



**Panel:**

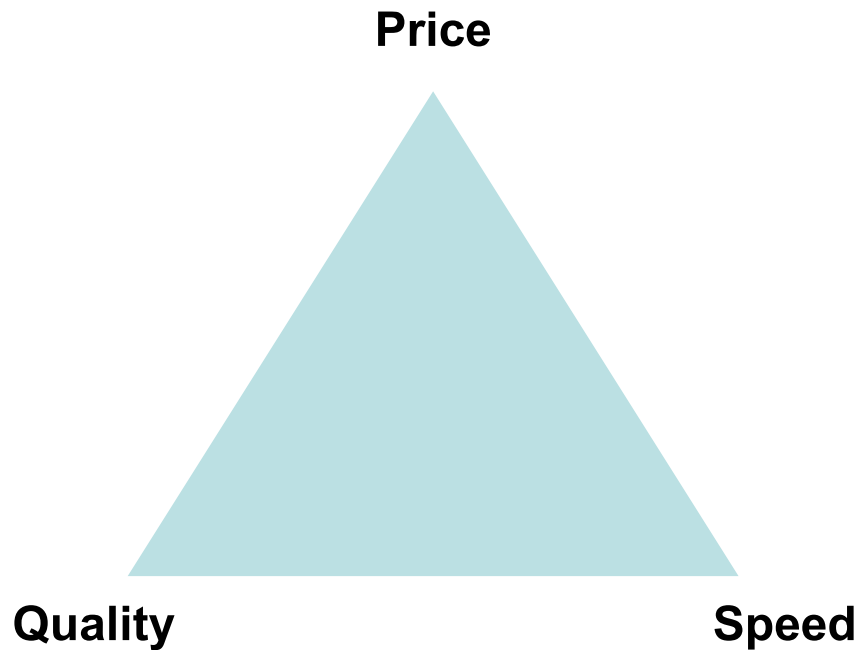
# **Translation at a click**

**Chris Wendt**  
**Microsoft**





# WHY MT?

