MT Impact – Horizon 2020 (and beyond)

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Agenda

• MT usage today
• NMT vs SMT
• Post-editing
• MT usage tomorrow
• Machine vs Human
MT usage
2017 Language Industry Survey - Trends
### 2018 – the year of MT

<table>
<thead>
<tr>
<th>No MT usage</th>
<th>2016</th>
<th>2017</th>
<th>2018 (prel.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSP’s</td>
<td>80%</td>
<td>57%</td>
<td>36%</td>
</tr>
<tr>
<td>Freelancers</td>
<td>69%</td>
<td>67%</td>
<td>48%</td>
</tr>
</tbody>
</table>

*Source: European Language Industry Survey*
What about Neural?
Neural MT – why the hype?

The Great A.I. Awakening

How Google used artificial intelligence to transform Google Translate, one of its more popular services — and how machine learning is poised to reinvent computing itself.

BY GIDEON LEWIS-KRAUS  DEC. 14, 2016
Where do you find neural MT today?

- Google Translate
- Skype Translate
- Microsoft Translator Live
- Facebook
- Amazon

... 

- DeepL
- Omniscien
- SDL
- Systran
- KantanMT
- Tilde

...
SMT vs NMT: main differences

Statistical Machine Translation (SMT)
• Phrase-based
• Separate language model, translation model and reordering model
• Fast training

Neural Machine Translation (NMT)
• Uses (recurrent) neural networks («deep»)
  NMT uses several layers of neural networks
• Sentence-based
• One single sequencing model – simpler than SMT approach
• ‘Predicts’ next word
• Restricted vocabulary (max. 50,000)
• More time needed for training
• No easy solution for terminology
• Less tolerant for low quality source
• More pre- and post-processing required
Is it really that good?
Findings Tilde (www.tilde.com/about/news/316)
# Findings DFKI/QT21 Project

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Occurrences</th>
<th>Percentage correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NMT</td>
</tr>
<tr>
<td>Formal address</td>
<td>138</td>
<td>90%</td>
</tr>
<tr>
<td>Genitive</td>
<td>114</td>
<td>92%</td>
</tr>
<tr>
<td>Modal construction</td>
<td>290</td>
<td>94%</td>
</tr>
<tr>
<td>Negation</td>
<td>101</td>
<td>93%</td>
</tr>
<tr>
<td>Passive voice</td>
<td>109</td>
<td>83%</td>
</tr>
<tr>
<td>Predicate adjective</td>
<td>122</td>
<td>81%</td>
</tr>
<tr>
<td>Prepositional phrase</td>
<td>104</td>
<td>81%</td>
</tr>
<tr>
<td>Terminology</td>
<td>330</td>
<td>35%</td>
</tr>
<tr>
<td>Tagging</td>
<td>145</td>
<td>83%</td>
</tr>
<tr>
<td><strong>Sum/average</strong></td>
<td><strong>1453</strong></td>
<td><strong>89%</strong></td>
</tr>
</tbody>
</table>
Findings DFKI/QT21 Project

Source:
MultiLingual Jan ’18, John Tinsley
So, is it better?

- NMT makes 3 to 5 times less errors in
  - Word ordering
  - Morphology
  - Syntax
  - Agreements
  Source: Tilde (EN>ET)
  This leads to more fluent translations, mainly on ‘difficult’ languages

- BUT
  - Older techniques (RBMT, trained SMT) can perform better on ambiguity
    (source: PBML, Aljoscha Burchardt et al., June 2017), terminology and tagging
  - Still quite some ‘dangerous’ errors, such as negation (although better than SMT)
  - Traditional automated evaluation methods (BLUE score) do not always agree with human evaluation results
  - Uneven results, depending on language pair
Let’s talk Post-editing
Post-editing levels

- **Full MTPE**
  - No distinction with full human translation

- **Light MTPE**
  - Correct understanding
  - No effort on stylistic aspects
  - Varying practices regarding linguistic accuracy
  - Run automated QA rules (ex. check for missing negation)

- **Focused MTPE**
  - Specific rules
    - Specific – highly visible – parts of the content
    - Check important elements like numbers, names, etc.
    - ...
Traps

• Higher fluency misleads post-editor
• Terminology
• Tag order issues
• «Target first» approach not ideal
So where does that lead us?
MT penetration – a personal view

User-generated content

- Standardized content
- Controlled language

Basic procedural content
- 2030

Complex procedural content
- 2030

Basic editorial content
- 2030

Complex editorial content (marketing brochures)
- 2030

Creative content (ads)
- 2030

- 2020

- 2018
Future role(s) of translator

« Machine translation will replace only those translators that translate like a machine »

« The machine will take care of the keystrokes. The translator will add the human dimension - the cherry on the cake. »

• Non-MT content (<20% - same as non-CAT content)
  – Transcreator / Copy-editor
• MT content
  – Full post-editing
  – Light post-editing
  – Focused post-editing
Translator = Post-editor = [Augmented Translator]?

- Do we need the same profile?
  - Editorial translation
  - Full post editing
  - Light post editing (cf software testing)

- Do we need the same training?
  - Creative writing
  - Pattern recognition (search for typical MT errors)
  - Eye for detail and critical sense
  - General (world) knowledge: disambiguation, logical errors
Workable MT is here. Are we ready to work with it?

Will translation buyer expectations become realistic?
Will translators embrace technology?
Will translation companies find a workable business model?
Will universities adapt training programmes to prepare future generations?
Will translation tool providers be able to integrate and standardise?

Come and see in 2, or rather 12 years!
Q & A