



Barbara Caputo
University of Rome La Sapienza

What is the vision behind ALOOF?

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What is this on the table??



What is the vision behind ALOOF?

What is this on the table??
Let me take a snapshot
and search on the Web...



*..if the robot could learn
from the Web like us....*



What is the vision behind ALOOF?



Let's see
on the Web..

A screenshot of a web browser window. The address bar shows the URL <http://www.marialiberati.com/2009/03/07/holy-cannoli/>. The page title is "Holy Cannoli !!". Below the title, it says "March 7th 2009 by Maria Liberati". There is a photograph of cannoli on a plate, which is highlighted with a pink rectangular border. Below the photo, the text "Holy Cannoli!" is underlined in red. The page also includes the text "Editor: Kate Hollinger", "Copyright, 2009, Maria Liberati", and "The Basic Art of Italian Cooking by Maria Liberati tm". At the bottom, there is a paragraph of text about the history and popularity of cannoli.

Editor: Kate Hollinger

Copyright, 2009, Maria Liberati

The Basic Art of Italian Cooking by Maria Liberati tm

<http://www.marialiberati.com/blog2>

A cannoli, which is Sicilian for "little tube", is an ever- popular pastry dessert found sprinkled throughout cafes and restaurants in Italy. We thank the Sicilian region of Italy for these rich desserts that are found today throughout the United States as well, thanks to the immigrants who brought the recipes over in the early 20th century. Cannoli originally came from the Palermo region of Sicily as early as the first century A.D., served as a treat and given to friends in dozens during the season of Carnevale, a festive European celebration held right before Lent. It is said that cannoli was most likely a symbol of fertility during the pre-Easter celebration similar in some ways to Mardi Gras.

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Holy Cannoli !!
March 7th 2009 by Maria Liberati



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http://www.browneyedbaker.com/2010/01/08/cannoli/

Cannoli
January 8, 2010 | 49 Comments | Email | Print



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Italian Food Quick/Easy Recipes Le Basi Classic Recipes

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Cannoli

Carnival, otherwise known as Martedì Grasso (Mardi Gras), means different things in different parts of the Peninsula. In Naples, for example, it's the occasion for a lavish banquet that invariably includes le [grande lasagne di Carnevale](#), an extraordinarily rich lasagna with ricotta, meatballs, and a host of other ingredients. Every family had a special ingredient or trick to make theirs unique, and many would go into hock to buy the necessary ingredients. In Venice, instead, they have recently revived the custom of donning masks, and going to fabulous parties. For the past century or so they've been holding Carnival parades with satirical floats in the town of Viareggio, on the Tuscan coast. And almost everywhere there are [cenci](#), [frittelle](#), and other sweets of one kind or another to liven the merrymaking. Among the most glorious are Cannoli, Palermo's fried wafers filled with an airy mixture of ricotta, candied fruit, chocolate, and other ingredients, which are so tasty that they have spread not just throughout the island, but to wherever Sicilians have settled, and are now greeted with joy year round.



In the past, when they were "Carnival's Crown," according to Giuseppe Pitre (the doctor and ethnographer who founded Palermo's museum of folk culture in 1909), people gave cannoli to all their friends -- by the dozen. One can only imagine the people in the [pastry shops](#) churning them out and the sweet sugary smell of the ricotta filling wafting over the city! They are older, however. Pitre also quotes an anonymous 17th century poet, who said:

I've been enjoying cannoli for a long time this holiday season. Sure you know I'm talking honest-to-goodness Sicilian's Nana. I had been hearing but never had the opportunity to try them be made and enjoyed of the family got together to help access as much as possible so that photo of the cannoli sitting on the that I took home with me.

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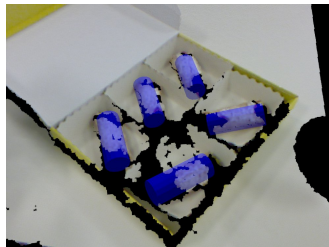
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Why this is difficult?



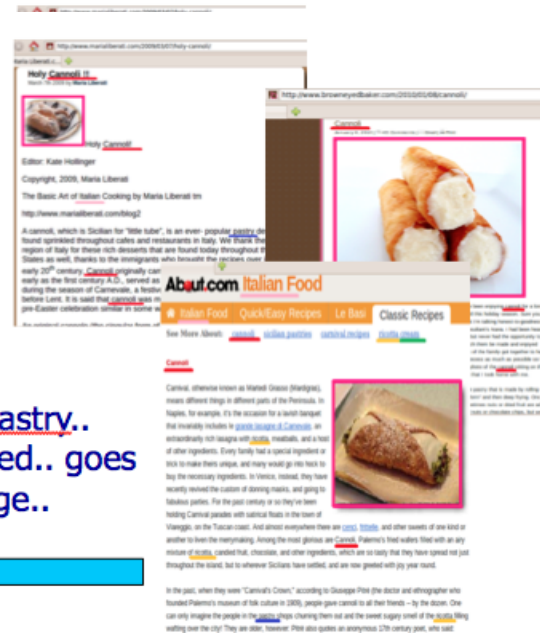
Let's see
on the Web..



Ok, now I
know what to
do with it



..cannoli..pastry..
..ricotta filled.. goes
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Why this is difficult?

*How does a robot know
it doesn't know?*

Let's see on the Web..