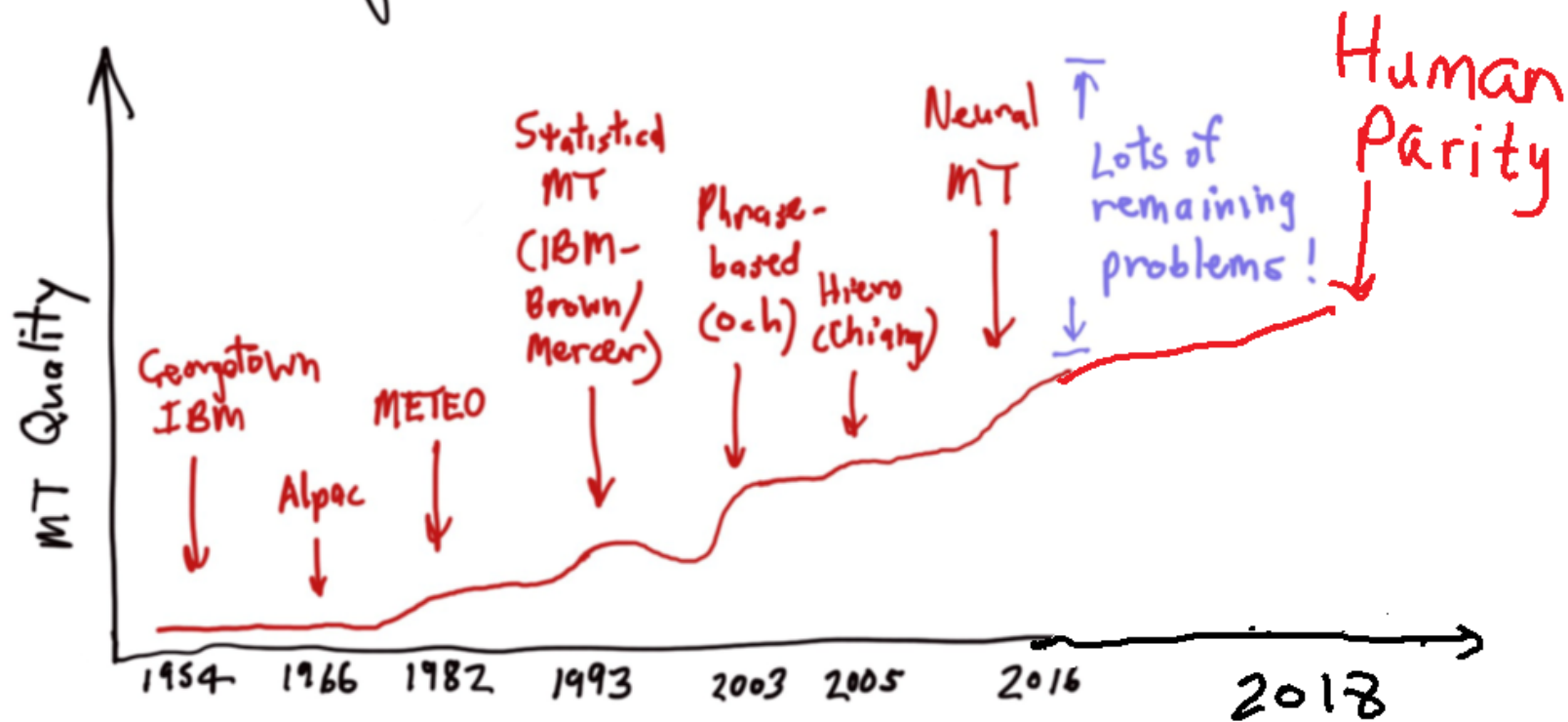


	Human	Machine
1M words	\$250000	\$280

\$280 is the runtime cost of customized Microsoft Translator.

Uncustomized costs \$70.

