Joint UNESCO and ITU
Global Symposium on Promoting the Multilingual Internet

Measuring Linguistic Diversity Through The Language Observatory

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Language Observatory Project

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Questions to Ponder

- How do we measure linguistic diversity on the Internet?

- How does the **Language Observatory** based at Nagaoka University of Technology, Japan measure linguistic diversity?

Lead Questions on Measuring Language Diversity

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- What are the most important indicators for measuring multilingualism in cyberspace?
- What measures are needed to build an internationally comparable indicator system?
- Who should be the main actors in data collection and analysis?
- What measures are needed to build statistical capacity-building at country level?
  - From Measuring & monitoring language diversity at Multilingualism for Cultural Diversity and Participation for All in Cyberspace at Barmako, Mali on 5-6 May 2005.

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Multilingual IT Implementation

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- Input & Output System
  - Voice
    - Voice recognition
    - Voice Synthesis
  - Text
    - **Character recognition**
    - Keyboard Layouts
      - **QWERTY / Localized keyboards**
  - Multimedia
- Knowledge Representation
- Text Processing
  - Search Engines
- Etc… the list goes on

IT Standards For MLIT. E-Business, Etc

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Multilingual Linguistic Issues

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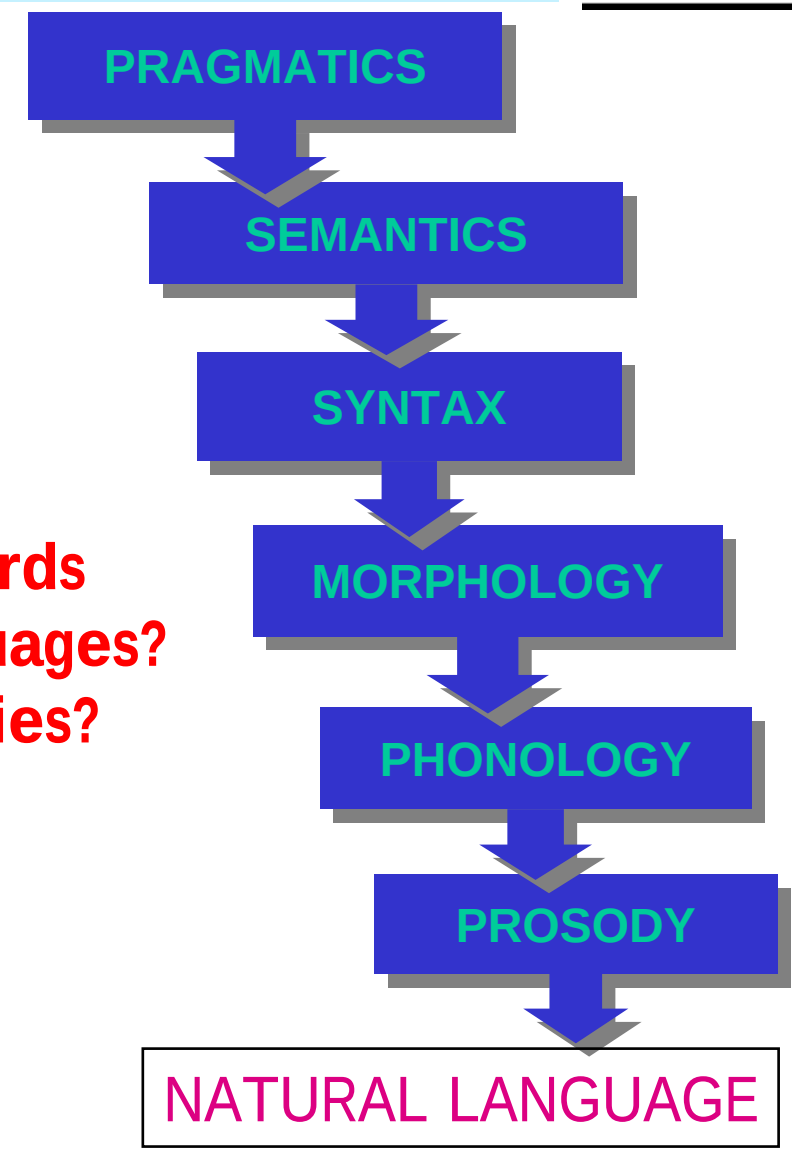
- Language Writing Systems
- Language Scripts
- Character Coding
  - ASCII / Extended ASCII
  - UNICODE / ISO 1046
- Character Sets
  - Fonts & Glyphs
- Dialects
- Computational Linguistics
- Terminology
- Etc… the list goes on

Standards For Languages? & Policies?



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Diversity of World Languages

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- UNESCO celebrates International Mother Language Day (21 Feb/Year): "to honor **6,000** Mother Languages currently spoken in the world"
- ISO 639 gives **440** language identifiers
- Universal Declaration of Human Rights (UDHR) is translated into **327** world languages
- Windows-XP handles **71** languages*
- **Google** returns pages written in **35** languages*
- Unicode 4.1 only defines 96,000 characters

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note: *language count is based on UDHR language names.

