

API Consultation

What do you think of the proposed definition of AI for the purposes of the strategy?

“A set of techniques used to allow computers to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, translation between languages and decision-making”

Bòrd na Gàidhlig agrees with the proposed definition of AI for the consultation. The reference to languages and translation is an important one when working with Gaelic. Over the past few years and under the direction of the University of Edinburgh Scottish Gaelic has been added to Google Translate which provides Google with Gaelic data to work with but there are still opportunities for growth within language recognition.

Developing AI for Gaelic would benefit Gaelic speakers of all levels both at home and in work settings. Gaelic AI development is of the upmost importance to ensure that all are provided with the same digital standards as their English language peers.

Dè bhr beachd air a’ mhìneachadh air Tuigse Fhuadain (AI) a thathas a’ moladh airson adhbharan na ro-innleachd?

“Seata de dhiofar dhòighean a bhios a’ leigeil le coimpiutairean gnìomhan a thoirt gu buil a bhiodh am bitheantas a’ feumachdainn tuigse dhaonna, mar eisimpleir a bhith ag aithneachadh rudan ann an dealbhan agus bhidiothan, a’ tuigsinn cainnt dhaonna, ag eadar-theangachadh agus a’ dèanamh cho-dhùnidhean.”

Tha Bòrd na Gàidhlig a’ gabhail ris a mhìneachadh air AI a thathas a’ moladh airson a’ cho-chomhairleachadh. Tha an t-ìomradh a thugadh air cainnt agus eadar-theangachadh gu h-àraidh cudromach a thaobh leasachadh na Gàidhlig. Seach gun deach Gàidhlig a chur ri Google Translate bho chionn beagan bhliadhnaichean, fo stiùir Oilthigh Dhùn Èideann, tha Google anis ag aithneachadh dàta sa chànan, ach gabhaidh barrachd a dhèanamh airson aithneachadh cainnt/cànain a leasachadh.

Bhiodh leasachadh AI don Ghàidhlig na bhuannachd do luchd-labhairt a’ chànan aig gach ìre an dà chuid aig an taigh agus ann an suidheachaidhean obrach agus suidheachaidhean ionnsachaidh. Tha leasachadh AI ann an Gàidhlig air leth cudromach ann a bhith a’ dèanamh cinnteach gu bheil na h-aon chothroman aig luchd-labhairt na Gàidhlig a thaobh teicneòlais ’s a tha aig luchd-labhairt na Beurla.

In terms of Speech recognition there are opportunities for Gaelic in the future for "natural language processing"- this would open opportunities for Gaelic including: -

- Opportunities for learners to engage in Gaelic conversations with their devices i.e. Natural language processing in which Gaelic teaching could be carried out via these devices.
- Opportunities for generalised AI - Gaelic for Google Home or Alexa. This could provide high-quality data inputting jobs for employees with Gaelic skills.
- Opportunities for those who use Gaelic at home to engage with their devices and not have to switch to English when engaging with devices such as Alexa or Google Home.
- Opportunities for gaming in Gaelic, providing much needed additional Gaelic language use opportunities for students in Gaelic Medium Education (GME). This would improve opportunities for language use at home and during their leisure time.
- Improved support needs for pupils with additional learning needs in GME particularly during exams (Ceitidh/Balbolka is already available but could be used to develop more software).
- Improved supported for Gaelic speakers with hearing and sight difficulties.

A thaobh aithneachadh cainnt dhaonna, dh'fhaodadh cothroman a bhith ann san àm ri teachd "pròiseasadh cànan nàdarra" a chur gu feum anns a' chànan, a' gabhail a-staigh:-

