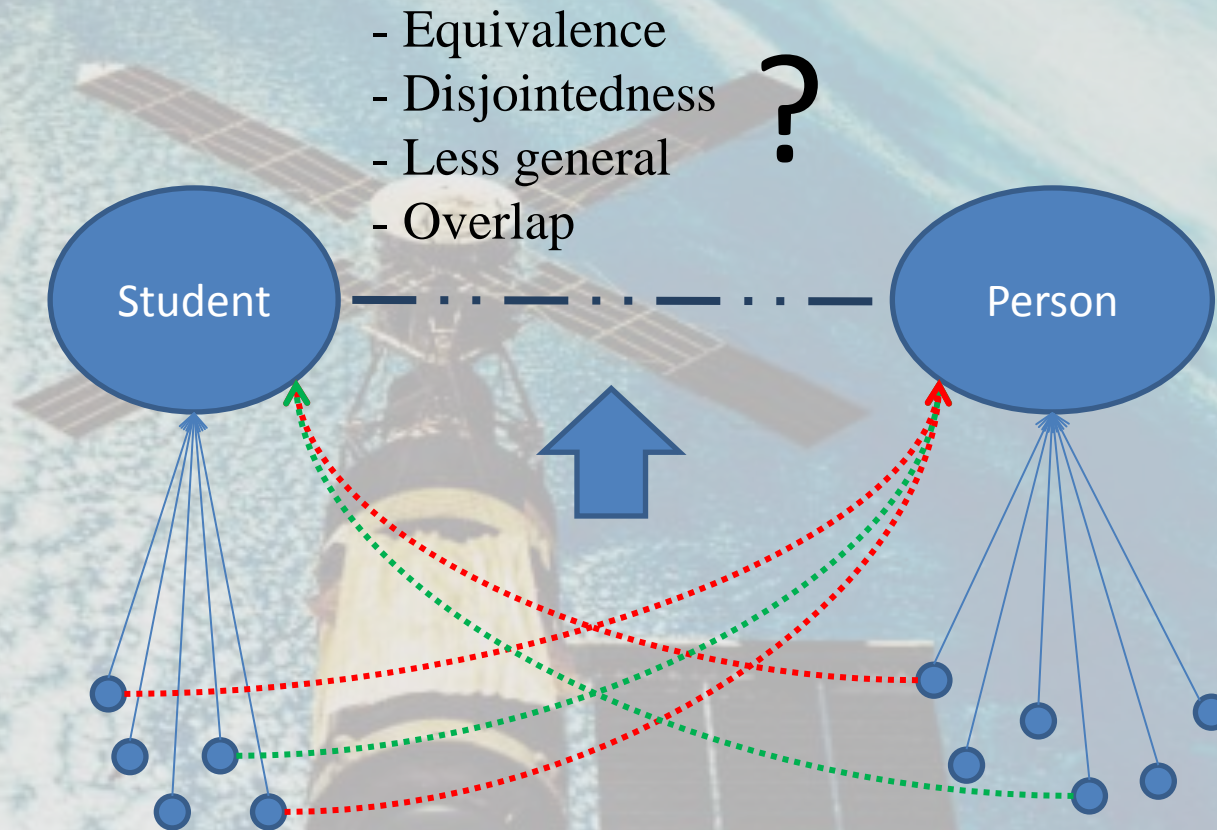


Help



# How do we use collected data?

Inferring class relations from task results





# Evaluation

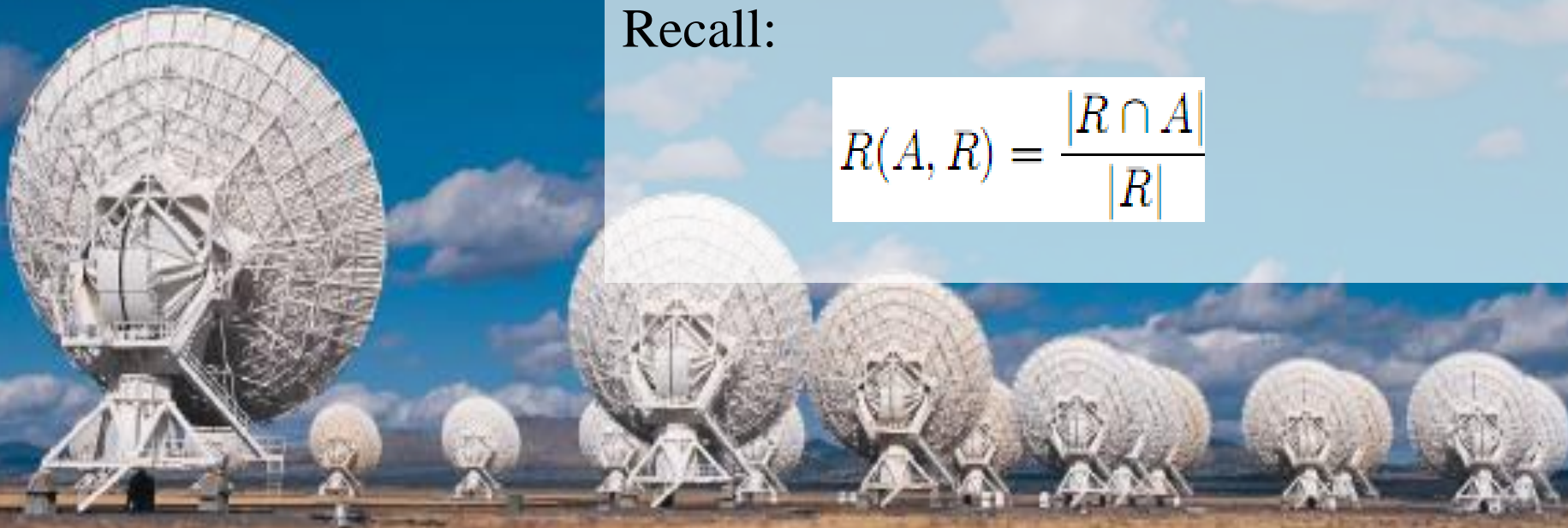
Given a reference alignment  $R$

Precision of an alignment  $A$  :

$$P(A, R) = \frac{|R \cap A|}{|A|}$$

Recall:

$$R(A, R) = \frac{|R \cap A|}{|R|}$$





# Perspective

A background image showing a car driving on a winding road at night. A bright, glowing light trail follows the curve of the road, leading towards the horizon. The scene is dimly lit, with the car's headlights and the light trail providing the primary illumination.

- Generating the next microtask depending on previous answers.
- Providing users more information about the context.
- Selecting the good users based on their profile and performance history.



# Conclusion

Problem: involving people for helping ontology matching

Solution:

- design a *captcha* tool
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So... tomatoes are vegetables. NO TAX!