Ok, now I know what to do with it

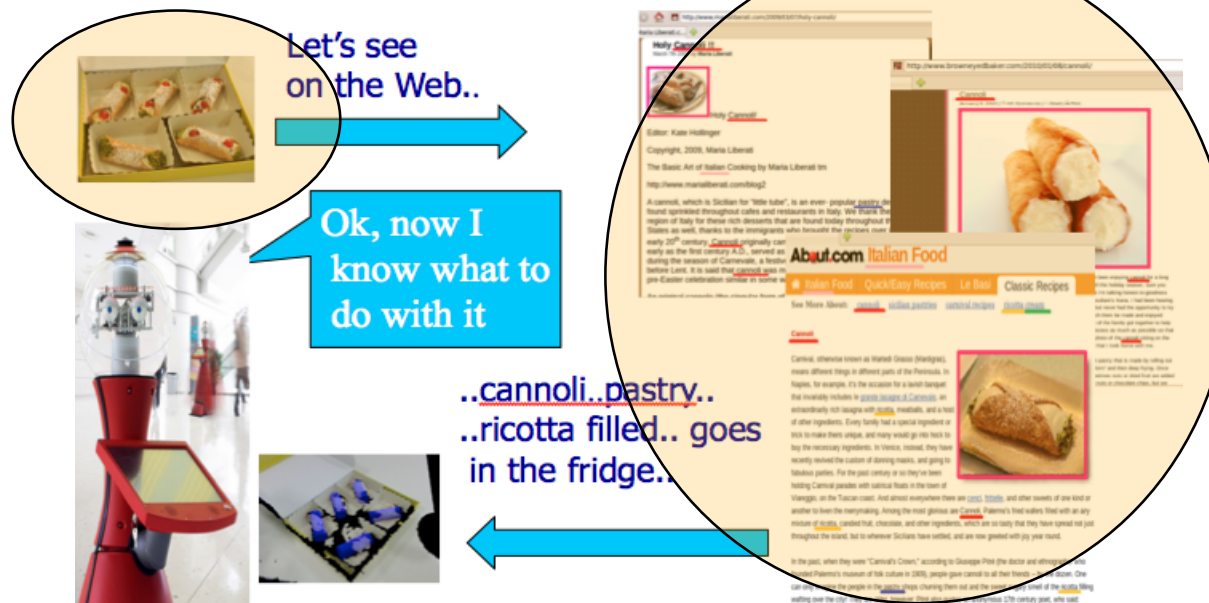
..cannoli..pastry..
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The diagram illustrates a robot's learning process. It starts with a red robot arm holding a tray of cannoli. A speech bubble says "Let's see on the Web..". An arrow points to a collage of web pages showing cannoli recipes and images. Another speech bubble says "Ok, now I know what to do with it". A final arrow points to a tray of cannoli, with a speech bubble saying "..cannoli..pastry..