- Cothroman do luchd-ionnsachaidh a bhith a' còmhraidh leis na h-innealan aca i.e. Pròiseasadh cànan nàdarra anns an gabhadh teagasg na Gàidhlig a dhèanamh tro na h-innealan seo.
- Cothroman airson 'generalised AI' - Gàidhlig do Ghoogle Home no Alexa. Chruthaicheadh seo cothroman cosnaidh aig àrd-ìre dhaibhsan aig a bheil sgilean cànan gus dàta a chur a-steach.
- Cothroman dhaibhsan a chleachdas an cànan aig an taigh còmhraidh leis na h-innealan aca, can le Google Home no Alexa, gun a bhith a' tionndadh chun na Beurla.
- Tha cothroman airson geamaichean-coimpiutair sa Ghàidhlig a' cruthachadh barrachd cothroman do dh'òigridh a tha ann am Foghlam tro Mheadhan na Gàidhlig (FtG) a' Ghàidhlig aca a chur gu feum. Chuireadh seo ris na cothroman aca gus an cànan a chleachdadh aig an taigh agus san ùine shaoir aca.
- Barrachd taic do sgoilearan ann am FtG le feumalachdan-taic a bharrachd, gu h-àraidh ann an deuchainnean (tha Ceitidh/Balbolka ann mar-thà, ach ghabhadh iad seo cleachdadh airson barrachd bathar-bog a leasachadh).

- Swifter technologies for the many lexicographers and cataloguers working with Scottish Gaelic.
- Building technology that recognises the Gaelic cases, masculine and feminine words (This is currently being undertaken by the university of Edinburgh as part of the Gaelic algorithmic research group).

Wikipedia is also off the upmost importance to minority language projects providing a large amount of data that can be built on to build AI infrastructure.

Do you agree that the strategy should be people-centred and aligned with Scotland's National Performance Framework?

As one of Scotland's national languages, Gaelic should be at the forefront of a people centred AI strategy. As a non-departmental public body, Bòrd na Gàidhlig is aligned to the National Performance Framework. Public and private bodies working together to create AI strategies for Gaelic is a fantastic potential opportunity. In 2013 the Bòrd was part of naming Gaelic as one of Microsoft's Language Families along with other minority languages.

A people centred strategy would work with Gaelic speakers to mediate Gaelic data. For example, increasing numbers of Gaelic

- Barrachd taic do dhaoine le Gàidhlig aig a bheil duilgheadasan claisneachd no fradhairc.
- Teicneòlas nas luaithe airson luchd-tasglainn agus facladairean a tha ag obair le Gàidhlig na h-Alba.
- A' togail teicneòlas a tha ag aithneachadh nan tuisean Gàidhlig agus faclan a tha fireann is boireann (Tha seo ga dhèanamh le Oilthigh Dhùn Èideann an-dràsta mar phàirt den bhuidhinn rannsachaidh algoritimeach).

Tha Wikipedia ro-chudromach cuideachd airson pròiseactan ann an mion-chànanan oir tha tòrr dàta ann a ghabhadh cleachdadh gus togail air bun-structar AI.

A bheil sibh ag aontachadh gum bu chòir don ro-innleachd a bhith 'people centred' a rèir Frèam-obrach Coileanaidh Nàiseanta na h-Alba?

Mar aon de chànanan nàiseanta na h-Alba, bu chòir dhan Ghàidhlig a bhith aig fìor thoiseach chùisean ann an ro-innleachd AI stèidhichte air daoine. Mar bhuidheann phoblach neo-roinneil, bidh Bòrd na Gàidhlig a' cumail ris an Fhrèam-obrach Coileanaidh Nàiseanta. Bhiodh co-obrachadh eadar an roinn phoblach agus an roinn phrìobhaideach gus ro-innleachdan AI a chruthachadh dhan Ghàidhlig na fhìor dheagh chothrom. Ann an 2013, ghabh am Bòrd pàirt ann a bhith ag ainmeachadh na Gàidhlig mar Teaghlach Cànan aig Microsoft cho math ri mion-chànanan eile.

Bhiodh muinntir na Gàidhlig an sàs anns an ro-innleachd stèidhichte air daoine gus sùil a chumail air càileachd an dàta a

learners in Scotland will ultimately develop the standard of Gaelic data content created.

As well as students in Gaelic medium education, an AI strategy with strong Gaelic involvement could also positively impact those working with the language on a day-to-day basis. For example, lexicographers such as those working at the Digital Archive of Scottish Gaelic (DASG) could benefit from any developments brought forward through the strategy.

