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Indigenous languages and technology

Challenges, standards, & tools for small language communities

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Outline

Technology and effects on indigenous language

Case study: Cherokee

Tech support for written and unwritten languages

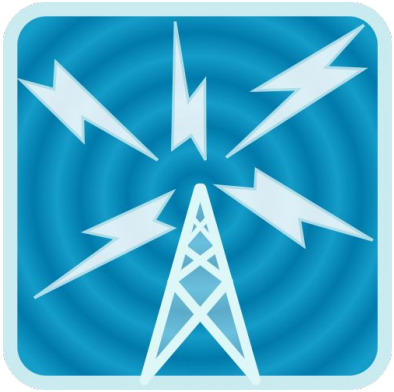
Example: Aikuma

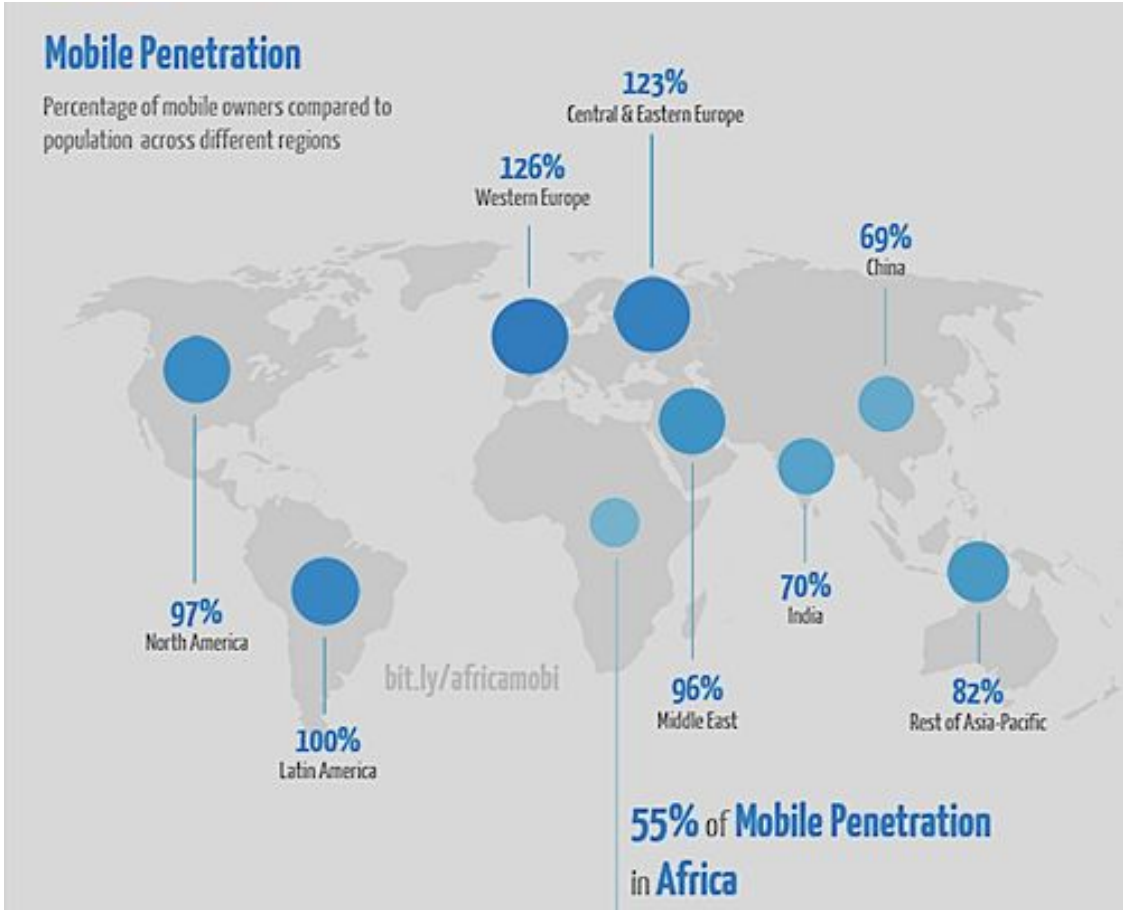
What tech companies can and can’t do

Actions that can be done by indigenous speakers

Conclusions

Technology is rapidly expanding around the world!





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Tech enables communication for everyone

Tech’s positive impact for indigenous peoples

+ Enables communication
+ Provides access to information
+ Promotes education & literacy
+ Grows economic opportunities

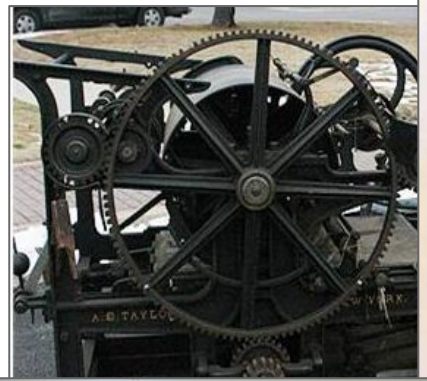
Tech’s potential negatives for indigenous languages

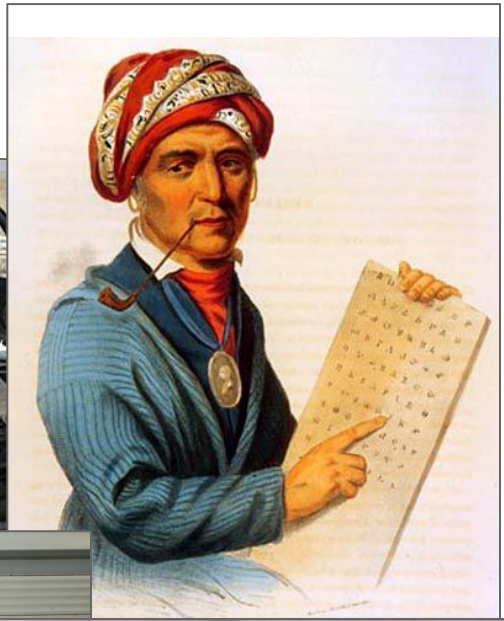
- Media from dominant cultures
  - Print, radio, television, video, games
- Education in dominant language
- New concepts: imported words
- Reduced perceived value
- Less young < -- > elder interaction

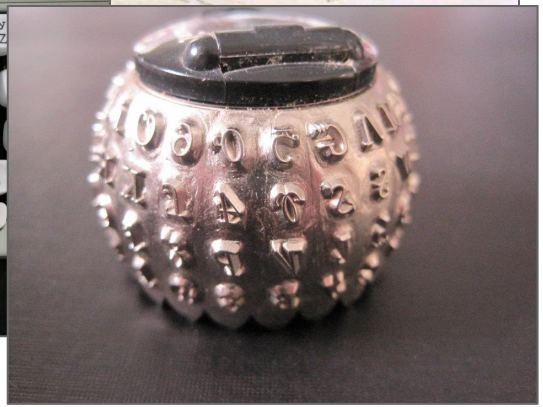
Tech opens the floodgates to overwhelming content

Case study: Cherokee language

- Began unique writing system in 1820s
- Literacy grows quickly
- Printing press and typesets in 1830s
- Newspapers, books, educational materials
- Typewriters for Cherokee
- Immersion schools, 2001
- Cherokee Nation establishes Translation Department, 2008