..ricotta filled.. goes in the fridge..".

Why this is difficult?

*How does a robot know
it doesn't know?*

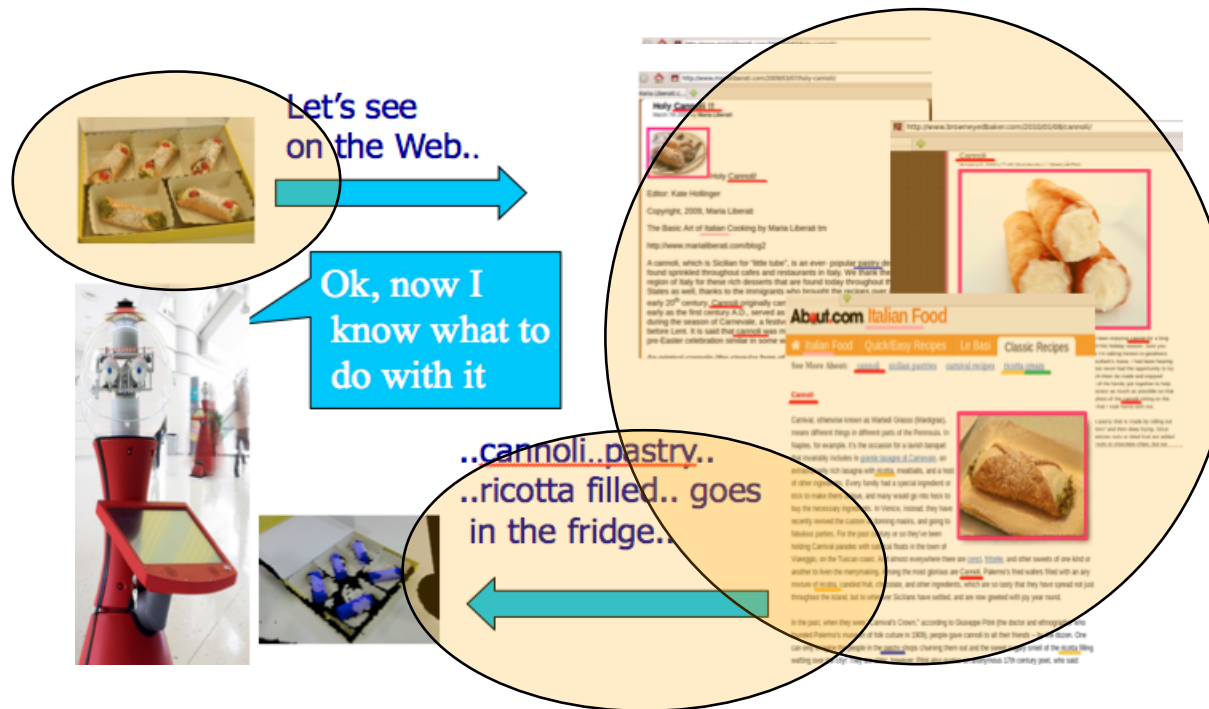
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information useful for a robot,
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*How to bridge between the
Web representations and the
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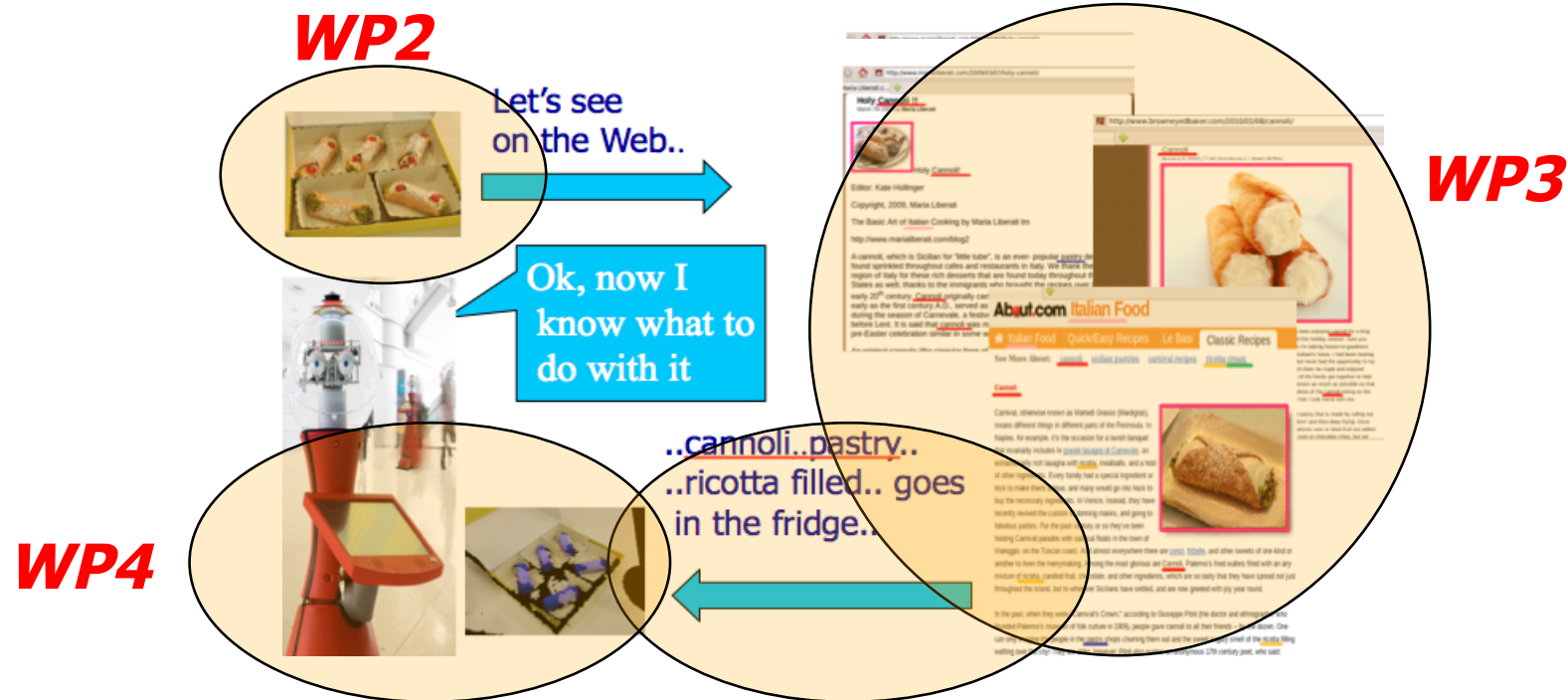
*How to use such information
to build a semantic object map?*