Language recognition is also important in the private sector for the many Scottish companies already using Gaelic names and words, as well as those using Gaelic in their marketing website cookie systems. These systems are currently not sophisticated enough to prioritise Gaelic content in the same way as English content. This could lead to the private sector choosing to forego the use of Gaelic in their publicity.

We believe that this could be dealt with through public and private sector collaborations between AI developers and Gaelic bodies, for the benefit of companies and Gaelic speakers.

chruthaichear sa chànan. Mar eisimpleir, dh'fhaodadh na h-uimhir de luchd-ionnsachaidh a th' againn buaidh a thoirt air càileachd an dàta a bhiodh air a chruthachadh.

A bharrachd air oileanaich ann an foghlam tro mheadhan na Gàidhlig, dh'fhaodadh ro-innleachd AI le Gàidhlig mar phàirt mhòr dhith deagh bhuaidh a thoirt air an fheadhainn a bhios ag obair leis a' chànan gu làitheil. Mar eisimpleir, bheireadh leasachadh sam bith a nithear tron ro-innleachd seo deagh bhuaidh air facladairean agus daoine a tha ag obair aig Digital Archive of Scottish Gaelic (DASG).

Tha aithneachadh cànan cudromach san roinn phrìobhaidich cuideachd airson iomadh companaidh Albannach a bhios a' cleachdadh ainmean no faclan Gàidhlig, cho math ris an fheadhainn a bhios a' cleachdadh na Gàidhlig anns na siostaman criomagan air na làraichean-lìn margaidheachd aca. Chan eil na siostaman seo leasaichte gu leòr gus prìomhachas a thoirt do shusbaint Ghàidhlig mar a tha iad sa Bheurla. Mar thoradh air seo, dh'fhaodadh companaidhean a bhith buailteach a' Bheurla a chleachdadh an àite na Gàidhlig anns an t-sanasachd aca.

Ach ghabhadh seo a rèiteachadh le co-obrachadh eadar luchd-leasachaidh AI an dà chuid san roinn phoblaich agus san roinn phrìobhaidich agus le buidhnean Gàidhlig gus taic a chumail ri companaidhean agus ri luchd-labhairt na Gàidhlig.

The diagram also refers to equal opportunities for all. This would provide those working in Gaelic and students of Gaelic with well-functioning technology. This is of the utmost importance to provide an equal work/education experience as to those in English language organisations.

How do you think AI could benefit Scotland's people, and how do we ensure that the benefits are shared, and no-one is left behind?

Gaelic is one of the official languages of Scotland. It is a living language that remains an integral part of Scotland and its people. By including Gaelic in the AI strategy for Scotland you ensure digital equality for Gaelic speakers not only in their daily lives, but also in their education.

Gaelic deserves to be a part of Scotland's AI infrastructure. If Gaelic were not recognised as an equal language, this would reduce the status of Gaelic and disadvantage the Gaelic community.

AI also affects lexicographers and cataloguers working in Scotland through the medium of Gaelic. Natural language processing could be used by bodies such as Tobar an Dualchais and DASG to digitise Gaelic recorded content. This will result in content being made available more quickly.

Tha an diagram cuideachd a' toirt iomradh air co-ionannachd chothroman do na h-uile. Bheireadh seo teicneòlas freagarrach do dh'oileanaich na Gàidhlig agus do dhaoine a tha ag obair ann an saoghal na Gàidhlig. Tha seo air leth cudromach gus am bi an aon seòrsa foghlaim/saoghal obrach aca sa th' aig an fheadhainn ann am buidhnean Beurla.

Ciamar a dh'fhaodadh AI a bhith na bhuannachd do mhuintir na h-Alba, agus ciamar a nithear cinnteach gum faigh a h-uile duine buannachd às agus nach bi duine sam bith air fhàgail às?

Tha a' Ghàidhlig air aon de na cànanan oifigeil ann an Alba. Tha i na cànan bheò a tha na pàirt bhunaiteach de dh'Alba agus de mhuintir na h-Alba. Le bhith a' cur Gàidhlig anns an ro-innleachd AI airson Alba, nithear cinnteach gu bheil co-ionannachd dhidseatach aig luchd na Gàidhlig, chan ann a-mhàin nam beatha làitheil, ach cuideachd san fhoghlam aca.

