

Using Intergaelic to pre-translate and subsequently post-edit a sci-fi novel from Scottish Gaelic to Irish

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Abstract

In this paper I describe how I used Intergaelic, an ad-hoc hybrid machine translation (MT) system, to pre-translate a novel and subsequently post-edit the resulting MT output.¹ One of the central themes in the novel is the increasingly central role of technology in society. Thus this experiment can be viewed as a metatextual translation, whereby translation is aided by one of the themes present in the material being translated. I examine whether the translation provided by the MT system reached a basic standard that would reduce overall time for translation, and by how much. I examine the process of post-editing (PE) and how it differs from translation from scratch. I compare text generated by Intergaelic with that generated by widely available MT systems. I examine areas of weakness in this use of Intergaelic. I explore what elements remain the reserve of the human translator. I describe translating the entire novel using this method and how the author and publishers responded to the process of translation. I examine possible criticisms of this

approach and the future of MT and PE in literary translation.

1 Intergaelic (IG)

Intergaelic was initially created by Kevin Scannell as an Irish-language standardising tool (for texts predating the standard language of *An Caighdeán Oifigiúil*, 1958) (Scannell, 2015). It was subsequently redesigned as an MT system for gisting of material in Scottish Gaelic (GD) for Irish-language speakers (2 closely related languages). IG is based on a corpus of 2.1 million words. This is relatively small compared to corpora available for major language pairs, but likely represents a significant percentage of all bilingual texts for this language pair. I used IG as an ad-hoc translation machine as I predicted that it would aid faster translation. IG is both rule-based and statistical-based. In relation to rules certain clusters of letters are changed, 'sg' to 'sc', (as in 'sgian' to 'scian') and 'chd' to 'cht' as in 'seacht' and 'seachd'. While neural MT has improved greatly in recent years approaches that use probability remain superior in the case of languages that lack a large amount of parallel texts.

Concern about the quality of MT for all languages, particularly around Google translate (GT) remains, despite significant improvements in recent iterations. Readers of Irish (GA) have even been acutely disappointed to find that certain books available online are the result of unedited MT. A poorly translated

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accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

¹ IG is available at <http://www.intergaelic.com/gd-ga/trans/>

copy of the Communist Manifesto is available.² While neural MT has improved greatly the improvement has been less marked for under-resourced languages. IG has the benefit of working with closely related languages.

I used IG in the present study as a tool to aid the speed of translation. An expertise in the source and target language are necessary. The accusation most commonly levelled against translation from English to Irish that is perceived to be of a poor quality is influence from the source language. IG cannot be accused of such influence as it contains only GA and GD. While the inner workings of GT are not entirely clear it seems that English is still often used as an intermediary step even when translating between major languages.

2 *Air Cuan Dubh Drilseach (ACDD)*

The novel in question is Tim Armstrong’s *Air Cuan Dubh Drilseach* (Armstrong, 2013) the first hard sci-fi novel in GD.³ The novel was awarded the Saltire Society First Book of the Year Award in 2013 and Scot Lit Fest named it one of the 5 most important novels in GD in 2016. The book outsold all GD books sold in the 2 years previous to its publication.⁴ A sequel to the novel is currently being serialised in the GD literary magazine STEALL. Though Irish has a long history of sci-fi with *Cuairt ar an nGealaigh* appearing in 1923 and highlights such as Cathal Ó Sándair’s *Captaen Spéirling*

of the 1960’s we have seen relatively little of the genre in Irish literature more recently (Mac Craith, 1923) (Ó Sándair, 1960).

3 Metatextual translation

ACDD describes a struggle against a supercapitalist society in which technology, particularly a fusion of AI and human intelligence, plays a central role. As IG is a basic AI my translation of the novel can be viewed as a *metatextual translation* of the novel whereby one of the central themes of the work is used to translate the work itself.⁵ This causes us to ask an interesting question, what else could be viewed as metatextual translation? What other themes might be used as methods to translate literary works?

4 Comparison of Approaches

I conducted some tests to compare the quality, speed and difficulties with the various approaches. I initially translated sections of the novel from scratch. I then pre-translated the novel with IG and subsequently edited the IG output. In both cases I aimed for a solid first draft, one that I was happy with on rereading in which the translation flowed and which showed no errors.⁶ The quality of the IG translation varied from sentences that needed no correction to others that needed to be rewritten entirely. I include below a comparison of sentences from the text.