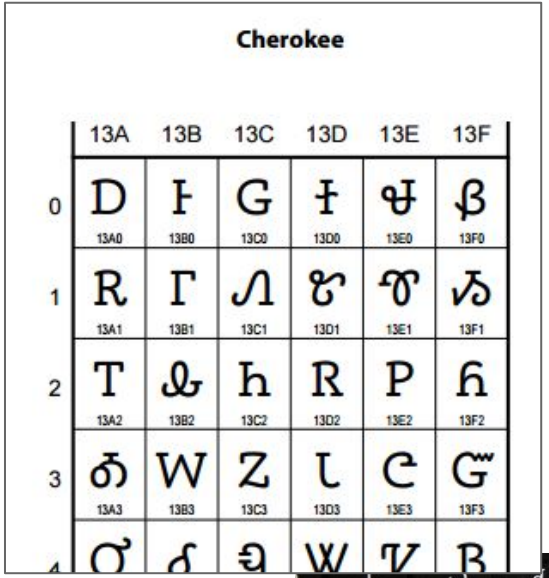


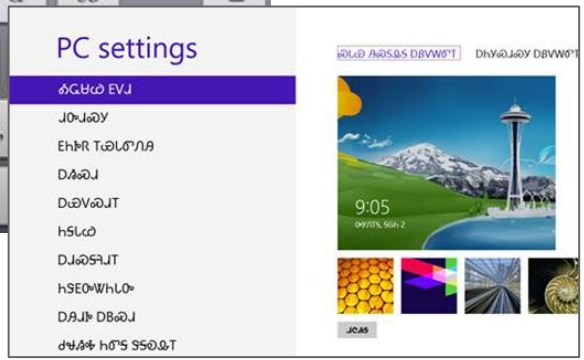




ᏣᎳᎩ and computer tech

- Cherokee script in Unicode (1999)
- With tech companies: interfaces, keyboards, fonts, etc.
- New for concepts, “spam” (ᎤᏂᎢ), “email” = “lightning paper” (ᏗᏔᏍ)





Special keypads that lie on top of the traditional laptop keyboards allow students to type with Cherokee characters.

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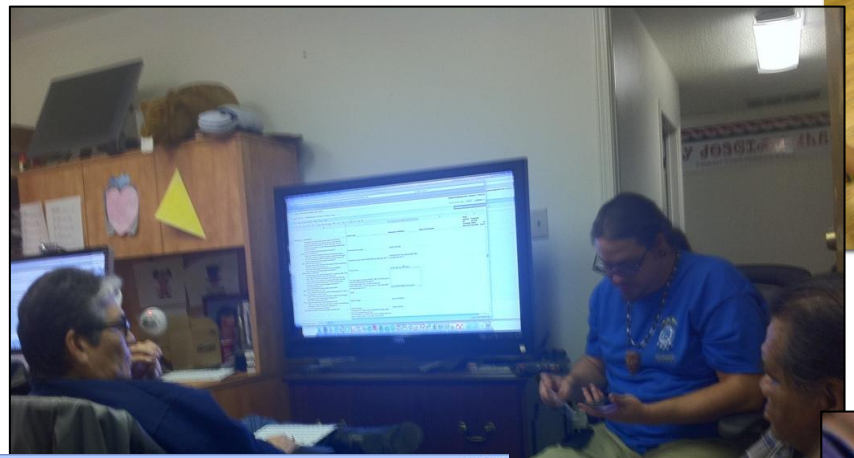
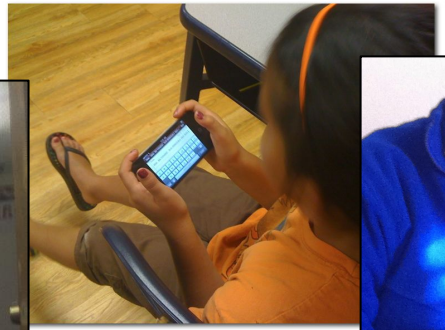
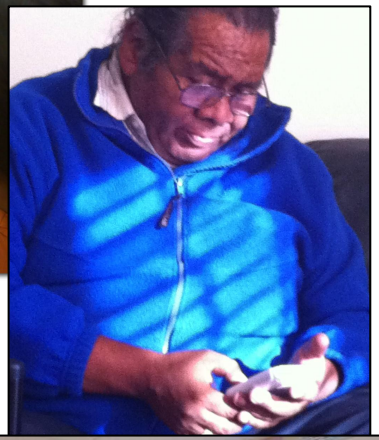
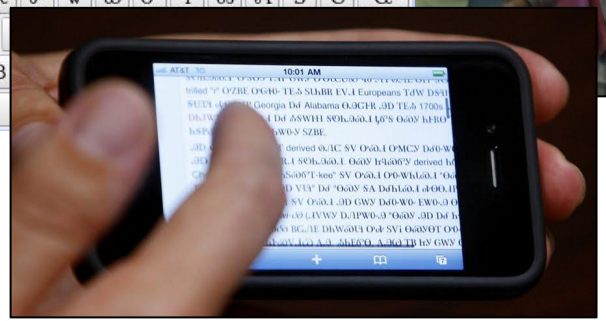
Translators at work









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ᎭᏩᎾ ᏗᏓBWᎵᏍᎩ ᎬᏗ Gmail ᏣᎳᎩ (Get started with Gmail in Cherokee)

November 19, 2012

December 20, 2012

Microsoft announces Windows 8 support for Cherokee, a native American language

Cherokee Is Now An Official Language In iOS

What is available now from Tech for languages

Character support:

- Unicode
- Input, keyboards
- Fonts

Tools and online services

- Media: blogs, social networks, video services
- Access to the internet
- Language-specific tools and archives

Frameworks for developing content and applications

Support for written languages:

Unicode: standard for writing systems*

- Any computer, operating system, and programming language
- For mobile and web-based
- First published in 1992
- Over 120,00 characters
- 129 modern & historic **scripts** ...
- Common data for almost 200 languages (CLDR)

Computer input in any written language

Virtual keyboards & input tools for many languages:

- Alphabetic input
- Complex writing systems
- Ideographic systems

在中国文字

Zài zhōngguó wénzì

Options include:

- Web-based & soft keyboards
- Handwriting recognition
- Phonetic and character-based

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Fonts: avoiding “tofu”

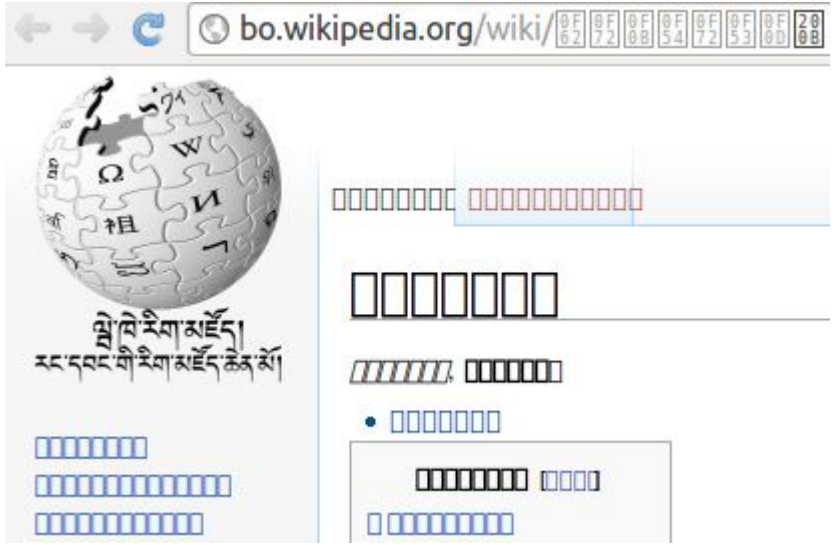
The font determines actual shape of characters on the screen or printed.

Most fonts cover a few scripts, but not all.