Tha Gàidhlig airidh air a bhith na pàirt de bhun-structar AI na h-Alba. Mura rachadh a' Ghàidhlig aithneachadh mar chànan co-ionnan, lùghdaicheadh seo inbhe na Gàidhlig agus chuireadh e a' choimhearsnachd Ghàidhlig fo ana-chothrom.

Tha AI cuideachd a' toirt buaidh air facladairean agus luchd-catalog a tha ag obair tron Ghàidhlig. Ghabhadh pròiseasadh cànan nàdarra a chleachdadh le buidhnean leithid Tobar an Dualchais agus DASG gus susbaint Gàidhlig clàraichte a chur ann an cruth didseatach. Bhiodh

Developing language recognition technology and an AI infrastructure that applies to Gaelic would ensure those with additional needs working in Gaelic are provided with equal opportunities. For example, closed captions are not currently available in Gaelic and are only available in English making it difficult for those with hearing issues to take part in online meetings.

An advanced AI development which includes Gaelic also benefits people across Scotland as it provides better digital recognition for businesses that use Gaelic words, phrases, and place-names.

Poor AI Gaelic infrastructure may contribute to decreasing use of the language. Gaelic and traditional music positively impacts on Scotland's economy, however many mainstream music apps such as Spotify struggle to recognise Gaelic song names to the detriment of the language and the consumer. In some cases, Gaelic focused bands may choose to forego their Gaelic names, for example Inyal.

This has also been the case for many brands with Gaelic names such as whisky companies who choose to forego Gaelic names as browser cookies currently do not prioritise Gaelic content.

susbaint ri faighinn na bu luaithe nan tachradh seo.

Ma chruthaichear teicneòlas aithneachaidh cànan agus bun-structar AI a tha a' gabhail a-steach na Gàidhlig, dhèanadh seo cinnteach gum biodh cothrom na fèinne aig daoine le feumalachdan a bharrachd a tha ag obair tron Ghàidhlig. Mar eisimpleir, chan eil caipseanan dùinte rim faighinn sa Ghàidhlig. Tha iad rim faighinn sa Bheurla a-mhàin agus mar sin tha e doirbh do dhaoine le trioblaidean claisneachd a bhith a' gabhail pàirt ann an coinneamhan air-loidhne.

Bheireadh leasachadh AI adhartach buannachdan do dhaoine air feadh na h-Alba oir bheir e aithneachadh didseatach nas fheàrr do ghnìomhachasan a bhios a' cleachdadh fhaclan, abairtean agus ainmean-àite Gàidhlig.

Dh'fhaodte gun cuireadh droch bhun-structar AI ri crìonadh a' chànan. Tha a' Ghàidhlig agus ceòl traidiseanta a' toirt deagh bhuaidh air eaconomaidh na h-Alba ach tha e doirbh do dh'aplacaidean ciùil mòra leithid Spotify a bhith ag aithneachadh ainmean nan òran Gàidhlig, rud a bheir droch bhuaidh air a' chànan agus an neach-cleachdaidh. Ann an cuid de shuidheachaidhean, bidh còmhlain Gàidhlig a' trèigsinn nan ainmean Gàidhlig aca, mar eisimpleir Inyal.

Tha seo cuideachd air buaidh a thoirt air iomadh brannd aig a bheil ainmean Gàidhlig, mar eisimpleir, companaidhean uisge-beatha, nach bi a' cleachdadh ainmean Gàidhlig a chionn 's nach bi

Poor AI infrastructure also effects Gaelic speakers on social media as currently it is not possible to use quick translations on social media in the same way as most European languages. This means organisations and individuals are turning away from using Gaelic in marketing and in their daily lives. Note that the translation function on Google does not currently work in Gaelic despite the existence of Google translate.

What do you think of the proposed overarching vision of the strategy, and the two strategic goals that are proposed to underpin this?

The overarching vision of Scotland's AI Strategy will be to use AI to benefit Scotland's people and organisations and help to achieve the transformational change envisioned in the National Outcomes.