Source text GD	Translation from scratch	IG output	IG output post-edited
Bha an triùir nan suidhe ann an cearcall cruinn an taca teine fhosgailte: Sàl,	Bhí an triúr suite i gciorcal timpeall ar thine oscailte: Sàl,	Bhí an triúr ina suí i gciorcal cruinn an taca tine oscailte: Sàl,	Bhí an triúr acu ina suí i gciorcal cruinn timpeall ar thine bheag: Sàl,

² https://www.amazon.com/Forogra-Cumannach-Communist-Manifesto-2016-06-14/dp/B01NAOH7HP/ref=sr_1_2?keywords=communist+manifesto+irish&qid=1564356902&s=gateway&sr=8-2
For those looking for an accurate translation see *Clár na Comharsheibhe: forógra Pháirtí na gCumannach* (Marx, 1986).

³ The title can be translated as *On a Glittering Dark Sea*.

⁴ Information from Comhairle nan Leabhraichean | The Gaelic Books Council.

⁵ The term ‘metatextual translation’ has been used previously in other contexts but I feel it is fitting to describe my approach in the present study. My search for a term was further complicated by the fact that the terms ‘metathematic translation’ and ‘metatranslation’, which might also suit this role, have also previously been used in other contexts.

⁶ This step of the study is limited in as far as translation and analysis performed was done by myself and was not blinded. In future, translations could be analysed by an independent professional translator.

Rìosa agus Sabhair, agus iad aig beul na h-oidhche air a' ghealach bhig, Roghail, a bha na dachaigh dhaibh.	Rìosa agus Sabhair sa chlapsholas ar an ngealach bheag, Roghail, a mbaile.	Rìosa agus Sabhair, agus iad ag béal na hoíche ar an ngealach bhig, Roghail, a bhí na baile dóibh.	Rìosa agus Sabhair, é ina chlapsholas ar an ngealach bheag, Roghail, a bhí mar bhaile acu.
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Translation from scratch resulted in a freer translation in which the word order and sentence structure is more varied compared to the source text. The post-edited IG output follows the structure of the source text more closely. Translation is more long-winded at times and there appears to be a tendency to explicitation, information that was implicit in

the source text has been added in the translated text. Translation from scratch is shorter for this sentence, likely due to the fact that I as translator wasn't primed with certain structures by IG. The IG process more closely followed the structure of the IG text and therefore the source text.

Source text GD	Translation from scratch	Raw IG output	IG output post-edited
Gu h-àrd, bha a' phlanaid dhearg, Na Hasta, a' coimhead sìos air an triúr mar shùil mhòir anns na speuran.	Lastuas bhí an pláinéad, Na Hasta, ag breathnú anuas ar an triúr mar a bheadh súil mhór spéire ann.	Go hard, bhí an phláinéad dhearg, Na Hasta, ag breathnú síos ar an triúr mar shúil mhóir sna spéartha.	Bhí an pláinéad dearg, Na Hasta, in airde ag breathnú anuas ar an triúr mar a bheadh súil mhór sna spéartha.

The raw IG output is intelligible and largely grammatically correct. A relatively high level of GA and GD ability would be required to translate at this level. Some elements remain untranslated such as 'an taca'. Older dative forms remain and gender is not corrected in translation. IG output post-editing, while differing from translation from scratch, does share many similarities. One of the issues I recognised, as MT had a role in the loop, was that I felt as a translator that I had to be hypervigilant to ensure any clangers caused by MT would not end up in the final translation. This concern remains despite subsequent drafts and was not felt in translation from scratch.

5 BLEU score

I decided to analyse the BLEU scores of the various translations generated.⁷ A BLEU score assesses how similar the raw MT output is to a from scratch translation. The score is correlated with human assessment. It is not based on language but matches words, and strings of words. It is in common use and has been described as objective. A BLEU score of 0

means that 0% of the text is similar to one translated by a human. 100 means that 100% similar to human translation. A BLEU score of over 30% is generally recognised as intelligible and 40-45% and above is recognised as the threshold for PE.

