



Centre for Translation Studies  
UNIVERSITY OF SURREY



# *What machine translation tells us about sentiments in other languages*

*... and how to improve MT of sentiments*

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## Structure

Introduction: UGC and why we want to translate it

Challenges when translating UGC

How to improve translation of UGC

Conclusions

# What is User Generated Content (UGC)



Mihai Medvedovici  
@medvedovici1

Replying to @CalcanBogdan and @Petreanu

Bun, și doar Olanda e gardianul corectitudinii la frontiera, toate celelalte tari sunt fraiere și sunt de acord? Am auzit și teoria ca se ascund în spatele Olandei, dar chiar așa să voteze 85% P.E. pentru România în schengen, dar nu, Olanda știe mai bine?

Translated from Romanian by Google

Good, and only the Netherlands is the guardian of fairness at the border, all other countries are suckers and agree? I also heard the theory that they are hiding behind the Netherlands, but even so 85% of the EP will vote for Romania in Schengen, but no, the Netherlands knows better?

3:37 PM · Oct 20, 2022 · Twitter for Android



Peter Obi last Born @ifeanyi\_chukwu · 2h  
Within 4 months Peter Obi and 36 states

Abia state 2baba portable opay lai mohammed **King Charles III** ruger rufai Igbo



# Uses of UGC (especially social media)

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ASSESS THE MOOD



TAKE DECISIONS



GAIN NEW INFORMATION  
(IN REAL TIME)

# UGC is messy (especially on social media)

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Non standard grammar and spelling

Typos, grammatical mistakes

Use of #hashtags part of the text

Emoticons/emojis

Code switching

Use of caps

No punctuation

Still [#devastated](#) and [#sad](#) [#Tariq](#)'s [#TariqLive](#) channel is no more and [#ProfessorBlackTruth](#) as well. [#YouTubeFAIL](#) [#EpicFAIL!](#) [#TariqNasheed](#) 😞

10:09 AM · Jul 12, 2017 · Twitter Web Client

Hes no even scared of em anymore

[#IndiaAgainstIslamists](#) [#RadicalIslam](#) possess the danger not only2 [#India](#) ,but also 2the world .Its time 4 uprooting the source f [#terrorism](#)

4:46 PM · Jul 11, 2017 · Twitter for Android

# UGC ...

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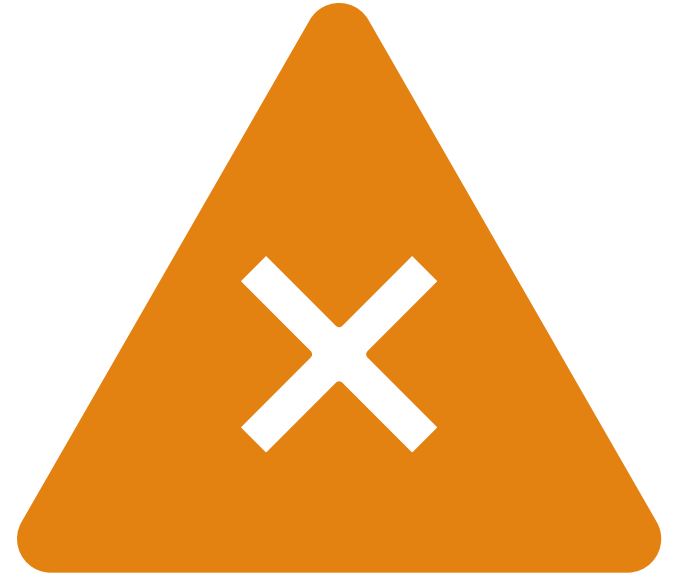
Not easy to process

At times unreliable

Not always in a language we understand,

... but too much to be translated manually (can it be translated automatically?)