Underpinning this vision will be two strategic goals – that through the adoption of AI:

- the people of Scotland will flourish*
- Scotland's organisations will thrive and prosper*

We agree with the overarching vision of Scotland's AI strategy and the two strategic goals. As stated above an AI Strategy incorporating Gaelic would be to the benefit of all Scotland's people, in homes,

criomagan brabhsair a' toirt prìomhachas do shusbaint Gàidhlig.

Tha droch bhun-structar AI cuideachd a' toirt buaidh air luchd labhairt na Gàidhlig air na meadhanan sòisealta oir aig an àm seo, cha ghabh eadar-theangachaidhean luath a dhèanamh air na meadhanan sòisealta san aon dòigh 's a nithear leis a' mhòr-chuid de chànanan Eòrpach. Tha seo a' ciallachadh gu bheil daoine is buidhnean a' tionndadh air falbh bho bhith a' cleachdadh na Gàidhlig ann am margaidheachd agus sna beathannan làitheil aca. Thoir an aire nach bi am foincsean eadar-theangachaidh air Google ag obair sa Ghàidhlig aig an àm seo, ged a tha Google translate ann.

Dè ur beachd air an lèirsinn fharsaing a tha san amharc san ro-innleachd, agus air an dà amas ro-innleachdail a thathar a' moladh gus taic a chumail ri seo?

Is e an lèirsinn fharsaing aig Ro-innleachd AI na h-Alba a bhith a' cleachdadh AI gus buannachd a thoirt do mhuinntir na h-Alba agus do bhuidhnean ann an Alba agus gus cuideachadh gus an cruth-atharrachadh air a bheilear ag amas anns na Builean Nàiseanta a thoirt gu buil.

Bidh dà amas ro-innleachdail mar bhunait dhan lèirsinn seo - tro bhith a' gabhail ri AI:

- soirbhichidh muinntir na h-Alba*
- soirbhichidh buidhnean ann an Alba*

Tha sinn ag aontachadh ris an lèirsinn fharsaing de ro-innleachd AI na h-Alba agus ris an dà amas ro-innleachdail. Mar a chaidh a chur an cèill gu h-àrd, bhiodh Ro-innleachd AI a' tha a' gabhail a-steach na

educational institutes, workplaces and the wider community.

Gaelic is an important part of life in Scotland and encouraging Gaelic speakers to engage with artificial intelligence would ensure Gaelic is not excluded from this important development in how we interact in modern day technology.

Question 6: Do you have any comments on the strategic themes that will be explored in detail?

The scoping document underlined the need for current initiatives within Scotland to take part in the process of regulation and development of AI. Over the past years several Gaelic initiatives such as DASG (digital archive for Scottish Gaelic), The University of Edinburgh, Sabhal Mòr Ostaig, IGàidhlig and Bòrd na Gàidhlig have taken part in the development of Gaelic technology and digital infrastructure. With the help of these bodies under the strategy Gaelic could see a much stronger AI presence.

One of the questions taken from the Scoping document reads.

“What data infrastructure is required for the successful functioning of Scotland’s AI ecosystem?”

Gàidhlig buannachdail do mhuinntir na h-Alba air fad, ann an dachaighean, ionadan foghlaim, àiteachan-obrach agus sa choimhearsnachd san fharsaingeachd.

Tha Gàidhlig na pàirt chudromach de bheatha ann an Alba agus le bhith a’ brosnachadh luchd-labhairt na Gàidhlig a dhol an sàs le AI, dhèanadh sin cinnteach nach biodh a’ Ghàidhlig air a dùnadh a-mach bhon leasachadh chudromach seo a thaobh mar a bhios sinn ag eadar-obrachadh le teicneòlas an latha an-diugh.

Ceist 6: A bheil beachd sam bith agaibh air na cuspairean ro-innleachdail a thèid a sgrùdadh gu mionaideach?

Dhaingnich an sgrìobhainn sgrùdaidh cho cudromach ’s a bha e gun gabhadh iomairtean làithreach ann an Alba pàirt anns a’ phròiseas riaghlaidh agus leasachaidh airson AI. Thar nam bliadhnan mu dheireadh tha grunn iomairtean Gàidhlig leithid DASG (tasglann didseatach airson Gàidhlig na h-Alba), Oilthigh Dhùn Èideann, Sabhal Mòr Ostaig, IGàidhlig agus Bòrd na Gàidhlig fhèin air pàirt a ghabhail ann an leasachadh teicneòlas Gàidhlig agus bun-structar didseatach. Le cuideachadh bho na buidhnean sin fon ro-innleachd dh’fhaodadh Gàidhlig làthaireachd AI mòran nas treasa fhaicinn.