The test passages translated in *ACDD* had a BLEU score of 35%. Despite not reaching the generally recognised level required my analysis found that the process of using IG and PE was faster compared to translation from scratch. This might relate to the fact that GA and GD are closely related languages. We must also remember that BLEU has its limitations. A highly accomplished translation might get a low score if it is very dissimilar to a given human translation. IG can prime the human translator with certain structures that are acceptable yet different to structures that the human translator would have generated from scratch. While GT has improved significantly in recent years a translation of these test passages done by GT in May 2019 was significantly worse than translations done by IG.

⁷ I used *Asiya* developed by the Universitat Politècnica de Catalunya and available at <http://asiya.lsi.upc.edu/>

6 Productivity Comparison

I next aimed to find out whether IG and post-editing changed the speed of translation. I translated sections of 300 words from three chapters.⁸

Comparison of translation time 1 (chapter 1)	Test 2 (chapter 2)	Test 3 (chapter 3)
20.39 minutes (MT)	16.20 (MT)	22.15 (MT)
24.49 (translation from scratch)	32.10 (from scratch)	28.03 (from scratch)

IG and PE were 31% faster compared to translation from scratch. I must mention that processing in IG took a certain amount of time but as the entire text was processed in one go, the time spent per passage was negligible overall.⁹ It must be noted that the time spent in both translation approaches was spent very differently. With MT and PE less time was spent typing as most of the words required were had already been provided by IG. It was often easiest to move words around, to delete words or add a word. More time was also spent rereading the translation to ensure it flowed.

7 Criticism of IG

Translating from scratch results in more natural Irish, in these initial drafts at least. As I was starting with a blank page in translation from scratch, I moved from the word order and sentence structure and length of the source text more frequently. I felt that it might have been easy to leave sentences created by IG in the translation if they appeared to reach an acceptable standard, where I might have translated them differently if I had not been primed by IG. As basic as IG may sometimes seem, it recognised the correct sense of a

⁸ This part of the research is limited in that it was not blinded. I did however ensure that I translated under the same conditions in both approaches, including performing the same amount of warm-up translation before translating passages and alternating which approach was used first.

polysemous word that initially was missed by this translator. The word ‘dealanach’ I initially understood as relating to ‘lighting’, IG provided the correct sense of ‘electronic’.

8 Elements where IG fails

Many elements remain the reserve of the human translator. These included; proper nouns, chapter titles, regional accents, neologisms and interjections. The corpus behind IG lacks the data to deal with some of these issues and named-entity recognition is a recognised weakness of MT.

Some elements relating to the structural differences of both languages presented a challenge. Tense in GA and GD does not map exactly to each other. The structure most commonly used to represent the passive voice of GD is the Irish autonomous verb whereby structures such as ‘Chaidh an talla a thogail...’ are translated by ‘Tógadh an balla’.

Sometimes multiple translations of a single source word were given, the words ‘pasáiste’ and ‘halla’ were given for ‘trannsa’ in the same paragraph. Alternatively sometimes a single translation was given for multiple source terms. ‘Bhí an duine cibirniteach gnóthach gnóthach’ was given as a translation for ‘[...]trang, dripeil’ in GD. Polysemous words such as ‘clár’ represented a challenge.

Faux amis were a particular challenge, perhaps due to fact that GA and GD are closely related languages. Such words, despite being faux amis, often had semantic overlap and inappropriate use might be easily missed in post-editing.¹⁰

9 Acceptability of literary MT

MT software is currently the industry standard used for pragmatic translation of, for instance, info booklets, reports and textbooks. MT along with PE has been shown to be up to 42.9% faster and has been shown to increase quality in

⁹ Many thanks to Kevin Scannell for assistance with this.

¹⁰ The following examples were noted; ‘geal’ and ‘bán’, ‘luath’ and ‘tapa’, ‘an té’ and ‘an bhean’, ‘mullach’ and ‘díon’, ‘lorg’ and ‘aimsíú’.

some cases. The subtleties of literature are of course more challenging. A project to translate Camus' *L'Étranger* to English and Italian, found that the result with Italian was better. (Toral et al 2015). A significant amount of editing was required. But if the translation is finished more speedily and of the same quality is it not worth it? We know that globally translation demand is increasing. A script for a Harry Potter play reached the top of the bestseller charts in France in 2016 despite the fact that it was in English (Agence France-Presse, 2016). In an increasingly globalised world, turnaround time for translation will get even shorter. MT might also represent a way for traditionally poorly-paid literary translators to increase output.