Very often used to express sentiments, emotions, opinions



# Machine translation

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**Is the era of artificial speech translation upon us?**

<https://www.theguardian.com/technology/2019/feb/17/is-the-era-of-artificial-speech-translation-upon-us>

**Will Machine Learning AI Make Human Translators An Endangered Species?**

<https://www.forbes.com/sites/bernardmarr/2018/08/24/will-machine-learning-ai-make-human-translators-an-endangered-species/>

**Meta's 'No Language Left Behind' AI Can Now Translate 200 Languages**

<https://www.cnet.com/news/social-media/metas-no-language-left-behind-ai-can-now-translate-200-languages/>

# MT and UGC

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An increasing number of platforms offer users the option to translate content

Some of them don't even show users the source text

Great way to access information

Can introduce mistakes



**KARL GROSS**

24/06/2021 la 12:36 pm

In acest minunat oras mam nascut am copilarit si Mi-am petrecut tinereta, in acel timp oamenii erau simplii saraci si se bucura de fie are clipa liberal.

Orasul meu natal este o lumina in inima mea un loc plin de fercire si bucurii. Cu tot respectul fata de acest oras si fata de toti care stiu s-al apreciehe. Va Salut Karl Gross.

Răspunde

In this wonderful city I was born, I grew up as a child and I spent my youth, at that time people were simple poor and enjoyed the liberal moment.

My hometown is a light in my heart, a place full of happiness and joy. With all due respect to this city and to all who know how to appreciate it. Hi Karl Gross.



# Do we trust MT?

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# Do we trust MT?



женья ди(р)кович | #StopRussianAgression  
@pizduk\_maksimka

прошло сто дней с начала войны в Украине. за эти  
сто дней тысячи людей потеряли дом, близких. их  
жизнь уже никогда не будет прежней.  
прошу, продолжайте говорить об этом, сейчас ни в  
коем случае нельзя молчать.

#твиттер\_говори\_о\_войне #SaveUkraine #Ukraine  
#UkraineUnderAttack

Translate Tweet

11:43 AM · May 24, 2022 · Twitter for iPhone

One hundred days have passed since the beginning of  
the war in Ukraine. During these hundred days,  
thousands of people have lost their homes and loved  
ones. their lives will never be the same again.  
please continue to talk about it, now **in no case can  
not be silent.**

#твиттер\_говори\_о\_войне #SaveUkraine #Ukraine  
#UkraineUnderAttack

# Do we trust MT?

Reviewed: 22 November 2020

## pleasant and comfortable

😊 · Excellent location for trips arriving by train in Sighisoara, less than five minutes from the train station .. For me **the main advantage was the location and the fact that I always heard the trains in the room of the pension.** Half an hour walk to the fortress. Small grocery store nearby. Very clean room and bathroom. Very comfortable bed. A big advantage for staying during the summer was the mini fridge in the room.

😐 · I have no negative mentions.

Translated by **Google** - [Show original](#)

9.0

Reviewed: 22 November 2020

## placut si confortabil

😊 · Excelent situat pentru calatorii ce ajung cu trenul in Sighisoara, la nici cinci minute de gara de mers pe jos.. **Pentru mine atuul principal a fost localizarea si faptul ca auzeam mereu trenurile din camera pensiunii.** Juma de ora de mers pe jos pana la cetate. Mic magazin alimentar in apropiere. Camera si baia foarte curate. Patul foarte confortabil. Un mare avantaj pentru sederea pe timpul verii a fost minifrigiderul din camera.

😐 · Nu am mentiuni negative.

[Show translation](#)

9.0



What kind of problems MT introduces when it translates UGC (especially when it comes to sentiments and emotions)

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# Can we translate emotions automatically?

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We run a study to see what kind of errors Google translate makes when translating emotions in Tweets

Used datasets from SemEval tasks on emotion and aggression detection

- Source languages: English, Arabic and Spanish
- Target languages: English, Romanian, Arabic, Spanish and Portuguese
- Focused on joy, fear, aggression, and anger (from the annotated data)

We identified mismatches between the original emotion and of the translation

Manually analysed 4 x 400 translations with English as source and 2 x 1,500 with target English

# Reasons for errors

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We focused on six reasons for **wrong translation of emotion**: hashtags, non-standard orthography, idiomatic expressions, polysemy and grammar (mainly negation structures)

We annotated a maximum of 2 types of errors per tweet

At times the source and target were such a mess that it was difficult to decide on the error

Target languages like Romanian (61%) and Arabic (41%) have higher percentage of tweets with mistranslated emotions

# Hashtags

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Hashtags contain lots of important information, but it is unclear when they need to be translated or not



- EN: “Are u #depressed #hypo #manic #lonely #bored #nofriends #needfreinds #friend I feel chatty I wanna help ppl or just #makefriend 's #dm #moms”
- RO: “Sunteți #deprimat #hipo #maniac # singur #bored #nofriends #needfreinds #friend Mă simt vorbăreț Vreau să ajut plpl sau doar #makefriend's #dm #moms”



- EN: It's lack of #faith that makes #people #afraid of #meeting #challenges #MuhammadAli
- RO: Lipsa de # credință face ca # oamenii să se teamă de # întâlnire # provocări #MuhammadAli
- EN: #disappointed ES: #diseñado (designed)

It may be possible to normalise the hashtags, but which ones?

