

Inclusive AAC Multi-modal and Multilingual Language Support for AI

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Overview



- 1. AAC general state of the art
- 2. Why AAC is, and should be, going mainstream on standard ICT platforms
- 3. Preconditions for inclusive AAC support in mainstream ICT
 - 1. Some history
 - 2. Now and future perspectives
- 4. The AEGIS Project Developments
- 5. Conclusions
- 6. References





Why AAC is, and should be, going mainstream on standard ICT platforms

Baseline: AAC as special / dedicated software and devices ... and now what?

- Mainstream ICT platforms part of everyday life, increasingly suitable for multi-modality and AAC
- Previous AT, such as TTS, going mainstream
- Infrastructure of flexible multi-modal and multilingual language representation technology – needed for good AAC support
 - substantial advantages of going mainstream
 - → inclusion, participation,
 - covering wider needs early literacy and language learning
 - → cost and availability in particular where resources are scarce
- Now happening on different levels mobile AAC apps, Widgit "Point" and "Insite" (proprietary), CCF (free software)

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Preconditions for inclusive AAC support in mainstream ICT

- Infrastructure for inclusive and integrated graphic symbol (and signing) representation of content and meaning in standard software environments
- These infrastructural tools need to be based on
 - open standards
 - be widely and freely available
 - be multilingual and multi-modal by design
 - so that more language representations may be added and maintained subsequently and in a distributed manner by local stake-holders
 - so that the resources may be accessed and used by/with all kinds of software applications and services
 - baseline of free language resources, symbol sets, etc.







Some history – previous attempts:

Comspec/ComLink, Access – ITHACA ... → The Comspec example:

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Technical issues:

- E.g. chat and messaging protocols are not supporting graphics or other non-text representation
 - How may such limitations be overcome to allow future multi-modal communication also via these channels?
 - Examples of options to overcome these restrictions:
 - add support for graphics in (some of) these standards
 - support for some graphic libraries packaged as standard and/or private area Unicode fonts (black & white limitation – AEGIS-CCF example)
 - semantic meta-data encoding that is decoded at the receiving side

AAATE 2013, Vilamoura, Portugal



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Hindrances for inclusive AAC support in mainstream ICT - 2

Other issues:

- Attitudes and predominance of proprietary resources
- Lack of well established open standards and resources for multi-modal and multilingual vocabulary interoperability
- major task in coming years to address these challenges to improve the preconditions for progress
 - CCF based developments (within and outside of AEGIS) may serve as a platform and inspiration for further European and international co-operation and standardisation
 - We suggest that such work should be linked to developing international frameworks like "Raising the Floor" and "GPII" (Global Public Inclusive Infrastructure)

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Inclusive Multi-modal Language Support The Concept Coding Framework (CCF)





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The CCF-SymbolServer and Its Ecoystem





The CCF-SymbolServer – and the LO/OO CCF-SymbolWriter extension



solid-hoofed herbivorous quadruped domesticated since prehistoric times

input: horse

The CCF-SymbolServer's GUI window, running locally on a desktop system – here in a verbose configuration







Symbol Supported Writing and Reading in LibreOffice/OpenOffice *Writer*



Writing and reading with symbols displayed outside text – to help comprehension and spelling



- No symbol insertion in text: The CCF Symbol Server displays looked-up concepts and symbols (ARASAAC + Bliss) as words are written, and/or as the text cursor is moved in the text
- Multilingual automatically changes look-up language according to document language (currently en, sv, es, nl)

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Writing with full AAC (Blissymbol) support

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Writer with CCF-SymbolWriter (in Insertion mode) and SAW





SAW 6 in CCF editing mode

 ECT-SymbolServer (ver 20120421-1237, port:12. 	2345, propaganda port: 8899)	
input: angry en	en aras,bliss angry · 🗌 Move	
http://www.conceptcoding.org/ontologies/2009/09/01/Bas http://www.conceptcoding.org/ontologies/2009/09/01/Con feeling or showing anger	aseReferenceOntology#BRO-300113818-3000	
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$\leftarrow \rightarrow$	OK Cancel	
	OK Avbrvt Verkställ Hiälo	

... retrieving symbol representations by word-to-concept-to-symbol look-up via the CCF-SymbolServer (upper window)

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Helpers producing symbol material



Mixed mode document – b&w symbol fonts, as well as colour graphics insertion in text

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Users in action

From Anna (tutor – in translation) "Hi!