Available for all scripts block in Unicode

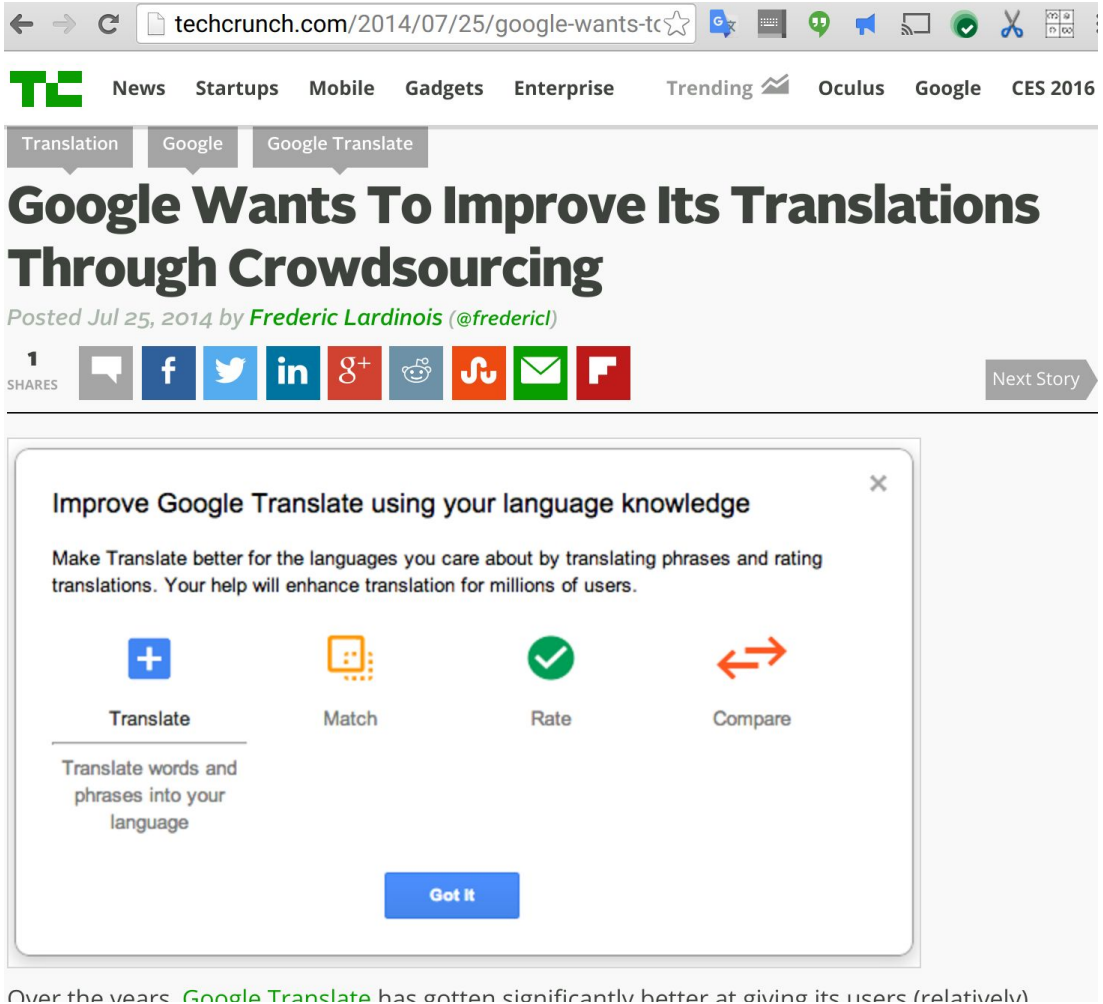
Special modified fonts (“encodings”) have been used for many languages

** Some devices prevent font installation



More support for languages

- Videos and captioning
- Crowdsourcing for translation
- User interface from users
- Tweets organized by language



Crowdsourcing for user interfaces in apps

Language	Users	Tweets	Top User	Tweets	First Tweet
Euskara	17052	8930528	berria	95353	eastigarraga
Kiswahili	1296	6359198	MariaSTsehai	104252	issamichuzi
Kreyòl Ayisyen	14270	5238855	amour109	80595	tichrist
Cymraeg	14249	4680735	newyddcymraeg	92301	meigwilym
Kapampangan	1379	2157062	keeyttguevarra	21818	desperada
Gaeilge	8023	1208870	Tuigim	67906	imeall
Frysk	2667	821667	omropfytsban	83379	eetweetje
Setswana	314	763816	sesutho	51189	WameDre
Asturianu	771	479357	iyangc	30782	Pingarates
Hausa	1331	409232	bbchausa	37671	mojaam
Yorùbá	2239	278701	yobamoodua	7388	kojere
Ikinyarwanda	289	249671	TweetRwanda	39897	kwitob
Soomaaliga	558	237739	Weedhsan	17356	HaPpYMaXaMeD
Gàidhlig	1126	207922	sconewt	27303	Seumas