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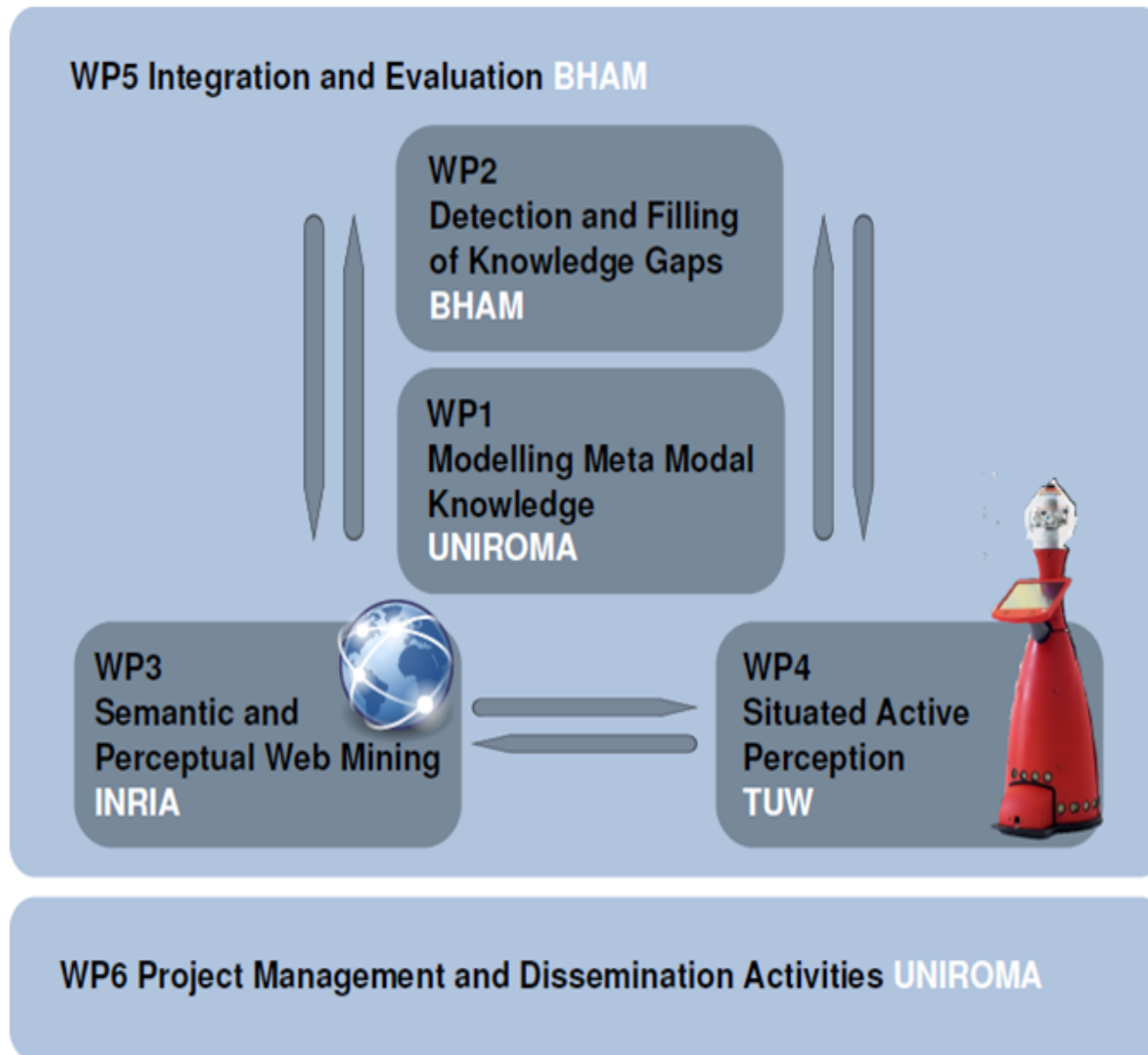
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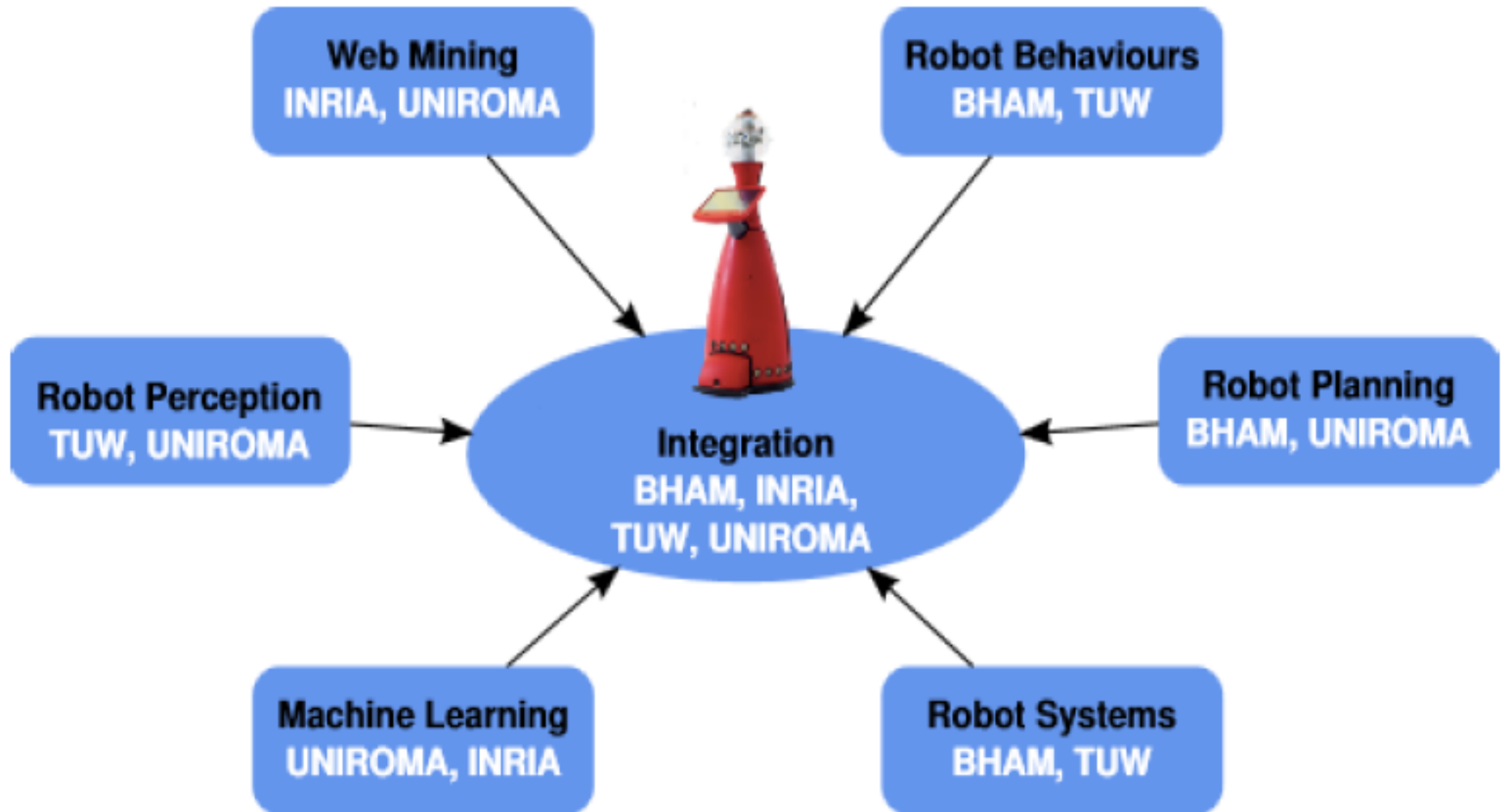
*How to use such information
to build a semantic object map?*

