

# **QTLeap: A European scientific research project on machine translation by deep language engineering approaches**

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## **POSTER ABSTRACT**

### **1 Introduction**

In this poster we present QTLeap ([qtleap.eu](http://qtleap.eu)), an ongoing project whose goal is to research on and deliver an articulated methodology for machine translation that explores deep language engineering approaches, which handle the representation of the meaning of utterances, in view of breaking the way to translations of higher quality.

### **2 Background**

Machine translation (MT) is a computational procedure that seeks to provide the translation of utterances from one language into another language. Research and development around this grand challenge is bringing this technology to a level of maturity that already supports useful practical solutions. It permits to get at least the gist of the utterances being translated, and even to get pretty good results for some language pairs in some focused discourse domains, helping to reduce costs and to improve productivity in international businesses.

There is nevertheless still a way to go for this technology to attain a level of maturity that permits the delivery of quality translation across the board. The QTLeap project explores novel ways for attaining MT of higher quality that are opened by a new generation of increasingly sophisticated semantic datasets and by recent advances in deep language processing.

The deeper the processing of utterances, the more fine-grained is the semantic representation and the less language-specific differences remain between the representation of the meaning of a given utterance and the meaning representation of

its translation: Further chances of success can thus be explored by MT systems that are based on deeper semantic engineering approaches.

### **3 Real usage scenario**

This project is aiming at delivering both an articulated methodology for quality machine translation that innovatively explores deep language engineering approaches to language technology, and an empirically grounded validation of its technological potential and impact.

The implementation of the project is structured along the development of a number of MT pilots. These pilots are embedded in a multilingual call center. This is a real usage scenario where high quality machine translation could not be called to play a more relevant and opportune role, by providing accurate answers to end-users and to support efficiency and economy of scale, and thus by serving as a real life testbed for the extrinsic evaluation of the results to be achieved and for the validation of the project objectives.

### **4 Approach to MT**

The QTLeap project counts on the contribution of partners that have, each of them, a wide range of strengths and backgrounds that, by bringing common and complementary technology, systems and resources, permit the project to embrace a common vision of undertaking research towards producing high-quality outbound MT by using more linguistic-intensive results.

This vision is being pursued under an approach aimed at exploring deep language processing and at resorting to a common hybrid methodology that combines the best statistical and rule-based solutions. To this end the project adopted a common architecture, based on transfer, and the same real-usage evaluation scenario.

The MT prototypes of the project are being developed along a progressive sequence of four pilots, where each one of these pilots covers every one of the seven languages in the project, in their translation pairs. The performance of these prototypes in this scenario is being assessed through a common set of evaluation metrics, thus ensuring full comparability of the results progressively obtained along the deployment of the project.

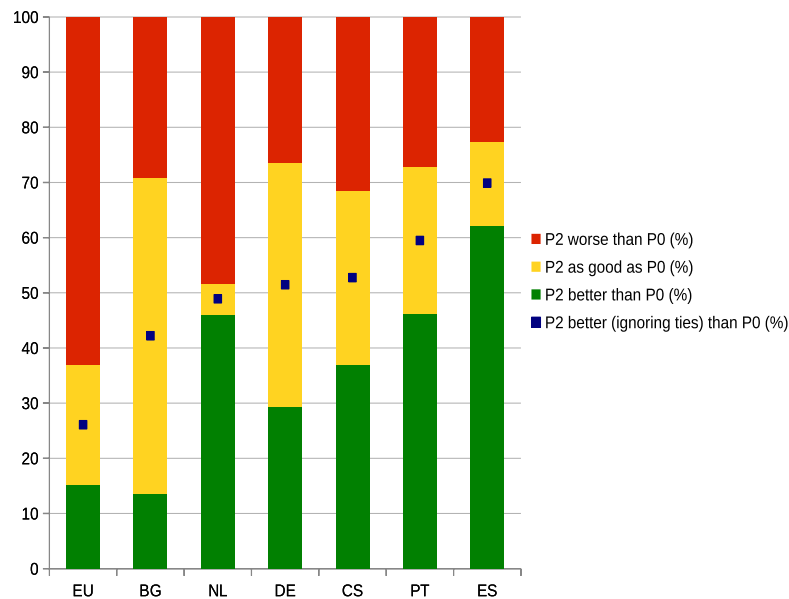
In a nutshell, the project is engaged with:

- vision: to produce high-quality outbound MT using more linguistic-intensive results
- approach: deep processing;
- methodology: hybrid between rule-based and statistical;
- architecture: transfer-based;
- evaluation real-usage scenario: online question answering in ICT trouble shooting;
- test dataset: interactions with users in the above real-usage scenario;

- evaluation metrics: automatic mainstream metrics supplemented with the multidimensional quality metrics;
- common language (English) as target or source for each one of the seven languages in the project;
- common path of progression for each language pair, ensuring comparability of the research exercise: every pair is developed along the four Pilots P0-P3

## 5 Interim results

Interim results indicate that the MT technology developed so far in the project are delivering better results than the statistical machine translation (SMT) technology that is currently the state of the art in commercial applications and that the project is taking as a baseline.



Part of these advancement are presented in the diagram above. This diagram summarizes the results of the comparative evaluation of one of the MT pilots (P2) developed by the project for each one of the seven languages of the project vis a vis the SMT pilot (P0). With the black dot indicating 50% or higher, five in seven systems that are supported by deep language engineering approaches are delivering similar or superior results than the baseline ones.

The research and development activities in the project are going on and the above results are expected to be further improved, with positive impact for all languages.

## **6 Final remarks**

The present submission is a short abstract of the poster to be presented at META-FORUM 2016. In the final poster complete information will be provided, including details concerning the project consortium, organizational structure, etc.

A thorough description of the project will be provided in the eventual final paper to be published.

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