INDIGENOUS TWEETS.COM

Blog

Indigenous Blogs

Kevin Scannell

Follow @IndigenousTweet

YouTube

irish language

How to speak the Irish language

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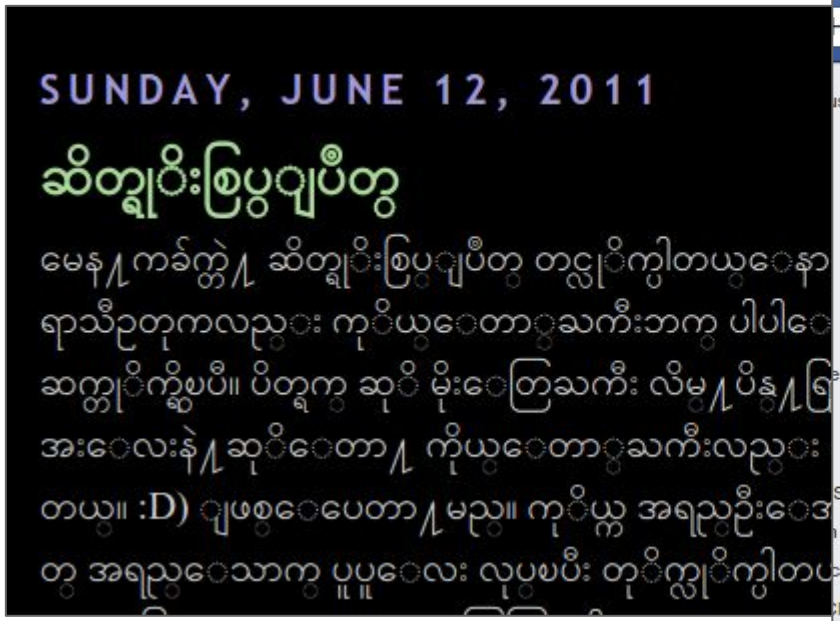
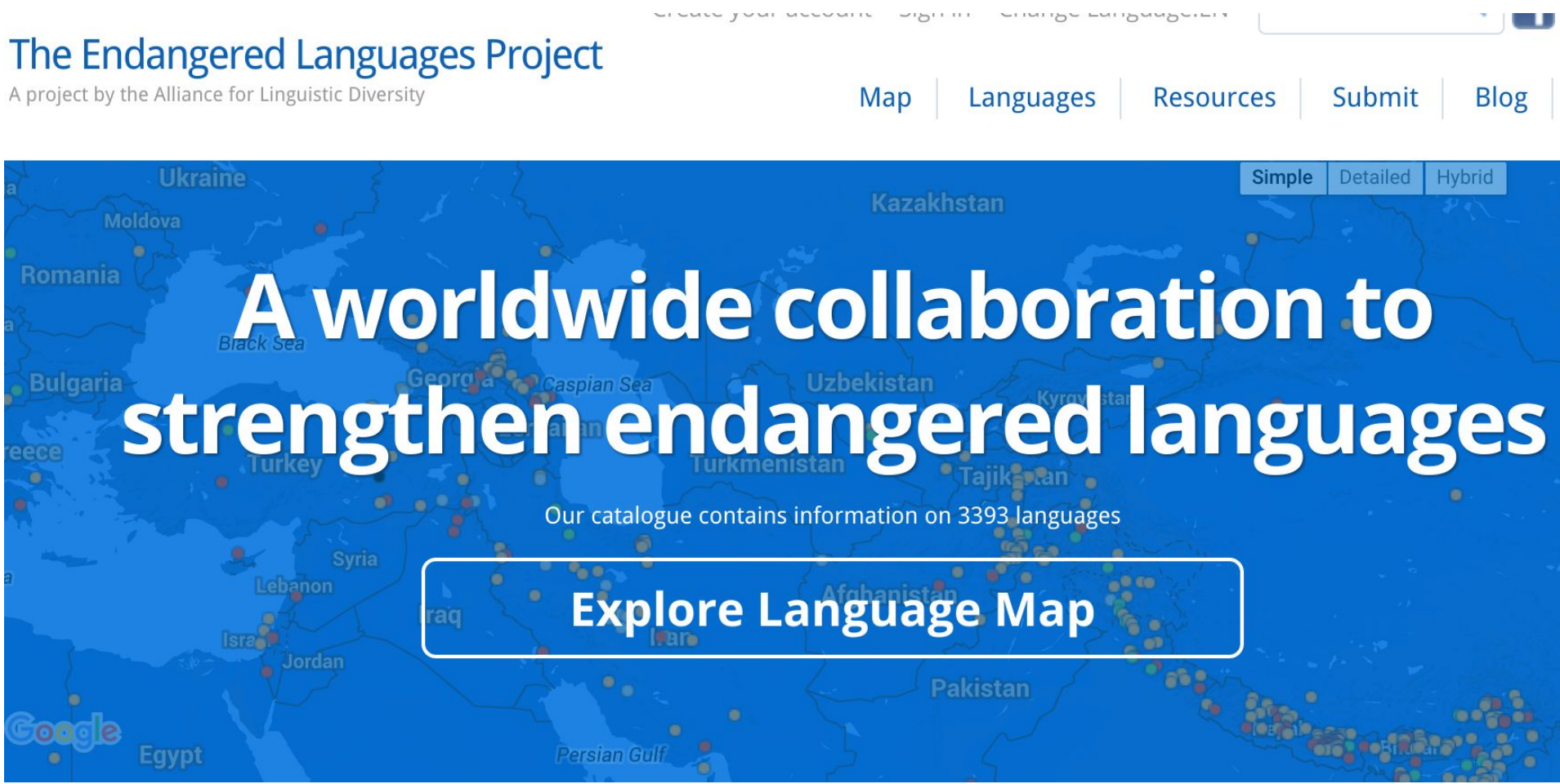
Online communities and blogs





endangeredlanguages.com

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Find existing language content

Locate and use web pages, applications, and services available in the user's language of choice.

A few examples:

- Find sites about educational opportunities written in the Navajo language
- Provide list of mobile apps that have a user interface in the Oriya language
- Find services in my city for native Mayan speakers
- Located social media pages in Urdu
- Find Tweets written in Choctaw

Tech challenges: how to determine the language from text.

Tech frameworks for 3rd party developers

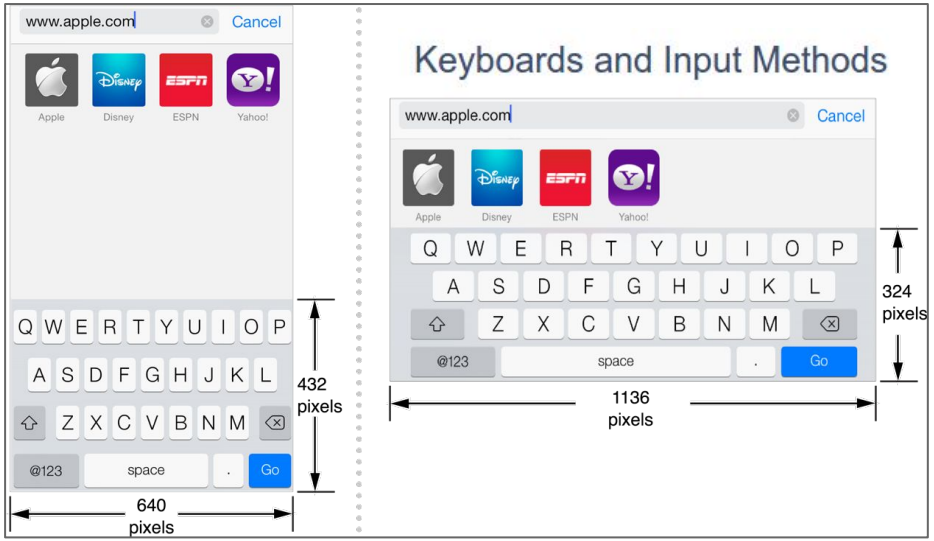
Keyboard development tools for operating systems, mobile devices and on the web. For example:

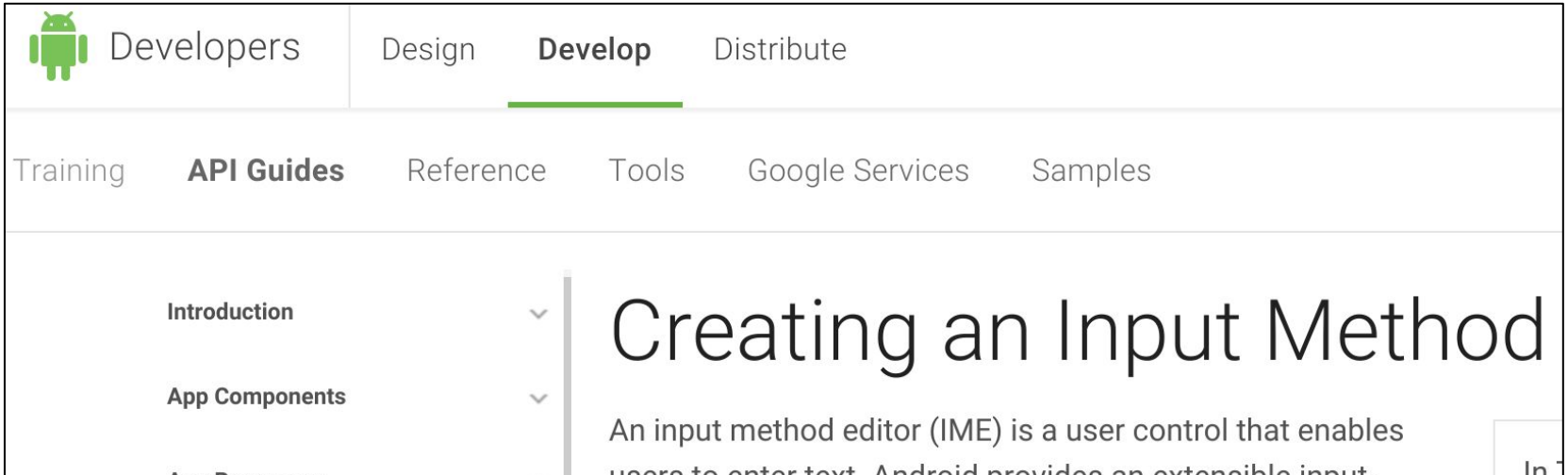
- iOS, Android, etc.
- Windows, OS X, Linux
- Web-based HTML / Javascript

Example: keyboard tools for 3rd party developers

Custom keyboards can be created.