WP1 *How to bridge between the
Web representations and the
own robot representation?*

The Project Structure



Partners

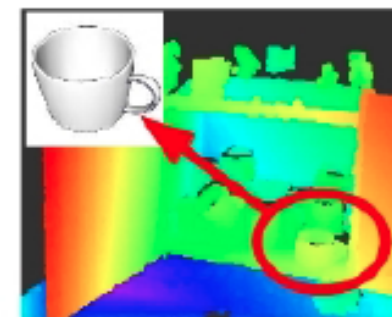
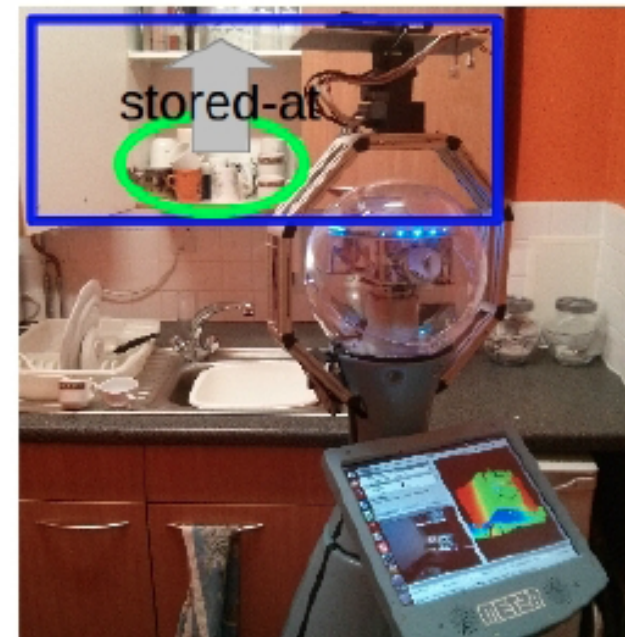
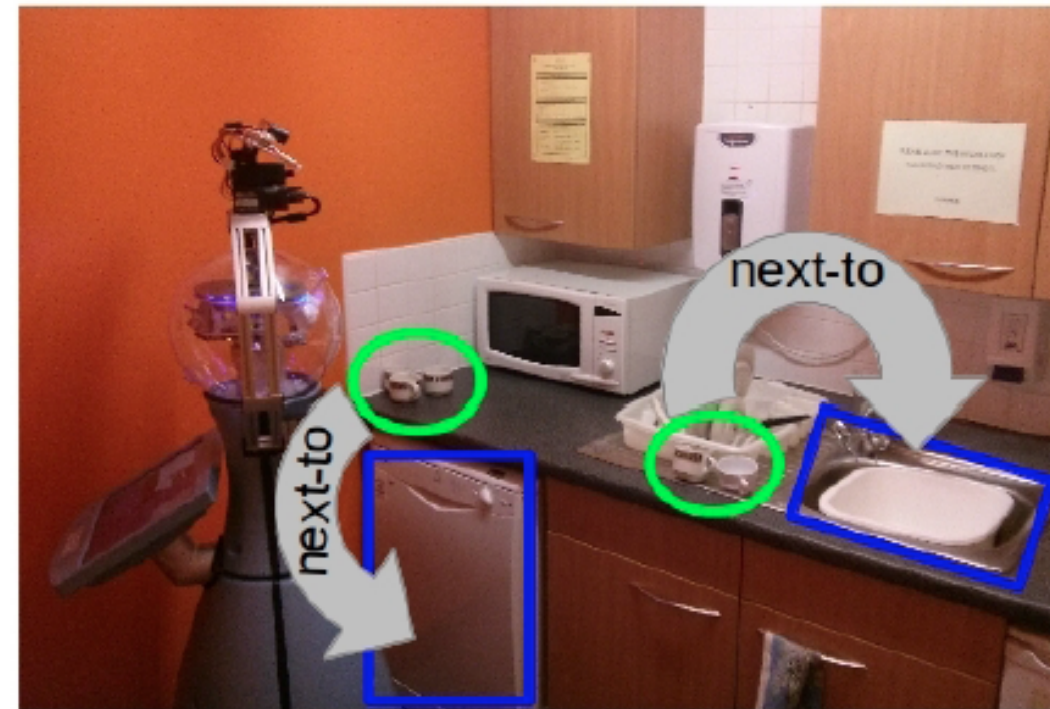


Working Scenario

Task1: Where is X?

Task2: What is Y?

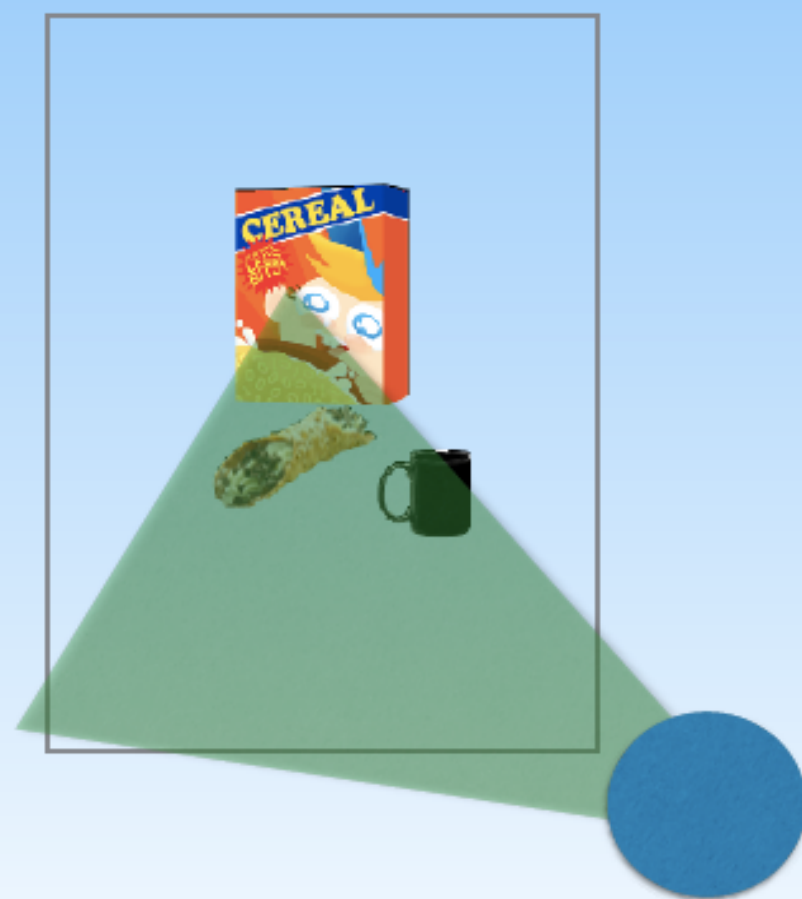
Learning from the Web:
object type,
room type,
proximity of furniture,
3D shape models