# Slang and dialectical expressions

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Slang and swear words are not translated correctly, usually meaning loss of emotion (usually aggression or anger)

Examples:

- “faggot” consistently mistranslated as “fagot” (bassoon) in Romanian
- “prick” consistently mistranslated as “Înțepătură”
- “Some people are shady a’f “ is translated as “Unii oameni sunt umbri”

Do we really have to translate UGC which is aggressive/abusive? In which contexts it is necessary to translate swear words?

# Non-standard orthography

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UGC uses creative abbreviations, unconventional orthography

- “watching sad bts video bc im sad. lwannacryy” is mistranslated to all target languages (Ro: “ma uit la un videoclip sad bts bc sunt trist. lwannacryy”)
- Such words are usually out of vocabulary, so cannot be translated

A normalisation step may be able to help, but it can also lead to information loss

Some of the non-standard orthography gets corrected in the translation process

- “Hes no even scared of em anymore” → “Nici măcar nu se mai sperie de ei”

# Idiomatic expressions/Polysemy/Negation

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All these are problematic in any context, but Arabic dialectical negation causes more problems in our data

“just kidding, no I’m fine” → “Glumesc, nu sunt bine”

At times funny effects:

- “A trip to the dentist never gets easier” -> PT: “Uma ida ao dentista nunca foi tão fácil” (“A trip to the dentist has never been easier”)



# Limitations

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The annotation scheme needs to be revisited and made more consistent

It's not always clear which is the main source of error

What we have now is very much a pilot, so it would be good to repeat the annotation

See how much we can use some automatic processing

A small scale experiment on Facebook comments lead to similar results

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# Sentiment preserving MT

How we can develop MT systems  
that preserve the sentiment of  
the source

# Translation of book reviews from Arabic

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Corpus of book reviews written in Arabic (both Modern Standard Arabic and Dialectical Arabic)

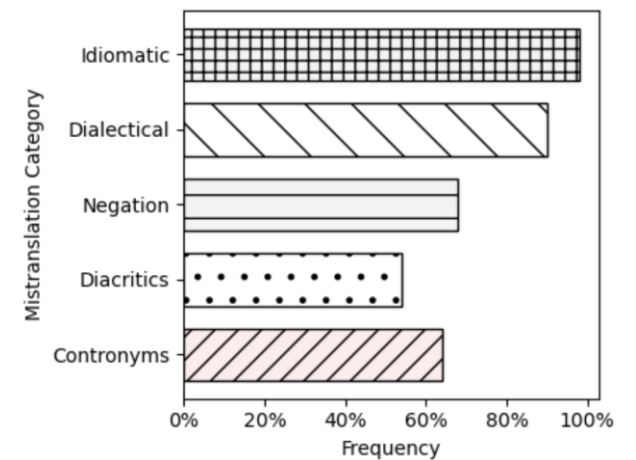
Scores assigned by the authors of reviews

Automatically translated about 13,000 sentence to English using Google Translate and used Microsoft Azure Text Analytics to determine their sentiment

Selected 1,000 sentences where the sentiment of the translation disagreed the original sentiment to analyse the reasons for errors

# Error classification

| Type of error | Automatic translation                                           | Correct translation                                                  |
|---------------|-----------------------------------------------------------------|----------------------------------------------------------------------|
| Idiomatic     | The book of <u>his blood is light</u>                           | The book is <u>funny</u>                                             |
| Dialectical   | and I felt that it was a <u>sweet</u> story                     | and I felt it was a <u>silly</u> story                               |
| Negation      | I admire that the protagonist of the novel is weak in character | I didn't like that the protagonist of the novel has a weak character |
| Diacritic     | The <u>envelope</u> of what I read                              | One of the <u>most entertaining</u> things I read                    |
| Contronyms    | Wonderful narration and <u>rigid</u> style                      | Wonderful narration and <u>excellent</u> style                       |