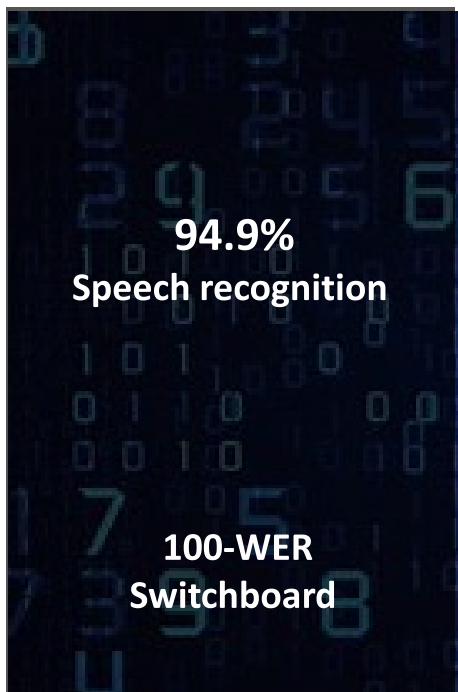
# Progress in MT



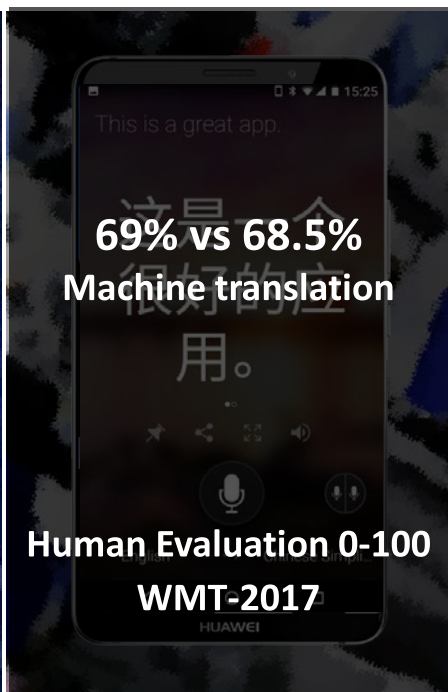


# Microsoft AI: Milestones reaching human parity

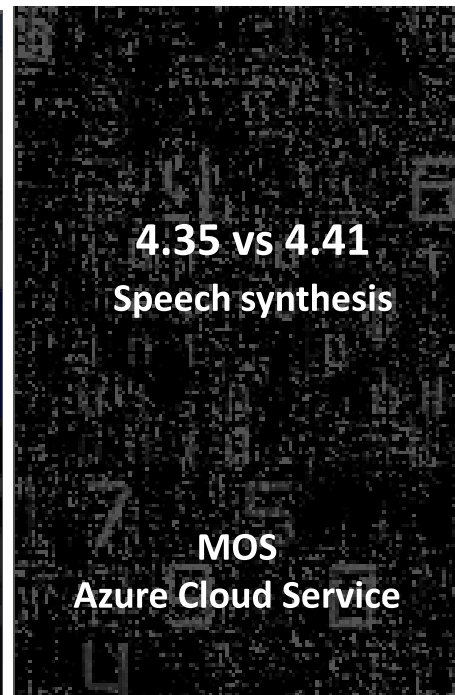
2017



2018



2018



# WHERE ARE WE?

- Getting closer to parity
- Year over year
- For the most translated languages

What is missing to true human parity?

- Document context
- Real-world knowledge
- Non-zero chance of catastrophic mistakes



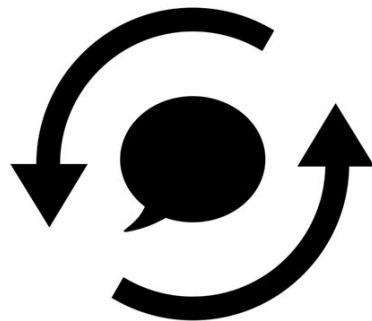
# DOCUMENT CONTEXT

## *Today: Customization*

- Train a custom translation system for the terminology and style of the enterprise or topic
- Good improvements (~ 10 point BLEU)
- Dictionaries
- Use previously translated prose for machine learning
- In domain, representing your style and terminology
- 20,000 sentences is a good start

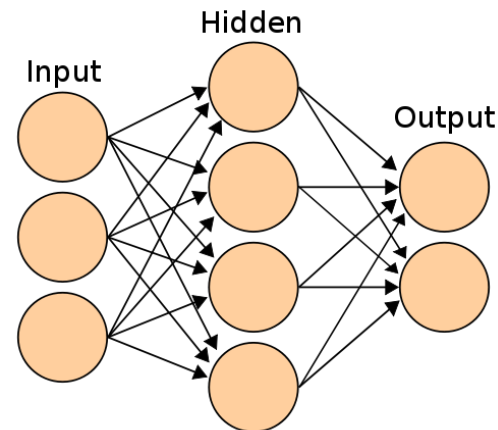
## *Research*

- Whole document context
- Cross-sentence transfer
- Sensory context



# NEURAL NETWORKS – WHY THEY ARE GOOD

- Processes the whole sentence
- Can store additional information in hidden layers
  - Language ID
  - Domain
  - A phrase from the previous sentence
  - A representation of the document context
  - GPS location
  - Age of the speaker
  - ...



