Computational Linguistics and Mayan Languages

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Languages
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    - Ergative vs. nominative languages
  - All of the available data in the language (uses by native speakers/writers in context)
Linguistic revolutions
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The First and Second Linguistic Revolutions: Writing, Printing
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- Increased population capable of creating accessible knowledge, but, because of costs, left this still quite limited.
Privileged and disadvantaged languages
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  - Speakers of disadvantaged languages remained handicapped in participation in national and global debates about the future
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  - Possibility of partially automating translation
  - Computer-assisted literacy training
The “Information Society”
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  - 3: “The ability for all to access and contribute information, ideas and knowledge is essential in an inclusive Information Society.”
  - 8: “The Information Society should be founded on and stimulate respect for cultural identity, cultural and linguistic diversity, traditions and religions, and foster dialogue among cultures and civilizations. The promotion, affirmation and preservation of diverse cultural identities and languages ... will further enrich the Information Society.”
The reality
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- 11 other indigenous American languages (only 4 with more than 100 articles)
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- Programming and markup languages are based on English. (Paolillo)
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  - “Strong” international, national, and regional languages (Thai, Tamil, Amharic, Swahili, etc.)
  - Languages already marginalized within their own countries
Causes of the LDD
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- Lack of users
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- Lack of power and financial resources
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- Linguistic imperialism, chauvinism
Bridging the LDD
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• Create documents in and tools for under-represented languages, including mediating interpreters
A role for translation?
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- Translation and the spread of knowledge in the Middle Ages
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- Translation could bridge the divide by making more documents available in disadvantaged languages and giving speakers/writers of these languages a voice.
Translation and the LDD
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English

K’iche’
Translation and the LDD

English

K’iche’
Translation
Translation

• The enormity of the problem
  - Hundreds of languages
  - Millions of documents
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• Machine translation
Overview of machine translation
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- The problem of integrating the two classes of methods
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- Transfer architectures
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- Transfer architectures
- Interlingua architectures
Machine translation
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- Toward appropriate and efficient forms of collaboration between people and machines (Kay)
L³: long-term goals
$L^3$: long-term goals

- Translation
L$^3$: long-term goals

• Translation
  - Between “disadvantaged” languages (DLs) of the Global South and “privileged” languages of the Global North
L³: long-term goals

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  - Between “disadvantaged” languages (DLs) of the Global South and “privileged” languages of the Global North
  - Among the the DLs
L³: long-term goals

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• Computational tools to aid in teaching the DLs
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  - Providing texts for training MT system
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  - Providing texts for training MT system
  - Providing feedback for MT system
L^3
• Collaboration between
Collaboration between Computational linguists and
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  - Computational linguists and
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  - Members of the linguistic communities themselves who
    ▪ Define the content areas for translation and
    ▪ Are responsible for the quality of the final translations
Machine translation and disadvantaged languages
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• Much research on privileged languages
  - English, French, German, Spanish, Russian, Dutch, Portuguese, Italian, Chinese, Japanese, Korean
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  - Arabic, Farsi, Hindi
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- For the majority of languages, we only have at best dictionaries and a few other resources
The situation in Guatemala
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• There are now some bilingual schools.
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- Other independent organizations working on Mayan language issues, including Asociación Ajb’atz’ Enlace Quiché, an NGO dedicated to using technology for teaching and strengthening the languages.
- Small number of online resources, a few monolingual and bilingual texts, bilingual dictionaries, teaching materials.
From *Loq’aläj täq Mayab’ kunab’äl* (Mayan Medicine)

**ANIX**

**UPETIK UB’ANTAJIK**

We q’ayes kunab’äl ri’, man kk’iy ta ulög utukel. Je wa’ kpetik: ri rulewal are täq le xoral, le uxäq laj täq xerxob’ uwach.

**RI KUKUNAJ**

- Pamaj.
- Ib’och’.
- Ruk’iysaj upam le tu’,

**RI UKOJIK**

- **Chi rech le pamaj**: Kpoq’owisäx jun laj jub’utzaj pa jun xa’r k’a te k’urí’
  kᵗzaq jub’iq’ tzam ruk’, ktijow jun qumb’äl ronojel nüm aq’ab’
  b’ejejb’ q’ij ktijowik.
- **Chi rech le ib’och’**: Kpoq’owisäx jun laj jub’utzaj pa jun xa’r, ktijow
  xäq pa ch’i kech kajb’äl, jun qumb’äl ktijowik ronojel q’ij, lajuj q’ij
  kᵗagejik.
- **Chi rech upam le tu’**: Ktijowik are ch’i ke’l ulög ri ixög pa tuj,
  kutiż jun qumb’äl chi rech pa waq’ib’ q’ij.
EL RÍO
Me gusta tu belleza
No más que tu pureza
Lo digo con ternura
Me encanta tu dulzura.

Cada vez al mirarte
No dejo de exclamarte
Lo bello y vitalizante
Que es tu mundo fascinante.

LE JA
Útz kinwil ri j’el apetik
Rumal ri asaqil
Kinb’ij ruk’ chuch’jal
Sib’alaj kwaj ri a k’al.

Ronajel le q’ij chi’ ka’tinwilo
Loq’ ta chik kinya’ kan rilik
Ri aje’lik xuquje’ ri k’aslik
Are b’a wa’ nimalaj ak’olb’al.
The situation in Guatemala
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• Internet cafes fairly common, home computers not
The situation in Guatemala

- Internet cafes fairly common, home computers not
- Cellphones everywhere
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- In order to benefit from the Digital Revolution, Mayan language communities need
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- In order to benefit from the Digital Revolution, Mayan language communities need
  - Access to technology
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  - Access to technology
  - Literacy in their mother tongues
  - Many more documents online
  - Ways to interact with speakers of other languages
$L^3$ and Mayan languages: short-term goals
L³ and Mayan languages: short-term goals

- Morphological parsers and generators for four largest languages (K’iche’, Kaqchikel, Mam, Q’eqchi’)

L³ and Mayan languages: short-term goals

• Morphological parsers and generators for four largest languages (K’iche’, Kaqchikel, Mam, Q’eqchi’)
• Translation of simple sentences in a narrow content domain among these languages.
Thank you!
¡Maltyox!
¡Matyox!
¡Chjonta!