Word lists can be added for suggestions.





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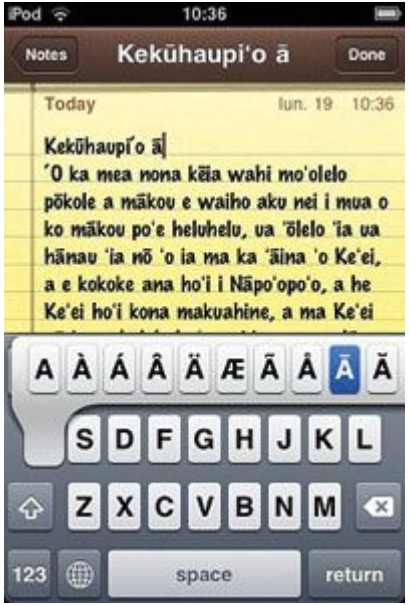
Anyone can create new content in any language

Build web pages, web & mobile apps with script / language.

- Business, non-profit, family, personal interest, etc.
- Create audio/video with spoken and written text, including closed captions
- Label these with standard language tags for discovery

```
<html lang="fj">
...
</html>
```

Tech challenges: keyboards, fonts, methods to label



Identify, create, and join language communities

Tools to create and discover language-based social media, discussion groups, community pages, chat rooms.

Examples:

- Locate social networks in Myanmar minority languages
- Find other speakers of Hausa
- Set up a discussion group on Gurindji
- Edit, comment, interact with my Vanuatu language communities

Tech challenges: Typing

Supporting languages that have no written form

Video & audio can be captured and shared

Educational materials can be created

Mobile platforms enable sharing and audio communication

Challenge:
How to make technology usable for non-literate users?

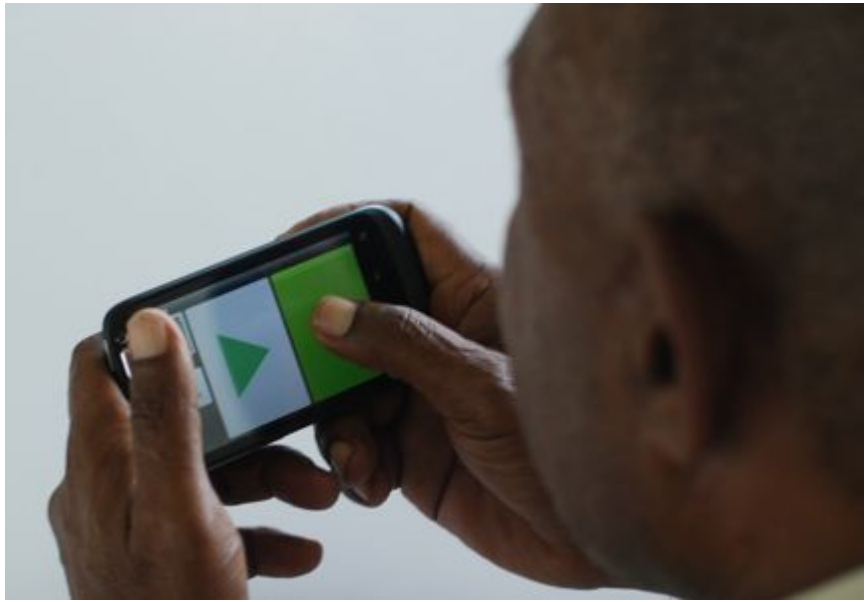
Case study: Aikuma for language documentation

"Aikuma: a free Android app that helps people record, share, and translate stories in the world's unwritten languages."

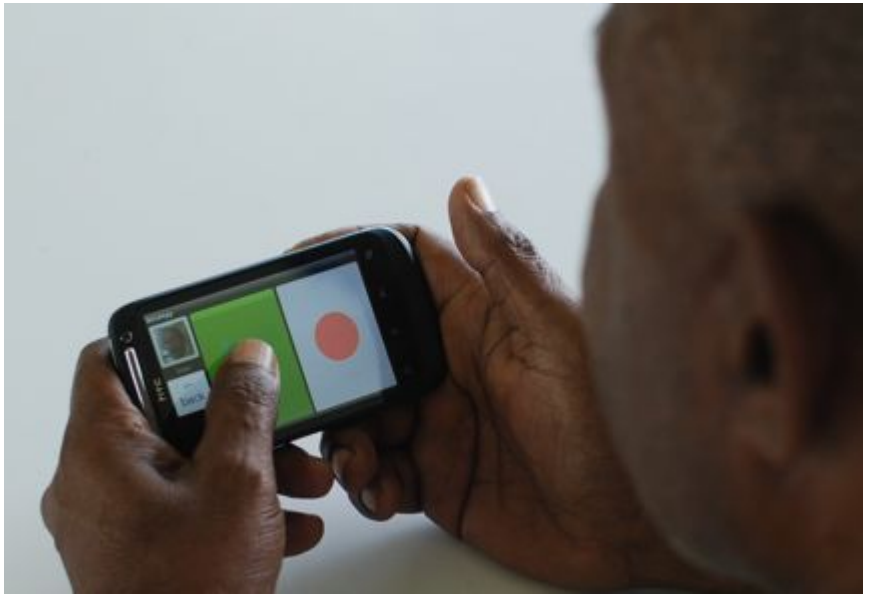
Created by Steven Bird, University of Melbourne http://www.aikuma.org/

Aikuma: record, replay, respeak, translate

Hold the green button
to listen to a phrase



Use the red button to
record a translation.



What Aikuma does:

Set language: ISO 639 or by name

Add speakers

Record audio

Respeak the recording

Add metadata

Translate

Share

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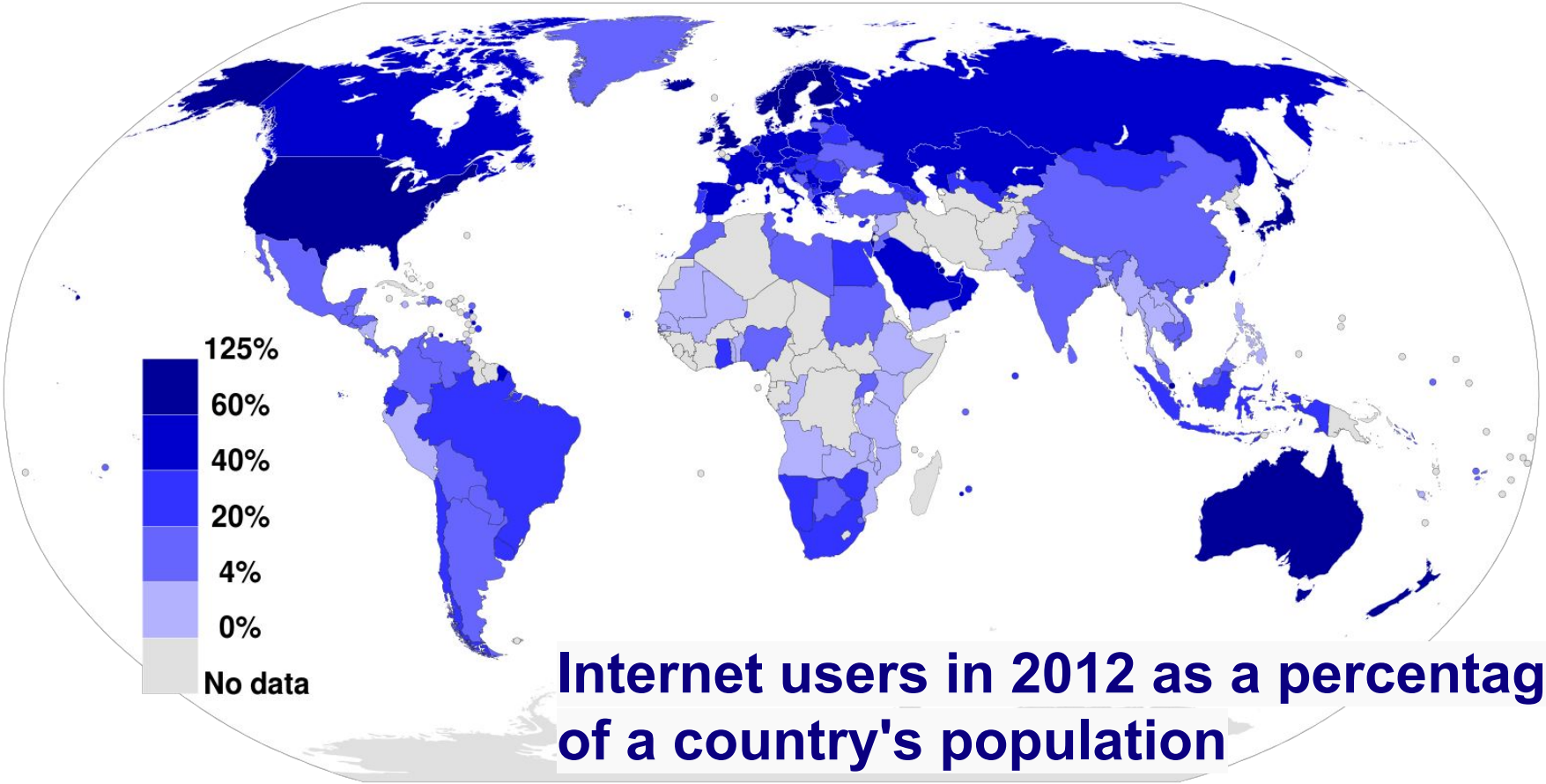
Internet usage is not universal (yet)!