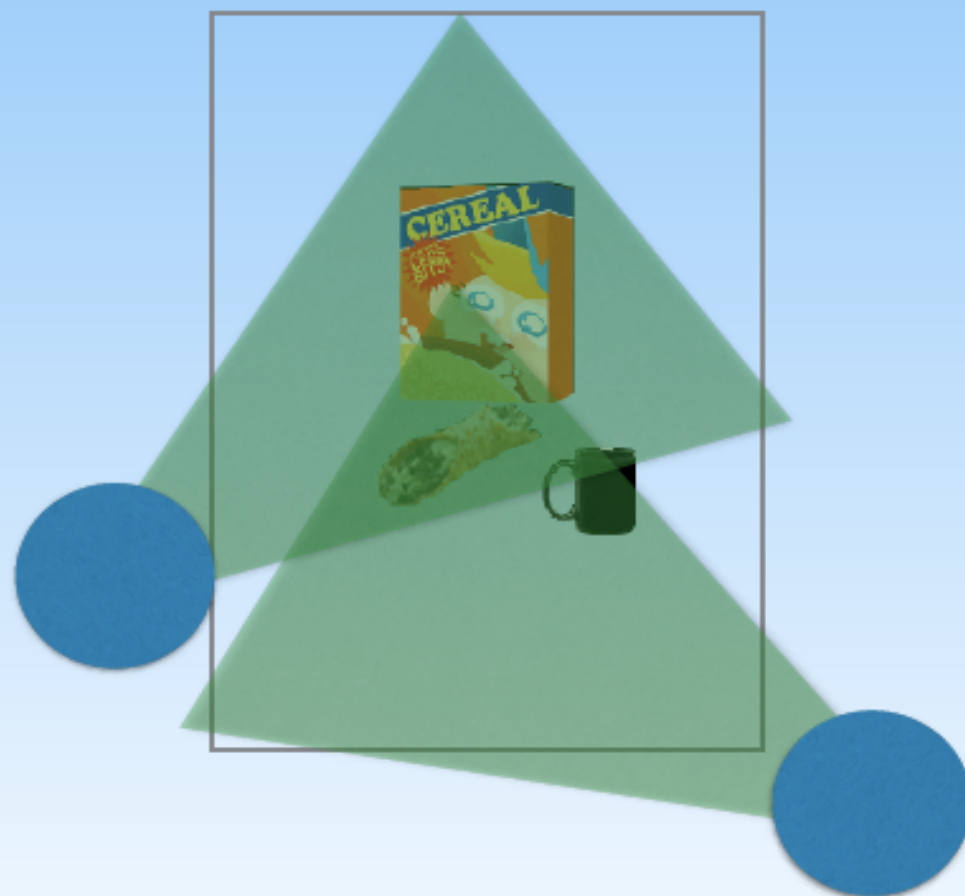


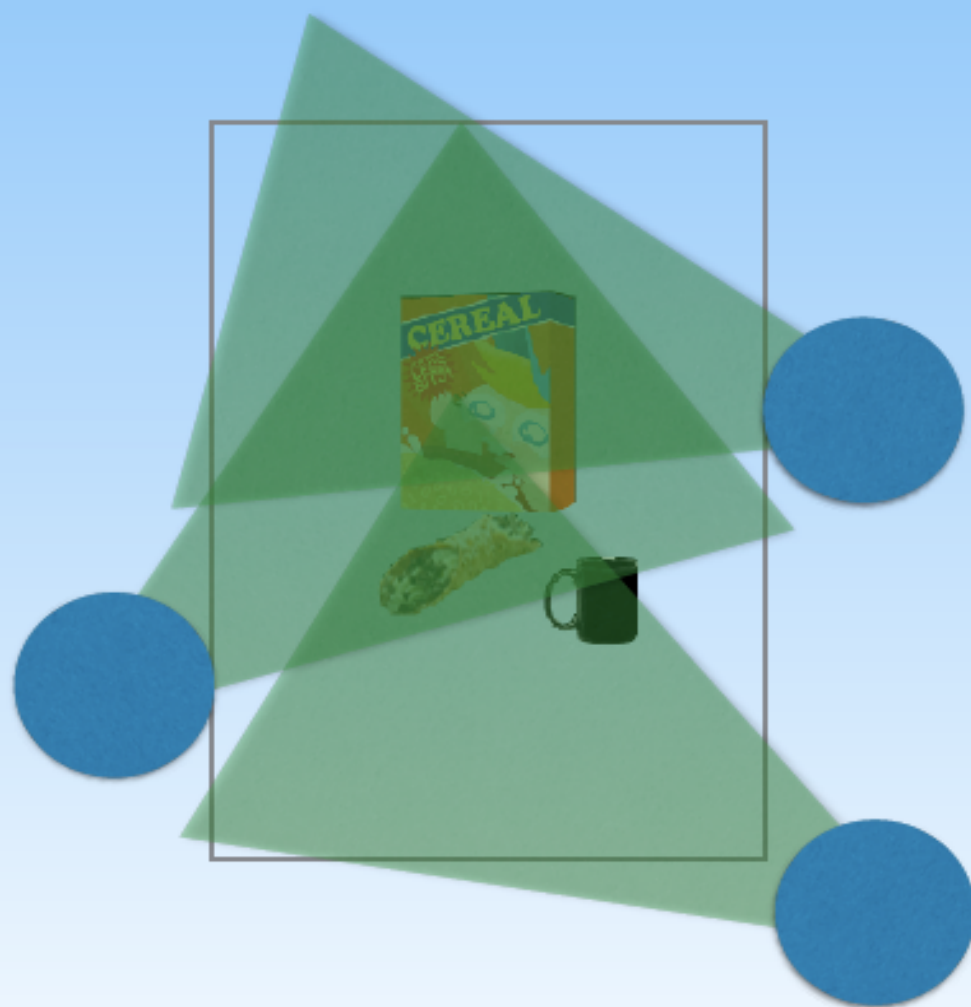
Key Results @Y2





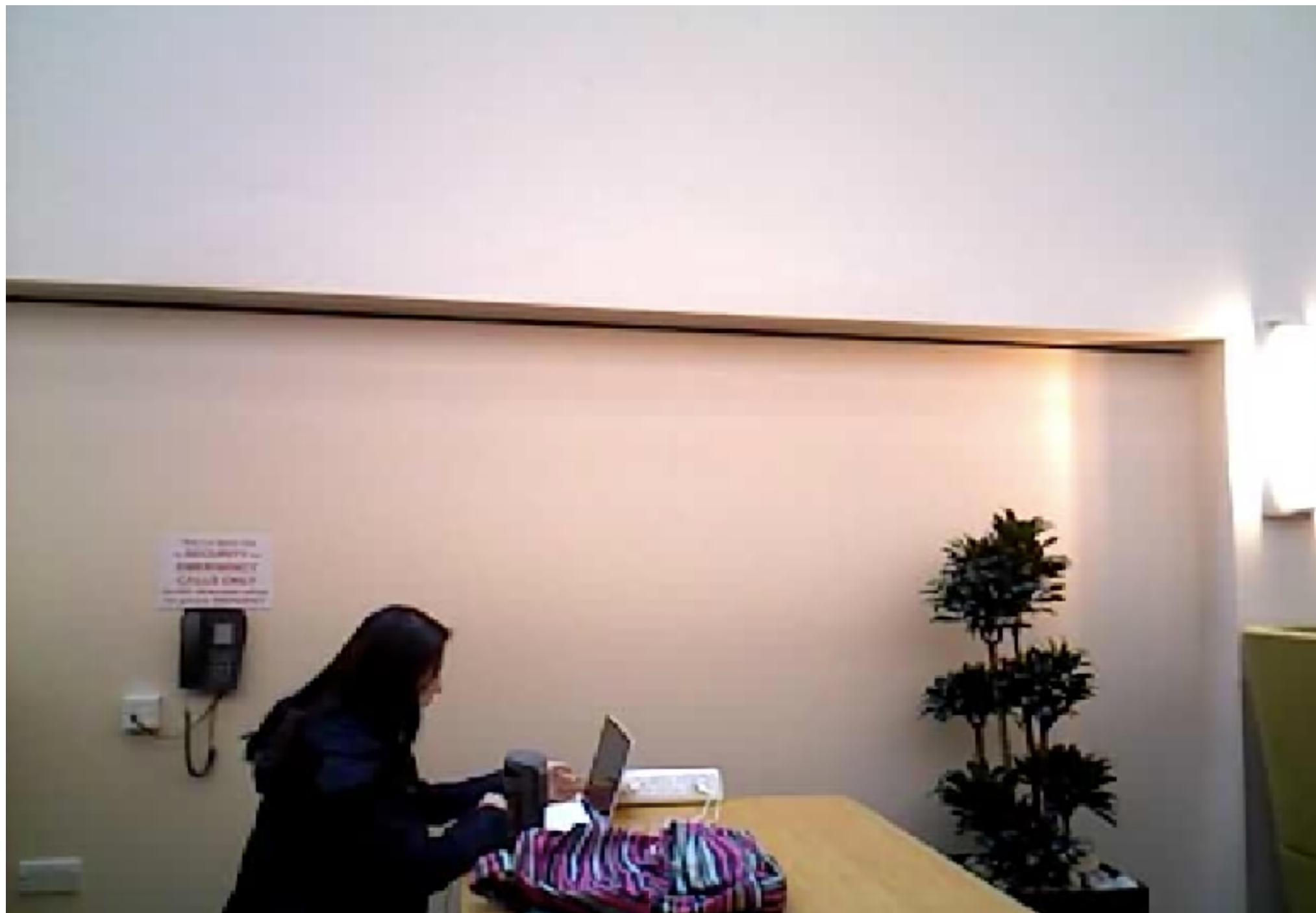






BHAM, TUW collaboration







How would a robot query the web?



Find a
cannoli

What is
this?

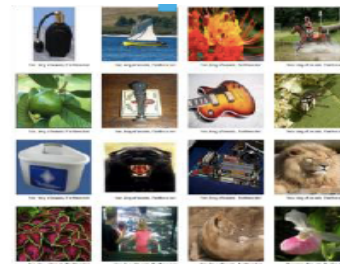


textual query

perceptual query

Rather than mining the Web on the fly, we might build clean Web-proxies, large enough to cover for most (any?) query

...but isn't this ImageNet????



IM  GENET

ImageNet as Web proxy



What a CNN is taught mugs look like



What mugs look like to Betty



First Results

1. An AlexNet trained on ImageNet does not generally perform too well on robot data