Language Endangerment

- Many languages are in danger of extinction in the physical world and virtual world
- Many languages are not even born on the Internet although widely used orally
- Insufficient Multilingual Info-structure
  - More than 80 known languages character sets are still not incorporated in Unicode
    - Script Encoding Initiative
- Literacy and IT Literacy
- Digital Language Divide

Language Observatory Project - Initial Research Questions

- Language Observatory tries to catch subtle messages of less spoken languages, as far as they appear in the virtual universe, and provides such information as:
  - **How many languages are found in the virtual universe?**
  - **Which languages are missing in the virtual universe?**
  - **How many web pages are written in any given language?**
  - **How many web pages are written using e.g. Arabic script?**
  - **What kind of character encoding schemes (CES) are employed to encode a given language, e.g. Khmer?**
  - **Is there any de facto CES standard for any given language?**
  - **How quickly is ISO/IEC10646 or Unicode spreading and replacing conventional single byte encoding schemes on the net?**
- **NOTE**: the **Language Observatory is not a search engine, but an observation instrument**.

Language Observatory Project

Members

- Nagaoka University of Technology (NUT)
- Tokyo University of Foreign Studies (TUFS)
- Keio University
- *Universiti Teknologi Malaysia* (UTM)
- *Universita Degli Studi di Milano* (USM)
- Miskolc University, Hungary
- Thai Computational Linguistics Laboratory (TCL), National Institute of ICT (NICT), Thailand
- Technology Development of Indian Languages (TDIL), Department of IT, India
- Supported by Japan Science & Technology Agency & UNESCO

Language Observatory
Operations

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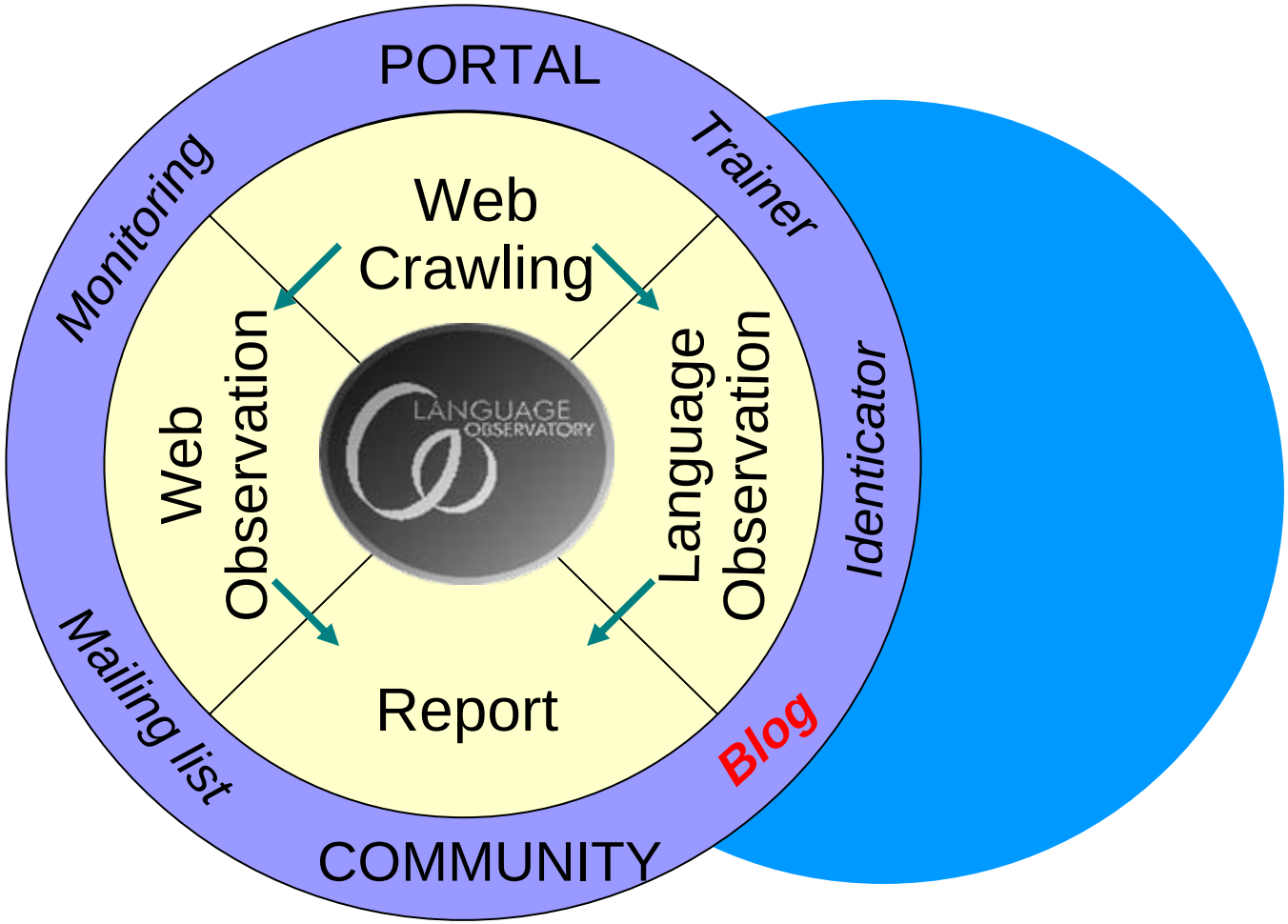

For More Info Please Look At:
www.language-observatory.org

What Kind of Reports Are Produced?

