

# MUSE: MUltilinguality and SEmantics for the Citizens of the World

M. Bozzano<sup>1</sup>, D. Briola<sup>1</sup>, D. Leone<sup>2</sup>, **A. Locoro**<sup>1</sup>, L. Marasso<sup>2</sup>,  
V. Mascardi<sup>1</sup>

<sup>1</sup>DIBRIS

University of Genova, Italy

{daniela.briola,angela.locoro,viviana.mascardi}@unige.it,  
michele.bozzano@gmail.com

<sup>2</sup>Engineering Ingegneria Informatica, Genova, Italy

{lanfranco.marasso,diego.leone}@eng.it

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# Outline

- 1 Domain and Motivations
- 2 The MUSE System
  - Overview of the System
  - The Query Expander Module
  - The Ontology
  - The Rules
  - The Corrective Module
  - The Research on the Field
- 3 Conclusions

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## The problem at hand

Access to information and services available to citizens all over the world is hindered by language barriers:

- access to multilingual services could really help improving the life quality of a huge amount of migrating people;
- minimizing language barriers in public administrations and structures daily facing multilingual diversity represents an important step toward culturally and linguistically appropriate standards.

# The problem at hand

## The MUSE system

- addresses the problem of the provision of multilingual services in the domain of Public Administrations, supporting business and interpersonal communication and enabling people to make sense of content and services already available in this domain;
- the user is driven by the system to go straight to the point and do the right moves to achieve his goals towards a happy end transaction with the municipality.

## The problem at hand



- the common way of interaction between a foreign citizen and the front office operator of an Italian registry office is very difficult;
- the most part of the time is spent in trying to communicate in Italian some of the bureaucratic concepts that belong to the public administration language and domain.

## The problem at hand



- the MUSE system aims at supporting a foreign citizen in his attempt to interact with the municipality staff in his own language;
- It acts as a proxy able to understand and interpret the citizens requests and returning her all the information that may result useful for her to have her request successfully accomplished.

# Outline

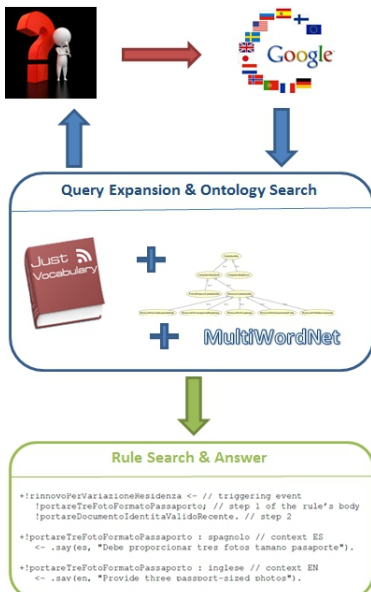
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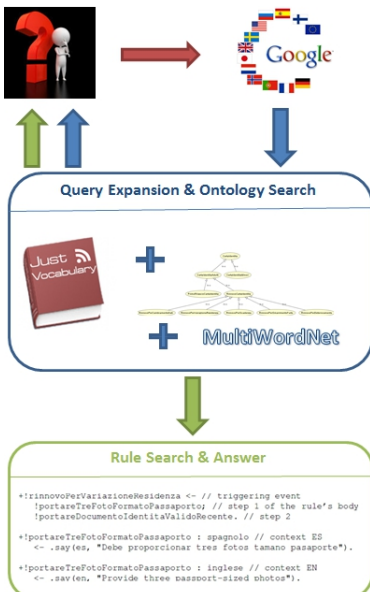












A vocabulary of expressions of the form:

```
expand(  
expressed_concept, intended_concept, value, language  
);
```

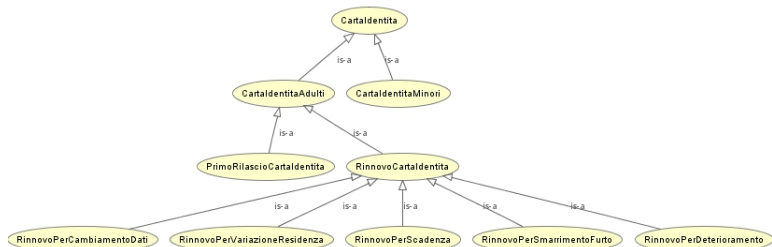
is used to detect and give semantic relevance (and a weight) to each of the concepts contained in the user request.

An instance of MultiWordNet<sup>1</sup> for the detection of collocations is also exploited to help the expansion procedure.

The vocabulary is incrementally improved with the addition of meaningful associations coming from the users feedback.

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<sup>1</sup><http://multiwordnet.fbk.eu/english/home.php>.



**Figure:** MUSE ontology for identity “well known problems”. From the topmost concept, and following a left-to-right BFS visit: “Identity Card”; “Identity Card of an Adult”; “Identity Card of a Minor”; “Identity Card First Issue”; “Identity Card Renewal”; “Renewal for Personal Data Change”; “Renewal for Address Change”; “Renewal for Expiry”; “Renewal for Loss or Theft”; “Renewal for Deterioration”

Procedural rules consist of:

- the “triggering event” that must match a leaf concept in the ontology;
- an optional “context” stating under which conditions the plan can be applied;
- the “body” consisting of a sequence of steps necessary to complete the procedure.



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```
+!rinnovoPerVariazioneResidenza <- // triggering event
  !portareTreFotoFormatoPassaporto; // step 1 of the rule's body
  !portareDocumentoIdentitaValidoRecente. // step 2

+!portareTreFotoFormatoPassaporto : spagnolo // context ES
  <- .say(es, "Debe proporcionar tres fotos tamaño pasaporte").

+!portareDocumentoIdentitaValidoRecente : spagnolo
  <- .say(es, "Debe proporcionar el último documento de identidad")
```

Some **users may do mistakes** when formulating their queries:

- MUSE records such mistakes and the relative correction;
- it ranks the pairs obtained as they are repeated during real time interactions;
- it may provide an automatic correction when the same situation happens again.

Some **users themselves offer feedback** when they select their intended request against a set of equally possible requests;

- hence they modify the ranking of translations based on such feedback for similar queries;
- the system is able to show as top ranks the more probable translations associated with the more probable requests.

A questionnaire has been prompted and submitted to users in form of **short interviews** that were conducted at the end of a typical interaction with a human operator, in order to drive the system design towards an improvements of interaction aspects:

- Which question did you make to the operator?
- Did you obtain the answer you were looking for?
- How difficult was understanding what you have to do?
- How difficult are the steps that you are now expected to face in order to complete the procedure?
- Was the time you were engaged into the conversation too short, too long or just fitting your expectations?

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Some of the foreseen advantages in using MUSE for the Registry Office are that

- misunderstandings and bad translations troubles are minimized, as well as the user sense of uneasiness;
- the difficulties in understanding the answers will disappear, as they are provided in native language;
- the queues at the registry office could be shortened, as the system may contribute to address the users to the right place.

THANK YOU!  
Questions?