I've tested the OpenOffice ext with one of our students who comes to our school here once a week. She was so happy when she could use her SAW on-screen-keyboard to write with blissymbols..."

To the right, the attached first produced blissymbol and text document "Natalie goes to a party" (variation over Cinderella)

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User at home with SAW + LO/OO Writer



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CCF-SymbolDroid mobile AAC app enables the user

- To create symbol messages for direct person-to-person communication – using the standard text-to-speech (TTS) installed on the Android device
- To communicate remotely via

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- Text messaging (text only later possibly with symbol font)
- Email (currently text only later possibly with symbols)
- directly with symbols to other registered users via a dedicated webserver.
- Current support for en, sv, es, nl, Bliss and ARASAAC more and better language and symbol representation support is envisaged
- Will be compatible with the **Tecla Access** app and **Tecla Shield** hardware for alternative input for persons with physical limitations



The CCF-SymbolDroid Mobile AAC App



The CCF-SymbolDroid AAC app in runtime mode

- 2 home screens with ARASAAC and Blissymbols
- 1 sub screen with Blissymbols

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The CCF-SymbolDroid Mobile AAC App



The CCF-SymbolDroid AAC app in setup & edit mode

- 1 setup screen to set up the user ID and language options for the communication with the online CCF-SymbolServer
- 2 edit time screens looking up Blissymbols for a sub screen, and displaying CCF representation management options

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CCF server port 8899	>·· here	>·· here
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Preffered symbol language	the transformed to the transfor	Translate to ARASAAC
Bliss	home internet cinema needle	Translate to Bliss
Default word language en	< here	Translate text
History Forget OK Cancel		Replace text



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The Nysnö Web Service Prototype

→ In the Nysnö web service screen-shots below, a short text has been sent to the online CCF-SymbolServer which has sent back symbol representations in ARASAAC and Bliss.

Nysnö	Nysnö
Symbolstödd nyhetstext på webben	Symbolstödd nyhetstext på webben
Hem Om Nysnö Kontakt	Hem Om Nysnö Kontakt
Här kan du få en text översatt till symboler. Välj vilket språk texten är på och vilket symbolstöd du vill ha. Du kan gå till 8 sidor för att hämta din artikel eller skriva din egen text. Tryck på översätt när du har en text i rutan.	Här kan du få en text översatt till symboler. Välj vilket språk texten är på och vilket symbolstöd du vill ha. Du kan gå till 8 sidor för att hämta din artikel eller skriva din egen text. Tryck på översätt när du har en text i rutan.
Jag och du måste nu.	Jag och du måste nu. .:: Bliss V Gå till 8 SIDOR Översätt
Jag och du måste nu	





Conclusions:



- The work to integrate the CCF technology, as well as the graphic language of Blissymbolics, as part of the ISO TC 37 multi-modal terminology standards, was initiated within AEGIS. The work continues.
- The general maintenance of the CCF vocabulary resources is a long-term commitment to further refine the support for the current languages and representational resources, and to subsequently add new ones.
- Cooperation and discussions with CLT (the Centre for Language Technology) in Göteborg, and Språkrådet (the national Swedish Language Council) and others, with the ambition to bring the CCF technology in under the umbrella of mainstream LT resources
- The CCF related software implementations of the AEGIS project are being slowly but continuously developed further.
- This will contribute to providing a new and free basic level support for access to text content, and a new and wider range of opportunities to communicate for people with communication difficulties in a more inclusive environment – and in general to AAC methodologies and tools to continue going mainstream.
- A European project focused on these specific goals would be motivated.

