The Impact of Advances in Neural and Statistical MT on the Translation Workforce

Association for Machine Translation in the Americas

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When Will AI Exceed Human Performance? Evidence from AI Experts   2024

- Abstract: "Researchers predict AI will outperform humans in many activities in the next ten years, such as translating languages (by 2024), writing high-school essays (by 2026), driving a truck (by 2027), working in retail (by 2031), writing a bestselling book (by 2049), and working as a surgeon (by 2053)."[1]

- 352 of the 1634 researchers publishing at two major AI conferences in 2015

- Estimate of "when AI will do this task better and cheaper than a team of human experts":

  - "Perform translation about as good as a human, who is fluent in both languages, but unskilled at translation for most types of text and for most popular languages." [2]

  - What does this mean?

  - What about about other kinds of translation (e.g., with skilled translators)?

[1]K. Grace, J. Salvatier, A. Dafoe, B. Zhang, and O. Evans (May 2017). *Will AI Exceed Human Performance? Evidence from AI Experts.* Downloaded 13 February 2018 from Cornell Library site: arXiv:1705.08807v2 [csAI} 30 May 2017.

[2]Ibid.

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What is Happening to MT?

- More improvements to machine translation, computer assisted translation, optical character recognition, and speech
  - Deep learning and neural nets increasing accuracy
  - Statistical and Rule-Based MT
  - More translation memory
  - More annotated data
  - More current machine translation to use, including for pivots
  - Many small improvements, including easier customization
- Market forces
  - Drive for new markets
  - Capitalize on Artificial Intelligence (AI) hype

- Better fluency in MT
- More machine translation and computer assisted translation options, including for dialects
- Somewhat better accuracy in many tools supporting MT (e.g., OCR)
- More need for localization
  - More need for cultural input
  - More interest in single-source authoring (and more need for guidance for customers)
- More marketing
  - More need for good evaluation
  - More need to help customers understand options for tools and humans

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What does the MT Look Like?

- Often more accurate, including with specialized domains
- More specialization, due to ease of creation in Statistical MT (SMT) and Neural MT (NMT)
- Significantly more fluency although not always greater accuracy
- Some high-risk in NMT, including problems with:
  - Negatives
  - New text inserted
  - Source text left out
- Sometimes higher cost for NMT due to hardware and data—thus not feasible for some languages and domains

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Experiment by Sue Ellen Wright, October 2017

DeepL (Deep Learning/Linguee)
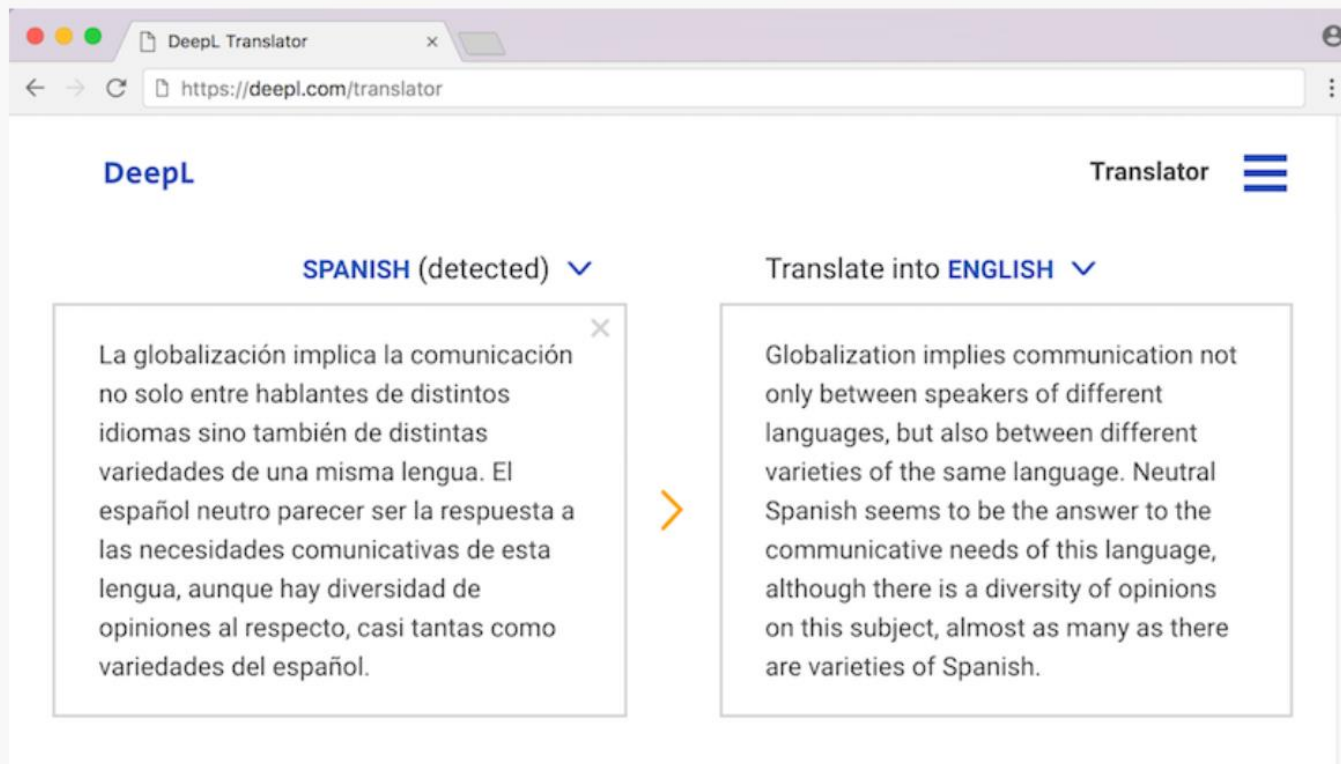
No post editing