# NMT system for contronyms

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We cannot address all the problems at once and probably each problem should be addressed using a different approach

We trained an NMT engine on a general corpus and tuned it on synthetic data to translate contronyms correctly

Prepared a dataset

- Automatically translated reviews from Goodreads from Arabic to English
- Manually corrected contronyms that were not correctly translated (but did not correct the rest of the sentence)
- Annotated each contronym with its polarity given the context

# NMT system for contronyms (II)

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We used OpenNMT

Three models tried:

- seq2seq model
- Transformer 1 (tagging with sentiment)
- Transformer 2 (tagging with sentiment and pretrained with a vector model created for contronyms)

| Method        | BLEU         | F1 – correct polarity | Sentence score distance |
|---------------|--------------|-----------------------|-------------------------|
| Seq2seq       | 33.9         | 0.55                  | 0.24/0.44               |
| Transformer 1 | <b>38.77</b> | 0.69                  | 0.14/0.21               |
| Transformer 2 | 37.14        | <b>0.81</b>           | <b>0.06/0.14</b>        |

# NMT system for contronyms (III)

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It is possible to develop MT systems that can address specific errors

But how does it affect the overall translation?

How our work applies to other language pairs (which language specific errors?)

How we can address several phenomena at once?

# Semi-supervised approach for translation of dialectical Arabic

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Dialectical Arabic is the cause of many error in translation of sentiment

Arabic UGC is written in a mixture of Modern Standard Arabic (MSA) and Dialectical Arabic (DA)

The two differ significantly in terms of lexis and grammar

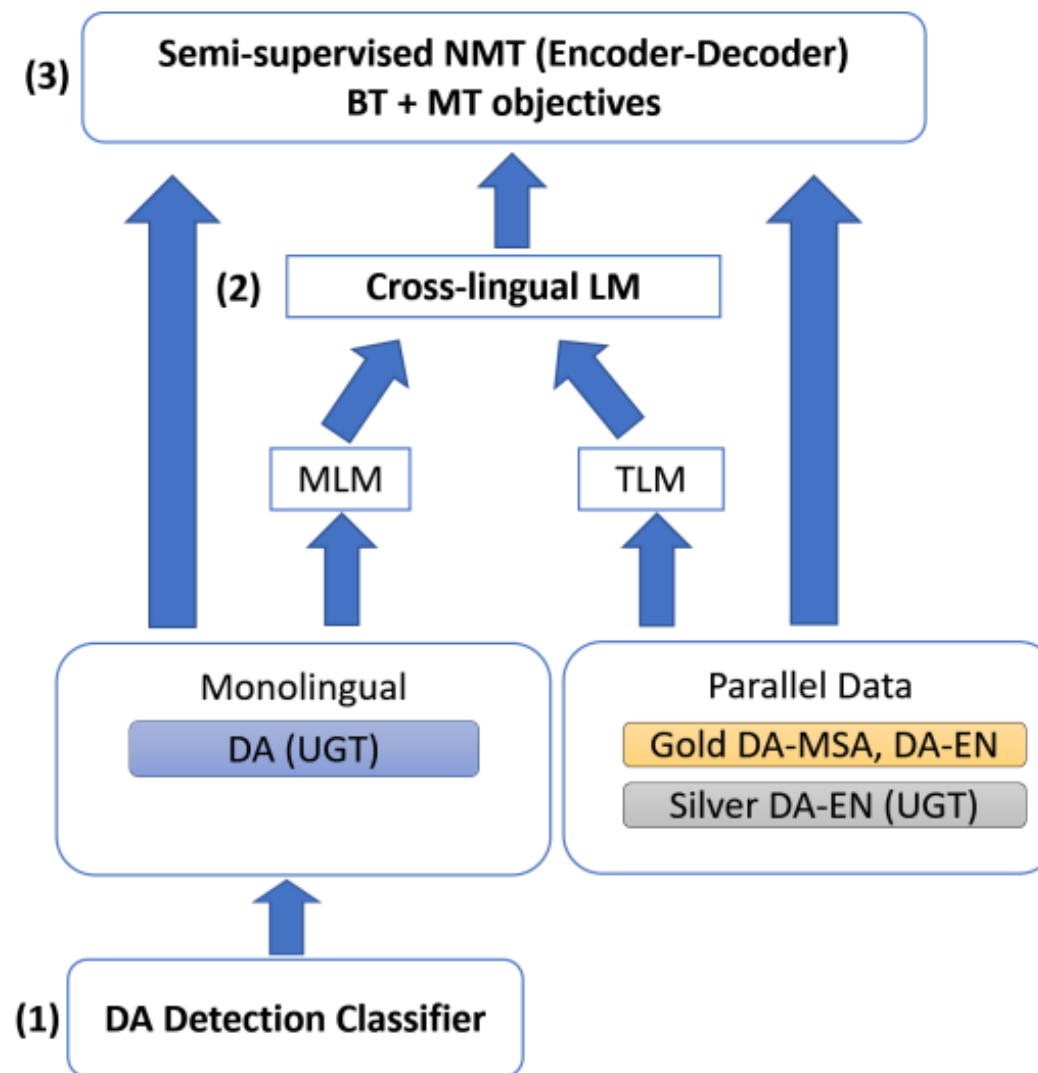
There are no parallel corpora to train MT systems (the existing DA-EN are small clean manually built corpora)