’S e tè na ceistean anns an sgrìobhainn sgrùdaidh.

“Dè am bun-structar dàta a tha a dhìth airson ’s gun obraich eag-shiostam AI na h-Alba gu soirbheachail? ”

Building a data-infrastructure that incorporates Gaelic is a challenge that can be tackled by public bodies working with private bodies and with the support of the government. Although the Bòrd understands that creating enough Gaelic data is difficult, it is possible through the employment of Gaelic speakers to help with the process of creating data. This could be carried out voluntarily or through existing bodies and has the potential to provide new jobs within the Gaelic sector and engage new volunteers.

7. How can confidence in AI as a trusted, responsible, and ethical tool be built?

Incorporating minority-languages into Artificial intelligence is part of using it as an ethical tool. Ireland has incorporated technology into its 20 year strategy for Irish Language and this year wales will launch an updated version of their plan for Welsh Language Technology Action Plan.

The Bòrd has worked in partnership with the university of Edinburgh to create the Gaelic algorithmic research group to focus on new technologies and AI for Gaelic.

<https://blogs.ed.ac.uk/garg/2020/04/07/new-release-of-tagged-scottish-gaelic-corpus-arcosg/>

Bòrd na Gàidhlig recognises that for Gaelic to have equal status with English in Scotland, creating technology that uses Gaelic is of the upmost importance. To do this, we would recommend that the AI

Tha togail bun-structar dàta a tha a' gabhail a-steach na Gàidhlig na dhùbhlann ris am faod buidhnean poblach a tha ag obair le buidhnean prìobhaideach dèiligeadh le taic bhon riaghaltas. Ged a tha am Bòrd a' tuigsinn gu bheil e duilich dàta Gàidhlig gu leòr a chruthachadh, gabhaidh e dèanamh tro bhith a' fastadh luchd-labhairt Gàidhlig gus cuideachadh leis a' phròiseas airson dàta a chruthachadh. Dh'fhaodadh seo a bhith air a dhèanamh gu saor-thoileach no tro bhuidhnean a th' ann mar-thà ach tha cothrom aige cuideachd obraichean a chruthachadh taobh a-staigh roinn na Gàidhlig agus cuideachd gus daoine ùra a bhrosnachadh gus a bhith nan saor-toileach.

7. Ciamar as urrainn misneachd a thogail ann an AI mar inneal earbsach, cunntachail agus beusanta?

Tha a bhith a' toirt a-steach mion-chànanan do dh'AI mar phàirt de bhith ga chleachdadh mar inneal beusanta. Tha Èirinn air teicneòlas a thoirt a-steach dhan ro-innleachd 20 bliadhna airson na Gaeilge agus thèid tionndadh ùraichte den Phlana Gnìomh Teicneòlais airson na Cuimris fhoillseachadh sa Chuimrigh am-bliadhna. Tha am Bòrd air a bhith ag obair ann an com-pàirteachas le Oilthigh Dhùn Èideann gus a' bhuidheann rannsachaidh algoritimeach Gàidhlig a chruthachadh gus fòcas a chur air teicneòlasan ùra agus air AI airson na Gàidhlig.

<https://blogs.ed.ac.uk/garg/2020/04/07/new-release-of-tagged-scottish-gaelic-corpus-arcosg/>

Tha Bòrd na Gàidhlig ag aithneachadh gu bheil e ro-chudromach gum bi teicneòlas ann a chleachdas a' Ghàidhlig ma tha co-

strategy ensures that the needs of Gaelic speakers is included.

ionannachd inbhe gu bhith aig a' Ghàidhlig agus a' Bheurla ann an Alba. Gus seo a dhèanamh mholamaid gun dèan an ro-innleachd cinnteach gum bi feumalachdan luchd-labhairt Gàidhlig mar phàirt dhith.