DeepL Challenged (Sue Ellen Wright)

DeepL

Translate from **GERMAN** (detected) ∨   Translate into **ENGLISH** ∨

Mitten im Dreißigjährigen Krieg träumte man an einem sächsischen Hof von einem deutschen Wörterbuch nach italienischem Vorbild, um das Französische zurückzudrängen. An latienduseligen Humanisten und frankophilen Höflingen vorbei entwickelte das Bürgertum sprachliches Selbstbewusstsein, schrieb im Alltag wie in der Poesie ein Deutsch mit zunehmend überregionaler Geltung, das schließlich zur Klassik führte. Allerdings begründete die Dichtersprache von Goethe und Schiller auch einen Mythos, der dazu beitrug, dass über der endlich gewonnenen kulterellen Einheit die mindestens so dringliche politische versäumt wurde.

620/5000

No matches for this word in the Linguee dictionary.

In the middle of the Thirty Years' War, a Saxon court dreamt of a German dictionary based on an Italian model, in order to suppress French. Passing by Latin-sounding humanists and Francophile courtiers, the middle classes developed linguistic self-confidence, writing in everyday life and in poetry a German of increasing supra-regional importance, which eventually led to classical music. However, the poetry of Goethe and Schiller also created a myth, which contributed to the fact that the political lack of at least as urgent as the cult-like unity that had finally been won was over.

Click on a word to get alternative formulations.

In the middle of the Thirty Years' War, a Saxon court dreamed of a German dictionary based on an Italian model in order to suppress French. Ignoring Latin-crazy humanists and Francophile courtiers, the bourgeoisie developed linguistic self-confidence, writing a German of increasing supra-regional importance in both everyday life and in poetry. To be sure, the poetic language of Goethe and Schiller also established a myth that contributed to the fact that although they finally achieved cultural unity, political unity, which was at least as critical, was neglected.

What is Happening to Tools?

- Probably little MT for
  - Tasks where there are needs for very low risk, high visibility, or extensive cultural context
  - Languages & domains with little demand
- In other areas, there is a need for translators to monitor the translations
  - Less surface editing
  - More checking for match with source text in content, completeness, and cultural context
  - Use of tools to facilitate that checking
    - Perhaps using predictive translation
    - Using confidence measures (e.g., match with terminologies)
    - Using quality assessment
    - Perhaps marking which sections have been evaluated
    - Perhaps also using automatic identification of different translation engines and translators
    - More sophisticated tools to check for negation, completeness, and subject area

What is Happening to the Translator Workforce?

- Discussion at the ATA Conference centered around different kinds of translation requirements
- Different source documents and requirements result in different tasks for translators
- Some of these tasks may be different
  - Question raised by David Rumsey, ATA President, at the 2017 Translation and Interpreting Summit:
    - Are we recruiting and training translators for the kinds of translation they have done in the past or for the new kinds of translation they will be doing in the future?
- Increasing focus on
  - Annotating data
  - Evaluating MT output for completeness, accuracy, context
  - Using tools and training others how to use tools

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References

- K. Grace, J. Salvatier, A. Dafoe, B. Zhang, and O. Evans (May 2017). *Will AI Exceed Human Performance? Evidence from AI Experts.* Downloaded 13 February 2018 from Cornell Library site: *arXiv:1705.08807v2 [csAI} 30 May 2017.*

- Systran (3 November 2018). Neural MT Workshop, Washington D.C.

- S. Wright (27 October 2018). How to Future Proof. *New Options for Translators, Interpreters, and Project Managers in the Artificial Intelligence-Driven Future of Language Work*. American Translators Association Conference, Washington D.C.

- Z. Ostrega, Old and New Practices at State Department. *New Options for Translators, Interpreters, and Project Managers in the Artificial Intelligence-Driven Future of Language Work*. American Translators Association Conference, Washington D.C.

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