We propose a semi-supervised method that uses:

- Large gold-standard MSA - EN corpora (~3m sentences, UN docs, TED talks)
- Gold standard DA – MAS (60k sentences, traveller's guide)
- Gold standard DA – EN (90k sentences, traveller's guide, subtitles, Wikipedia)
- Silver standard DA – MAS (166k, back translation UGC, with automatic corrections)
- Silver standard DA – EN (166k, automatic translation UGC, with automatic corrections)
- Monolingual DA data (166k UGC)

1. DA Classifier: 92%
2. Create a cross-lingual LM based on (Lample and Conneau 2019):
  - Masked Language Model (MLM): on source/monolingual gold standard
  - Translation Language Model (TLM): on the parallel gold standard
3. Semi-supervised NMT: backtranslation and MT objectives

Shared vocabulary for all corpora 20k



# Evaluation results

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Wanted to measure not only the quality of translation, but also the sentiment transfer

Evaluation on 3000 parallel sentences (test set) and a hand-crafted challenge set (180 sentences)

Sentiment distance calculated based on the Sentiment Intensity Analyser provided by VADER

Human evaluation: scores 1-5 how well the sentiment from the source is preserved in target

|                     | Sentiment Distance | Human Evaluation |             |             | BLEU        | METEOR      |
|---------------------|--------------------|------------------|-------------|-------------|-------------|-------------|
| Model               | Test Set           | Hand-Crafted Set |             |             | Test Set    | Test Set    |
|                     |                    | H1               | H2          | H3          |             |             |
| Baseline            | 1.02               | 1.53             | 1.38        | 1.51        | 0.21        | 0.30        |
| Semi-supervised NMT | <b>0.14</b>        | <b>4</b>         | 3.26        | <b>4.35</b> | <b>0.43</b> | <b>0.45</b> |
| Google Translate    | 1.62               | 3.32             | <b>3.28</b> | 3.33        | 0.34        | 0.33        |

# Final thoughts

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Machine translation has improved dramatically in recent years and is used everywhere

Translation of user-generated content is here to stay

There is a whole range of challenges that need to be addressed in order to translate correctly sentiments and emotions

Identifying errors in MT output may be difficult because the output is so coherent (is there a way to flag errors to users ... QE style?)

It is possible to develop methods that address specific phenomena, but how easy is to adapt them to other languages?

We need to have evaluation metrics that capture how well the sentiments/emotions are translated

Educate users of the limitations of translating UGC (related to the issue of MT literacy)

In many cases culture specific issues need to be considered when translating sentiments/emotions



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# Thank you for your attention!

The research presented here would have not been possible without the contribution of Hadeel Saadany, Rocio Caro Quintana, Felix do Carmo, Leonardo Zilio, Emad Mohamed, Ashraf Tantavy in some of the research presented here and hopefully future research.