¨Access¨ will happen

Google[x] Project Loon: WiFi via balloon

Facebook's Connectivity Lab:
"drones, satellites and lasers"

Cellular networks continue
to grow in coverage
and speed

What tech companies probably cannot do

1. Provide *user interfaces* for products in all 7000 human languages
2. Build 100% accurate *language detection* for written text in all languages
3. Add *machine translation* for all the world's languages
4. Build *speech recognition* for most languages
5. Provide *text to speech* for most languages
6. Support all *variations of language* use, such as vocabulary / grammar. e.g., Mexican vs. Nicaraguan Spanish.

Don’t expect user interfaces in every language

Many companies support 50 - 150 user interface languages in major products.
However:

- Translation is expensive
- Maintenance is a continuing cost
- Many languages are not standardized
- Few committed & organized translators
- Small impact for potential users

General approach: companies work to support at least one language spoken by most people, e.g., Spanish in Central / South America, Filipino in the Philippines.

Don’t expect machine translation for every language

Why not?

Translation is much harder than having a dictionary.

Translate needs massive amounts of data:

- Millions of words in parallel text
- Many samples of common usage

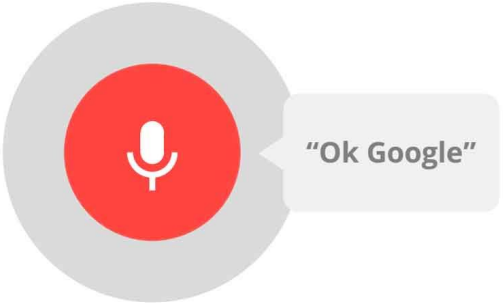
Support voice on more languages?

Perhaps:

- Support for human annotation / transcription tools for media such as video and audio

Probably not:

- Detect the language from audio or video
- Reliable speech to text (voice recognition)
- Automated text to speech



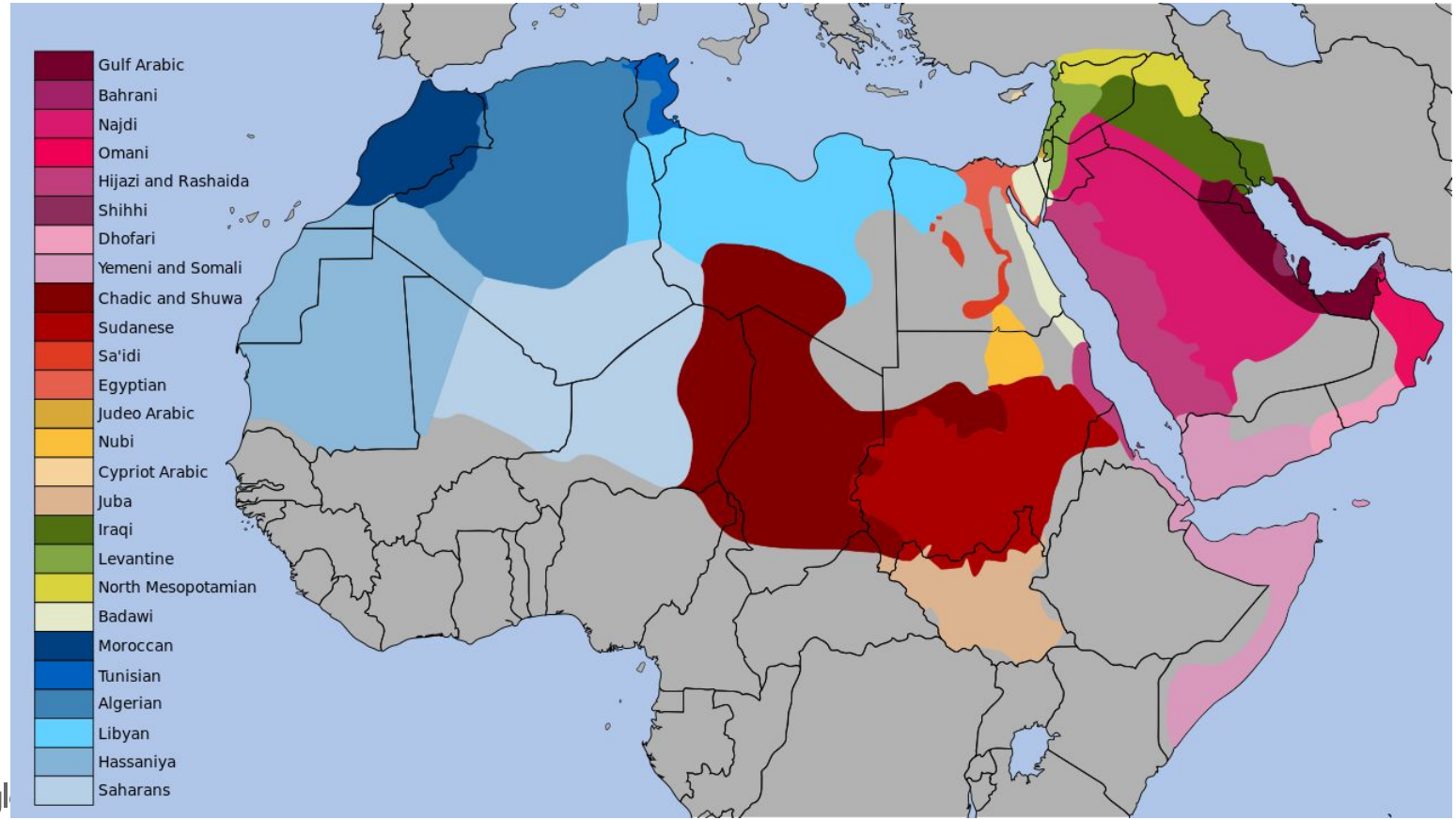
Why not speech recognition for every language

Similar to machine translation, speech recognition needs massive amounts of audio training data:

- A large sample of all common words and phrases
- From multiple speakers (500 or more)

Also, accents vary widely and context is extremely important.