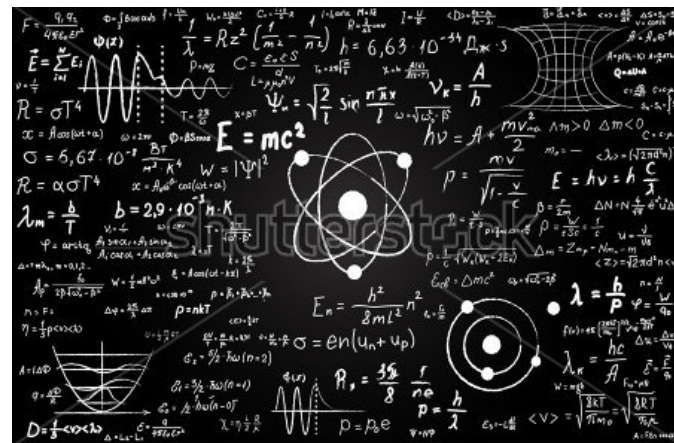
## Result

- Better fluency
- Translating the concepts rather than the words
- Chance of getting a concept wrong and still produce a fluent sentence

# REAL-WORLD KNOWLEDGE

Gathered from <wherever>  
Stored in a hidden layer  
Very domain specific

Names – Places - Relationships  
Whole document context



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European  
Commission

# CATASTROPHIC MISTAKES

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Dutch original:

Nederland en Australië stellen Rusland aansprakelijk voor zijn aandeel in het neerhalen van vlucht MH17.

Our original neural translation to English:

The Netherlands and Australia are responsible for its share of the MH17 of the flight.

Today's neural translation to English:

The Netherlands and Australia make Russia liable for its share in the taking down of flight MH17.

# CATASTROPHIC MISTAKES

## Wrong word choice

The original English sentence is:

Today, President Trump will welcome Crown Prince Mohammad bin Salman of the Kingdom of Saudi Arabia to the White House.

This was the incorrect translation:

اليوم، سيرحب الرئيس ترامب بالأمير محمد بن سلمان، ملك المملكة السعودية ، في البيت الأبيض.

The correct translation is:

اليوم، سيرحب الرئيس ترامب بالأمير محمد بن سلمان، ولي عهد المملكة السعودية ، في البيت الأبيض.