2. AlexNet(ImageNet) outputs WordNet classes as labels, so a WUP similarity is appropriate
3. WUP score average 0.51 → practically meaningless for most of objects (although *microwave*, *laptops*, *keyboards* have WUPs >0.75)

What are we missing? Can we do better?

(Some) Open Issues

ImageNet is a db created in 2012 of 1K categories –**static, closed world assumption**

1. What if we could continuously update all its classes?
2. What if we could augment its classes (1k, 3K, ..10K)?
3. What if we could exploit prior knowledge on the task and build on demand task specific databases?

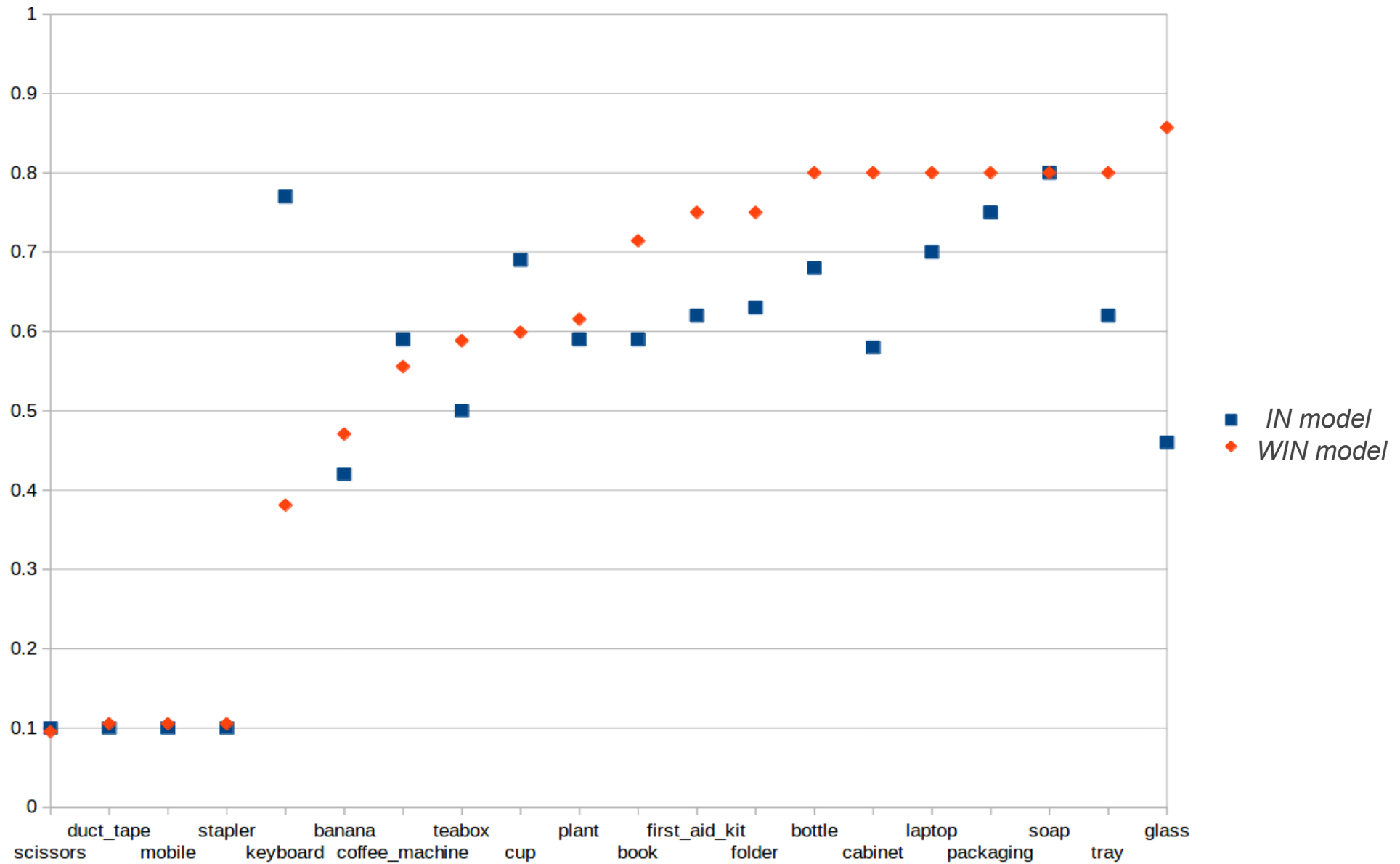
Can we automatically generate larger/task specific databases?