Language variants: Arabic as an example



Things language communities should avoid:

Don’t use a “hacked font” (font-encoding):

- Text can’t be show without a special font. Fails on mobile devices.
- Search and other text processing fails.

Don’t create new writing systems.

- In most cases, an existing Unicode script can be applied.
- Be careful with novel use of diacritics. Many fonts may not be able to render them correctly.

Don’t give up!

What indigenous communities can do...

Create content of all kinds & declare the language

Use your language in all communications: text, mail, audio, video, etc.

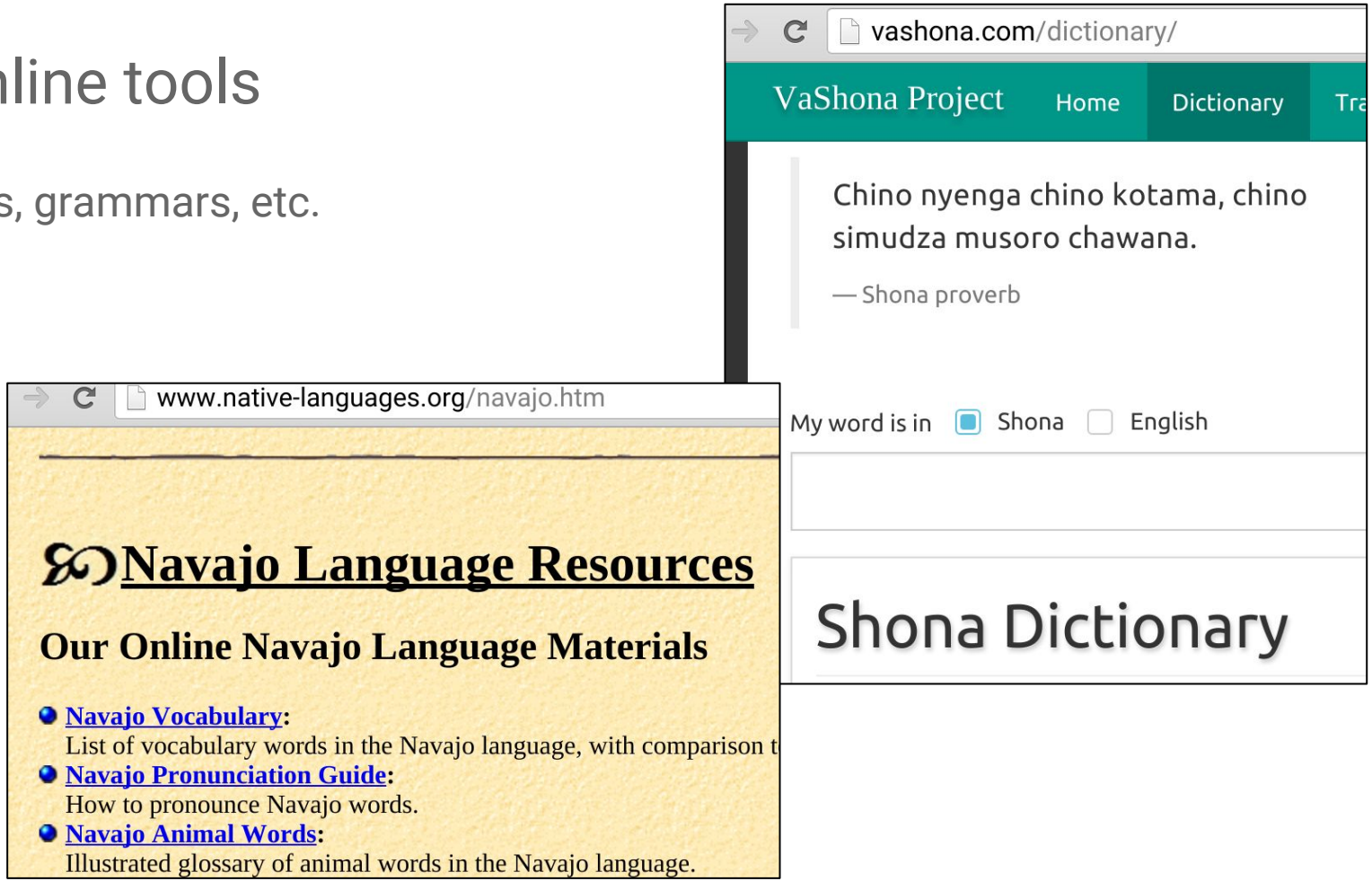
Establish and use language communities. Engage new users!

Use video to teach. Add closed captioning.

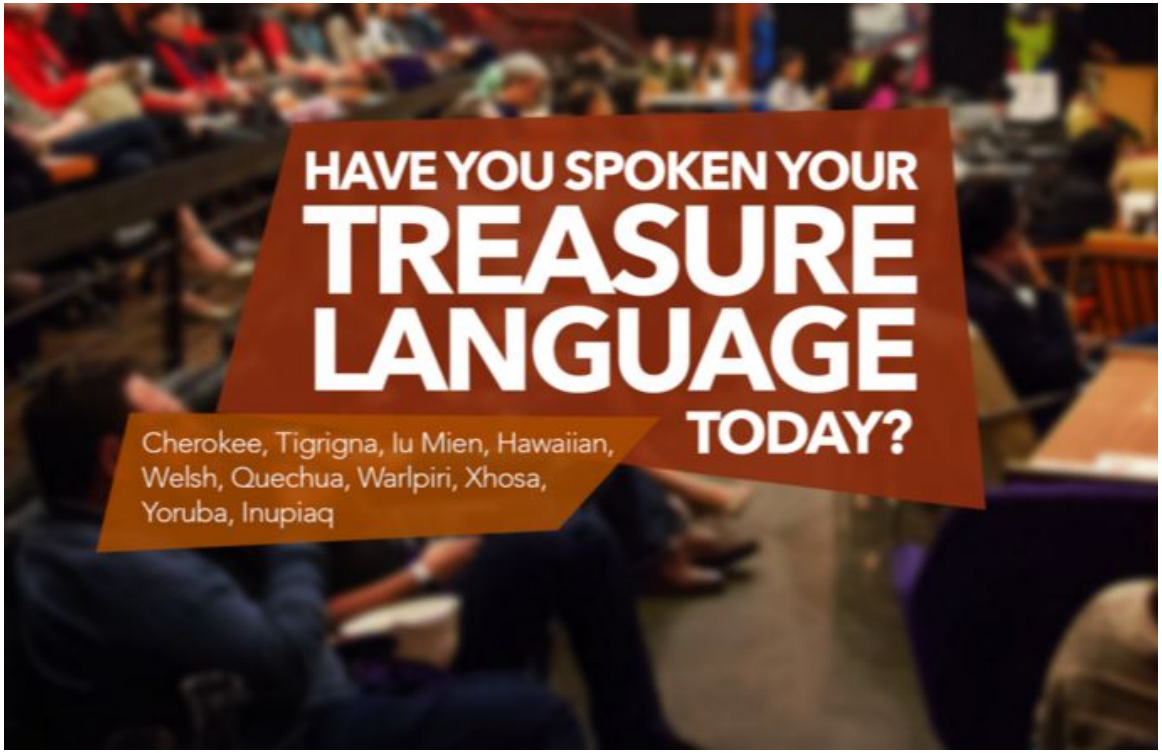
Encourage developers of input tools, fonts, applications, etc.

Build online tools

Dictionaries, grammars, etc.



