



Real Time Adaptive Machine Translation for Post-Editing with cdec and TransCenter



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cdec Realtime

<http://www.cs.cmu.edu/~mdenkows/cdec-realtime.html>

```
import rt

# Start new Realtime translator using a Spanish--English system and automatic,
# language-independent text normalization (pre-tokenization and post-detokenization)
translator = rt.RealtimeTranslator('es-en.d', tmpdir='/tmp', cache_size=5, norm=True)

# Translate a sentence for user1
translation = translator.translate('Muchas gracias Chris.', ctx_name='user1')

# Learn from user1's post-edited translation
translator.learn('Muchas gracias Chris.', 'Thank you so much, Chris.', ctx_name='user1')

# Save, free, and reload state for user1
translator.save_state(file_or_stringio='user1.state', ctx_name='user1')
translator.drop_ctx(ctx_name='user1')
translator.load_state(file_or_stringio='user1.state', ctx_name='user1')
```

Adaptive machine translation that **immediately learns** from human feedback. (Denkowski et al., 2014)

Full **Python API** for deploying and interacting with **adaptive MT systems** already included in **cdec**.

Scalable implementation serves any number of **concurrent users** working with the same system.

Full **tutorial** online for **building** and **deploying** Realtime systems in **production environments**.

Data Collection

ID	MT	Post-Edited	Rating	Keypress	Mouseclick	Edits	Time
1	Thank you, Chris. And it is indeed a great honour	Thank you, Chris. And it is indeed a great honour	5	0	0	0	22776
2	have the opportunity to come to this stage for the second time. I am extremely grateful.	to have the opportunity to come to this stage for the second time. I am extremely grateful.	5	3	1	3	26259
3	I have been moved by this conference, and I would like to thank all of you	I have been move by this conference, and I would like to thanks all of you	5	146	3	143	156690
4	for their kind comments about what he had to say the other night.	for your kind comments about what I had to say the other night.	3	13	3	12	31397
5	And I say that sincerely, in part because -- (Sollozos fingidos) -- what you need! (Laughter)	And I say that sincerely, in part because -- (fake sobs) -- I need it! (Laughter)	2	39	3	38	48657
6	Put yourselves in my position!	Put yourselves in my position!	5	0	0	0	21007
7	Volé on the plane vicepresidencial for eight years.	I flew on the vice presidential plane for eight years.	4	18	6	14	43915
8	Now I have my my shoes or boots to subirme a plane!	Now I have take off my shoes or boots to get on a plane!	2	23	2	23	46021
9	(Laughter) (Applause)	(Laughter) (Applause)	5	0	0	0	1716
10	I will tell you a quick story to illustrate what has been for me.	I will tell you a quick story to illustrate what has been like for me.	5	5	1	5	14248

TransCenter logs **edit history**, **keyboard and mouse activity**, and **translation time** for each sentence.

Reports are output in **formatted HTML** and **comma separated value format** for interoperability.

Summary reports show **initial and final translations**, **quality ratings**, **keypress**, **mouse**, and **edit counts**, and **millisecond timings**.

All user interactions **time stamped** to facilitate further analysis, including **pause measures**.

TransCenter

<https://github.com/mjdenkowski/transcenter-live>

Talk 5				Pause	Submit	?
	Source	Translation	Rating			
1	En la pausa, varias personas me preguntaron	At the break, I was asked by several people	4 - Usable			
2	acerca de mis comentarios sobre el debate en torno al envejecimiento.	about my comments about the aging debate.	4 - Usable			
3	Y este será mi único comentario al respecto.	And this will be my only comment on the matter.	5 - Very Good			
4	Y que es que, a mi entender	And that is, I understand	3 - Neutral			
5	los optimistas viven mucho más que los pesimistas.	optimists live much more than the pessimists.]	Rate Translation			
6	(Risas)		Rate Translation			
7	Lo que voy a contarles en mis dieciocho minutos es		Rate Translation			

Translators log into a **web-based** translation editor using **Mozilla Firefox** or **Google Chrome**.

Sentences are **translated on demand** by an adaptive MT system that **learns as users work**.

Automatic highlighting and **full keyboard navigation** provide a smooth user experience.

Users **edit translations** and provide **quality judgments** of MT output as they work.

Validation Experiment

Spanish-English cdec system trained on **WMT 2012 data** (Europarl, news, news commentary).

Blind out-of-domain test: **TED talks** (spoken language, broad range of topics).

Six translators post-edited **4 talk excerpts** totaling **100 MT outputs** each.

Two excerpts translated by **baseline** (static) system, two by **adaptive** (learning) system (shuffled by user).

	HTER	Rating	SPE BLEU
Baseline	19.26	4.19	34.50
Adaptive	17.01	4.31	34.95

Evaluated required **post-editing effort (HTER)** and **translator perception (Rating)** of each system.

Compared results to **simulated post-editing** with **non post-edited references** (development scenario).

Small improvement in **simulated post-editing** leads to **significant improvement** for **human translators**.