Proof of concept: generate a copy of ImageNet by downloading images using the class names as queries

What a CNN is taught mugs look like



Results with AlexNet(Web-ImageNet)



(Some) Open Issues

ImageNet is a db created in 2012 of 1K categories –**static, closed world assumption**

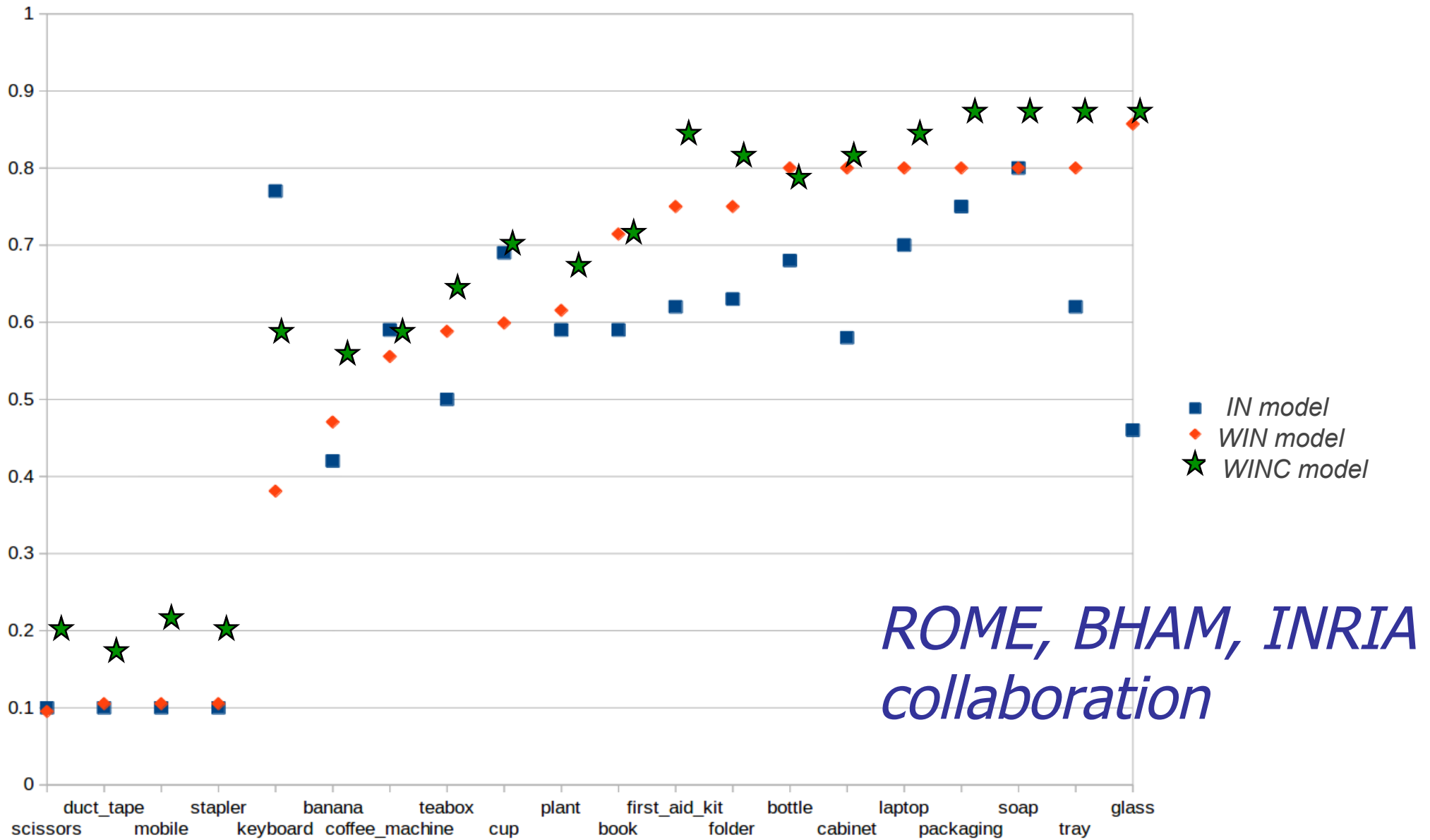
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Can we automatically generate larger/task specific databases?

Issues to deal with:

1. How to minimize noisily annotated images when harvesting the Web
2. What is the effect of noise on a given CNN architecture

Results with AlexNet(Web-ImageNet-Cleaned)



**More details and more results
at the poster session tomorrow!**

**For the whole story (data, demos, papers)
please visit our project web-site:**

<https://project.inria.fr/aloof/>

Thanks