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- The Language Observatory regularly publishes the following 3 reports.
- **1. The Cyber Census Report:**
  - This report reveals the activity level of all the languages observable on the web pages of the Internet.
  - It contains statistics on;
    - number of pages and bytes by language
    - number of pages and bytes by script
    - number of pages and bytes by character encoding scheme (CES)
    - relative share in the cyberspace by language

What Kind of Reports Are Produced? Cont..

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2. The CES Report:

- The report describes what kind of character encoding scheme (CES) is employed to encode each languages and scripts.
- Although most pages on the Internet are encoded by widely known CES, some pages are encoded by locally developed "fonts" to represent local languages.
- These locally developed fonts are not just a font, but a kind of implicit character encoding scheme.

3. The Corpus Statistics Report:

- The report gives various statistics of text data. Statistics includes;
  - Single byte/character distribution for given CES text
  - Two bytes/characters distribution for given CES text
  - Three bytes/characters distribution for given CES text
  - Single word distribution for given language/script text

Relevance of the Reports

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- To reveal actual usage of languages in the virtual universe
  - to assist policy makers, international organizations and governments to understand the real situation of unbalanced usage of languages in cyberspace.
- To assist ICT developers and policy makers to understand the technical problems behind "Digital Language Divide".
  - To enable Technical specifications of observed Implicit CES be developed to assist development of converters.

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Where Is Unicode Used?
Asian & African Summary

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	Asia except CJK	Africa
# of ccTLDs	46	60
date of survey	September 2005	December 2005
# of domains (servers) visited	33,694	182,671
# of domains with at least one Unicode page	5,008 (15%)	9,184 (5%)
# of unique pages collected	43 million	77 million
# of pages using Unicode	5.6 million (13%)	6.6 million (11%)

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Where Is Unicode Used?
by ccTLD, Asian Domains

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Unicode documents on web servers in Asian TLDs (1)					
TLD	Unicode docs (%)	Unicode domains (%)	TLD	Unicode docs (%)	Unicode domains (%)
ae	38.4	18.6	ir	55.4	64.3
af	49.6	10.3	jo	30.1	10.1
az	18.8	34.2	kg	9.5	0.8
bd	51.1	8.3	kh	1.7	5.6
bh	0.6	6.9	kw	4.3	17.2
bt	5.4	15.4	kz	14.5	11.4
cy	5.0	17.9	la	0.2	5.4
id	6.3	13.3	lb	14.7	17.7
il	5.9	11.4	lk	31.3	19.5
in	31.2	24.6	mm	0.2	8.7

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Where Is Unicode Used?
Asian Domains (cont.)

Unicode documents on web servers in Asian TLDs (2)					
TLD	Unicode docs (%)	Unicode domains (%)	TLD	Unicode docs (%)	Unicode domains (%)
mn	14.0	18.0	sg	21.3	20.4
mv	0.2	3.2	sy	6.1	9.1
my	14.4	14.4	th	4.0	13.2
np	48.7	14.7	tj	71.7	13.0
om	3.1	15.2	tm	48.5	8.1
pg	0.3	3.4	tp	3.4	9.4
ph	20.6	15.3	tr	5.6	9.4
ps	4.7	19.0	uz	3.0	3.7
qa	12.3	15.8	vn	69.1	74.5
sa	13.6	21.7	ye	0.9	10.6

UTF-8 Usage
by ccTLD in Asia

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ccTLD	K pages	UTF-8
vn	1,556	70.55%
ir	516	57.14%
np	94	50.81%
bd	55	45.26%
lk	149	35.78%
mm	33	31.49%
ae	283	28.97%
in	1,463	24.04%
az	175	21.47%
ph	827	18.99%

ccTLD	K pages	UTF-8
sg	1,577	18.24%
pk	348	15.29%
mn	277	12.68%
my	1,932	11.66%
id	656	7.85%
il	15,197	5.82%
th	5,495	4.17%
kh	29	1.63%
la	198	0.09%
accessed Sep. - Oct. 2005		

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source: Language-Observatory

End of presentation…

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Terima kasih…..

Merci

Domo arigato gozaimasu

Syukran

THANK YOU…

"In the galaxy of languages, every word is a star."
… UNESCO

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