What will happen to translators in this digital age of ever-improving MT?¹¹ The role is likely to change to that of literary post-editor. While such approaches are more likely to happen in popular fiction acceptance might take longer for perceived high-literature. I suspect that MT and PE are likely in use in some genres of literature already. My use of IG in this project likely resulted in thousands or tens of thousands of differences compared to the text that I would have translated from scratch. If two professional translators were to translate a given text of this length, you would likely see even more differences. I hold that my use of MT and PE as above is acceptable. I am concerned, however, that this approach would ultimately result in the demotion of human intellectual labour. I see no reason why MT alone should not ultimately be superior to human literary translation.

10 Response of the author and publishers to translation approach

¹¹ I might mention that as a tutor in translation in an Irish third level institution in 2019 I noticed that GT outperformed all but one of approximately 60 third year students in translation of a short pragmatic passage from English to Irish.

¹² Translated from a personal email. 'Tá sé sin thar a bheith spéisiúil agus, dar ndóigh, bheadh an-spéis againn ina leithéide de leabhar a fhoilsiú'

¹³ A previous translation from Scottish Gaelic published by the publishers had sold poorly.

¹⁴ Translated from a personal email. '[M]á thagann cáipéis faoi mo bhráidse a raibh meaisín in úsáid leis an réamhobair a dhéanamh uirthi, ní gá go ndéanfadh sé aon

The novel is currently being edited and a publisher intends to publish it. The publisher has a positive view of the project. 'This is an extremely interesting [project] and we would of course be very interested in publishing such a book.'¹² The text as post-edited by myself will be edited as a translated Irish text. This process would have also happened in the case of a scratch translation submitted to the publisher. Another publisher accepted the translation approach but decided against publishing the book on other grounds.¹³

Although the present publisher had doubts about the process they were assuaged by the fact that the MT text would be post-edited by myself. The editor would be looking at the end product rather than the process. '[I]f a machine carries out preliminary work on a document that comes before me, it does not necessarily make any difference to me - I am only looking at the final product and not at the process.'¹⁴

The author was extremely positive, perhaps unsurprisingly for someone interested in the genre of sci-fi. 'As an author, and especially as someone who writes science fiction, your translation project was very appealing to me. Machine translation suits the theme of the novel very well, as well as the practical benefits. For me it will be interesting to see how the reader will accept it, knowing that a basic (AI) machine was involved in creating the text they are reading. But I am not concerned; I am looking forward to it. It is thought-provoking.'¹⁵

11 Conclusion

I hold that IG and PE is an acceptable translation approach for a sci-fi novel. IG aided me in translating the novel 31% faster than a

difríocht domsa — is ar an obair chríochnúil amháin a bheas mise ag breathnú agus ní ar an bpróiseas.'

¹⁵ Translated from a personal email. 'Mar ùghdar, agus gu sònraichte mar chuideigin a sgrìobhas ficsean-saidheans, bha an tionnsgnadh eadar-theangachaidh agad gu math tarraingeach dhomh. Tha mi a' smaoineachadh gu bheil eadar-theangachadh innealta a' freagairt glè mhath air cuspair na nobhail, a bharrachd air na buannachdan practaigeach a thig na lùib. Dhomhsa, bidh e gu math inntinneach faicinn ciamar a ghabhas an leughadair ris, is fios aca gun robh tùr innealta (AI) bunasach an sàs ann an cruthachadh an teacsa a bhios iad a' leughadh. Ach chan eil eagal orm; tha mi a' dèanamh fiughair ris. Bidh e smaoineachail.'

translation from scratch. In sections of the text over 50% of the tokens remaining in the third draft had been provided by IG. I found that the standard was similar to translation from scratch. I recognised some issues with IG which are tractable and resolved in the PE step.

I recognise that a principled philosophical stance against MT and PE might be warranted as MT is likely to change the role of translators to editors and ultimately take up their role entirely. The translation approach was acceptable to the author and to two publishers.

In relation to further research a closer and more objective analysis of the varying approaches would provide a better understanding of the process. A blinded comparison with translation by an independent professional translator along with a review of my post-edited translations and translations from scratch would add to the strength of findings above. IG also exists for Manx Gaelic, the possibility to translate from that language could be examined in future. The approach outlined above might initially be more acceptable in translation of news articles and pragmatic text.

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