Form communities and tell stories!



Share stories with family, friends, and strangers in your own language.

Encourage developers to think beyond the big languages

Find developers to support additional languages, e.g., games.

Increase awareness of the needs for:
    input methods, fonts, applications, etc.

Encourage and use standards-based tools that can use language data plugins.

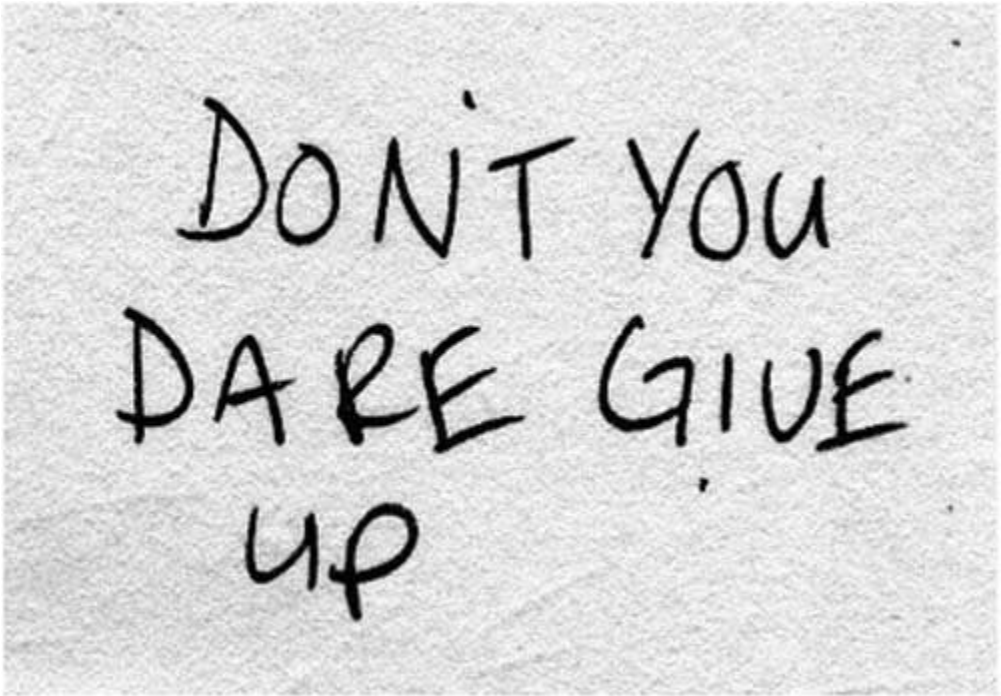
Reward developers who support your languages.

Advice: Be persistent!

Use the language: the key to preserving it!

Help users understand how to write using the new tools.

Be proud of the language. Advocate for its public use!



Conclusions: Technology and Indigenous Languages

Great potential for indigenous languages

Dominant languages can be overwhelming

There is general support for text, audio, video, internet access

Advanced language tools are much harder

Indigenous communities can apply tech to help preserve and extend their languages & culture


thank you
danke
謝謝
gracias
merci
obrigado
dziękuję
bedankt
go raibh maith agat
teşekkür ederim
ngiyabonga
спасибо
рахмат
Баярлалаа
dank je
tapadh leat
mochchakkeram
sukriya
kop khun krap
terima kasih
grazie
arigatô
dakujem
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tack
mersi
barka
welalin
misaotra
matondo
paldies
grazzi
mahalo
faafetai lava
vinaka
blagodaram
kiitos
dankie
dhanyavad
hvala
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GV!
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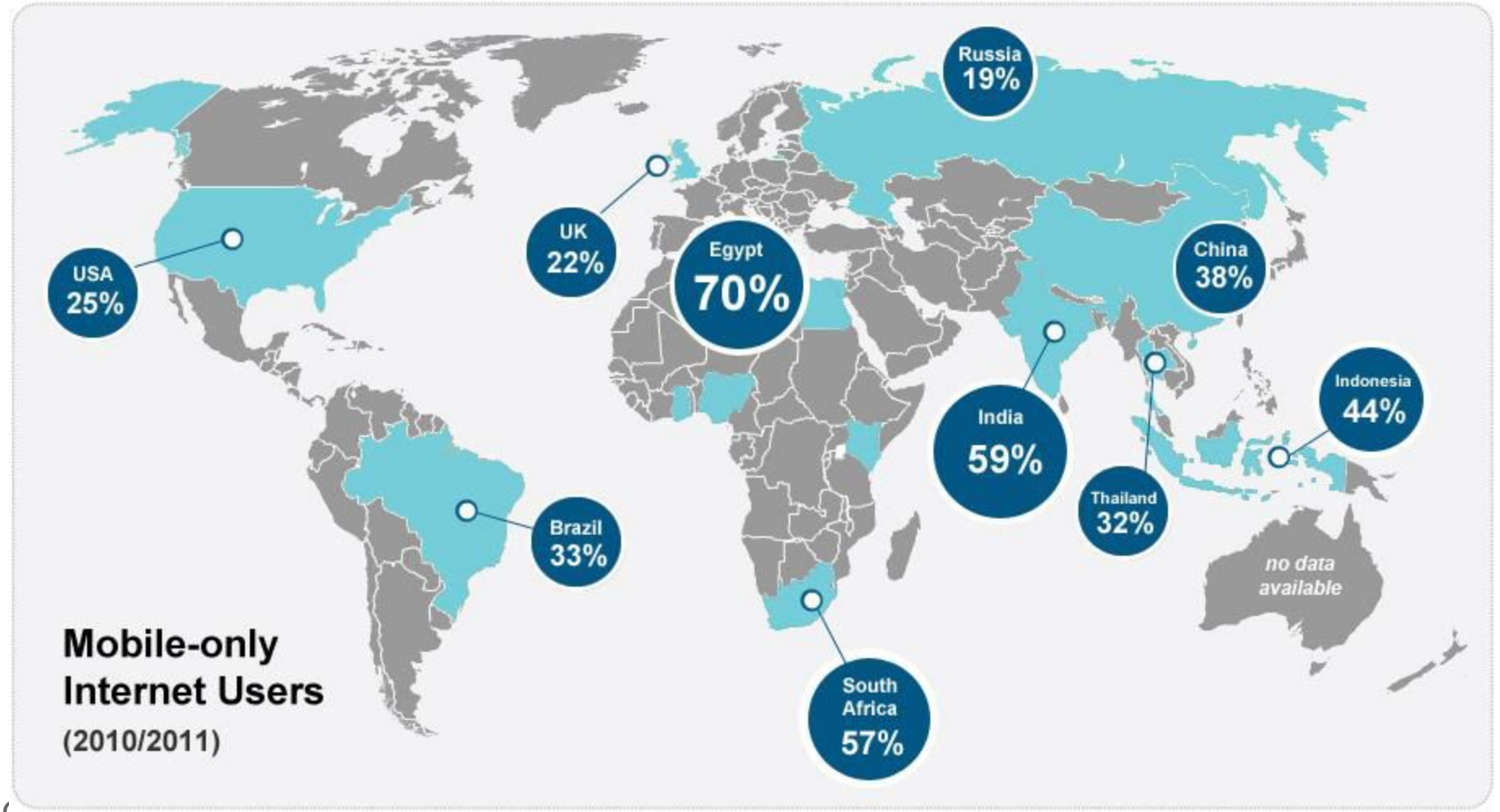
Russia
19%
UK
22%
Egypt
70%
USA
25%
China
38%
India
59%
Indonesia
44%
Thailand
32%
Brazil
33%
no data
available
South
Africa
57%
Mobile-only
Internet Users
(2010/2011)

Technology can also *dis*-connect us