# Speech Recognition – Translation – Speech Synthesis



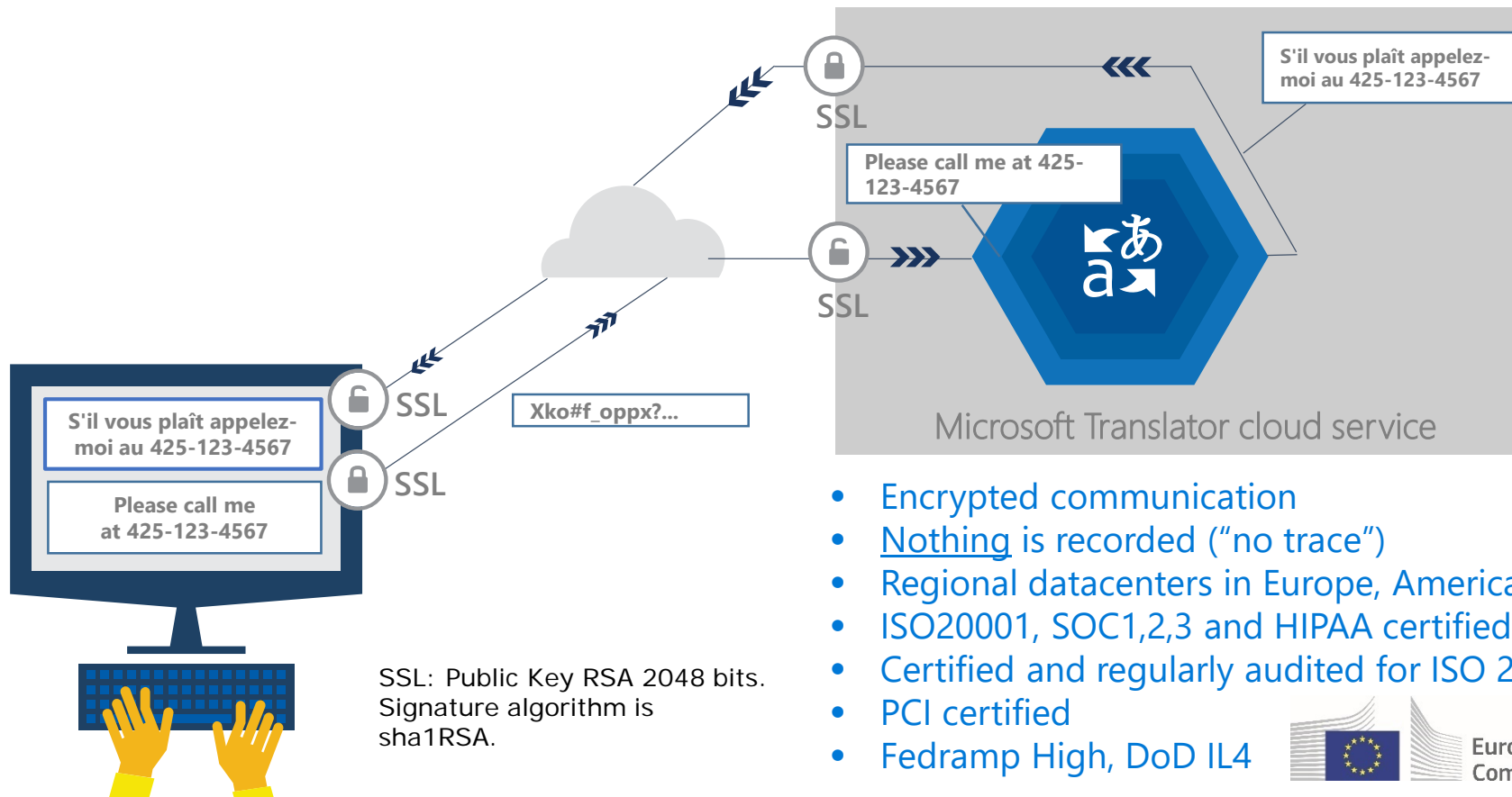
Building human-to-human connections



Mockrát děkujeme!  
Σας ευχαριστούμε πολύ!  
Muito obrigado! Go raibh maith agaibh!  
Vielen Dank! Multumesc!  
Nuoširdžiai dėkojame! Najlepša hvala!  
Благодаря! Köszönjük szépen!  
Merci beaucoup! Grazie mille!  
Děkujeme vám velmi pekne! Hartelijk dank!  
Tack så mycket! Kiitos! Nirringrazzjawk ħafna!  
Hvala lijepa! Muchas gracias!  
Dziękujemy za uwagę!  
Mange tak!

# APPENDIX

# TRANSLATOR API PRIVACY AND SECURITY

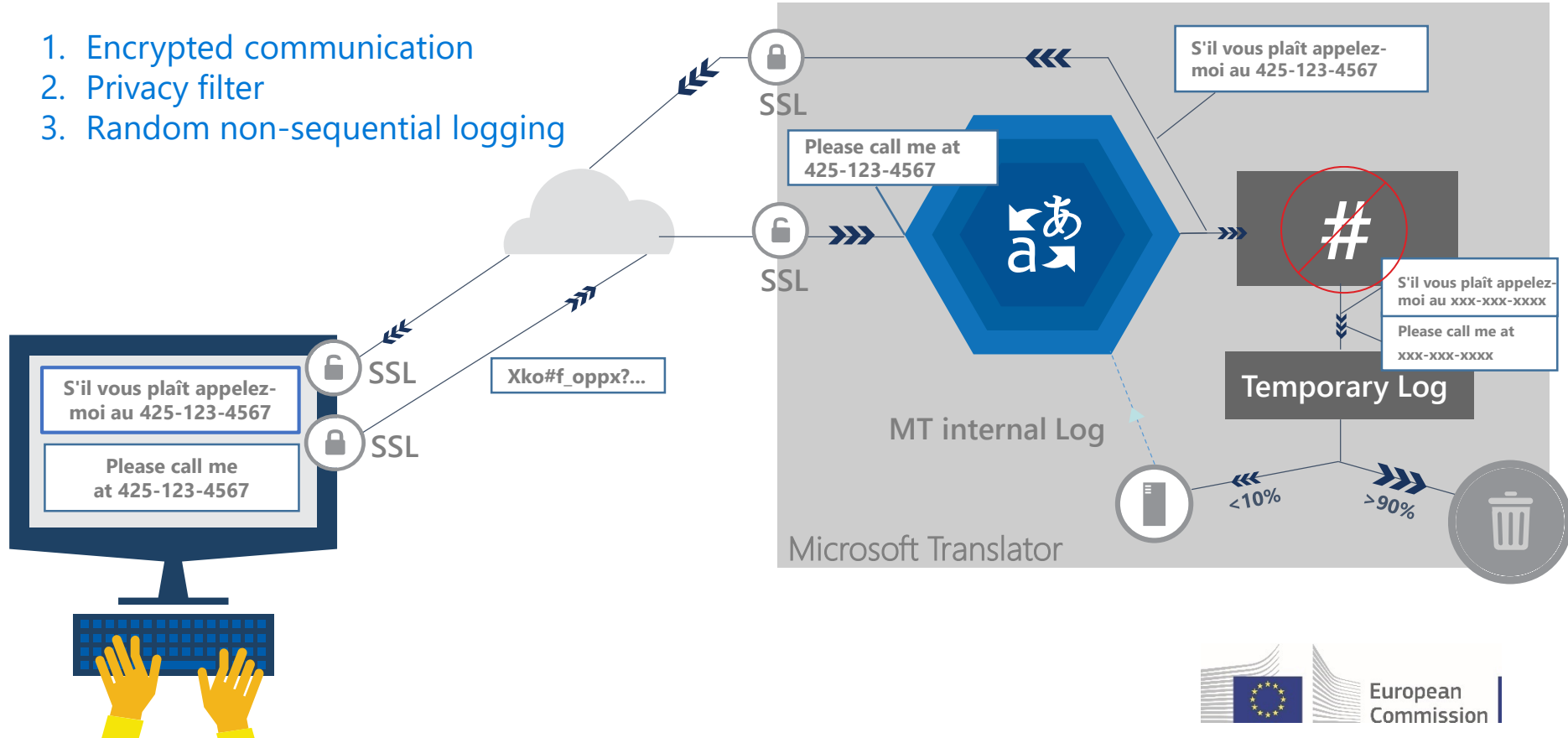


- Encrypted communication
- Nothing is recorded ("no trace")
- Regional datacenters in Europe, Americas, Asia
- ISO20001, SOC1,2,3 and HIPAA certified
- Certified and regularly audited for ISO 20017/18
- PCI certified
- Fedramp High, DoD IL4



# TRANSLATOR PRIVACY AND SECURITY: CONSUMER APPS

1. Encrypted communication
2. Privacy filter
3. Random non-sequential logging



# Microsoft AI principles

Designing AI to be trustworthy requires creating solutions that reflect ethical principles that are deeply rooted in important and timeless values.

## Fairness

AI systems should treat all people fairly



## Reliability & Safety

AI systems should perform reliably and safely



## Privacy & Security

AI systems should be secure and respect privacy



## Inclusiveness

AI systems should empower everyone and engage people



## Transparency

AI systems should be understandable



## Accountability

AI systems should have algorithmic accountability



# POTENTIAL DAMAGE BY AUTOMATED TRANSLATION

Translators and interpreters losing their job	That particular job. Maybe eventually. So far not observed.
A life lost, a war started	Danger is low. There is context outside the translation to help the humans. If that was a common occurrence, we would have heard about it, as a result of error-prone HT.
Unconscious bias promoted	Potential for damage is high, requires careful attention.

# TRANSLATORS LOSING WORDS