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References – links:



- Concept Coding Framework (CCF): www.conceptcoding.org



- www.aegis-project.eu
- www.oaeg.eu
- www.raisingthefloor.net
- http://gpii.org

- www.oatsoft.org



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- SAW Special Access to Windows www.oatsoft.org/Software/SpecialAccessToWindows
 - BCI -Blissymbolics Communication International www.blissymbolics.org
 - ARASAAC www.catedu.es/arasaac/
 - AEGIS Accessibility Personas
 - AEGIS Demonstrators / Downloads
 - Tecla Access http://scyp.idrc.ocad.ca/projects/tekla
 - http://projects.gnome.org/accessibility
 - White Paper on Mobile Devices and Communication Apps from AAC-RERC (2011) http://aac-rerc.psu.edu/index.php/pages/show/id/46
 - Widgit www.widgit.com/

Acknowledgement. The development of the CCF-SymbolServer, with the CCF-SymbolWriter extension for LibreOffice/ OpenOffice Writer, the CCF symbol support in SAW 6, and the CCF-SymbolDroid AAC app on Android, have been made possible with the financial contribution of the European Commission in the context of the AEGIS project

More references:



D. Svanæs, Comspec. A Software Architecture for Users with Special Needs (1993), InterAct'93 and Chi'93 conference companion on Human factors in computing systems, ACM

Comspec/ComLink: http://www.handicom.nl/en/projects/Comspec.html, and: http://www.javakomp.nu/infosidor/comlink-en.html

M. Lundälv, D. Hekstra, E. Stav, Comspec, a Java Based Development Environment for Communication Aids". TIDE conference in Helsinki, 1998.

M. Antona, C. Stephanidis, G. Kouroupetroglou, Access to Lexical Knowledge in Modular Interpersonal Communication Aids, 1999. http://www.ics.forth.gr/files/publications/antona/1999/Antona_et_al.pdf

ITHACA: http://speech.di.uoa.gr/ithaca/framework.html

A. Pino, G. Kouroupetroglou, ITHACA: An Open Source Framework for Building Component-Based Augmentative and Alternative Communication Applications (2010),

http://www.researchgate.net/publication/215205140_ITHACA_An_Open_Source_Framework_for_Building_Component-Based_Augmentative_and_Alternative_ommunication_Applications/file/d912f509a7fe13e93b.pdf

K. F. McCoy, P. Demasco, Some Applications of Natural Language Processing to the Field of Augmentative and Alternative Communication (1995), http://www.eecis.udel.edu/~mccoy/publications/1995/McCoDema95.pdf

The World Wide Augmentative & Alternative Communication project (IST-2000-27518 WWAAC): http://www.wwaac.eu/

A. Judson, N. Hine, M. Lundalv, B. Farre, Empowering disabled users through the Semantic Web. In Proceedings of First International Conference on Web Information Systems and Technologies, (WEBIST 2005), Miami, USA (pp. 26-28).

M. Lundalv, A. Judson, B. Farre, L. Nordberg, L. de Waard, Deliverable D10 - "Code of Practice" (2004), http://www.wwaac.eu/products/Docs/D10_v10%20CoP.pdf

AEGIS - Accessibility Everywhere: Groundwork, Infrastructure, Standards (2008-2012),

www.aegis-project.eu/ - co-financed by the European Commission's 7th FP

[White Paper on Mobile Devices and Communication Apps from AAC-RERC (2011)

http://aac-rerc.psu.edu/index.php/pages/show/id/46

Widgit - www.widgit.com/

M. Lundälv, S. Derbring, L. Nordberg, A. Brännström, B. Farre, Graphic Symbol Support in Open/LibreOffice Shaping Up - Graphic Symbol Server and Inline Symbol Font Display Based on the CCF :

www.slideshare.net/aegisproject/conference-proceedings-2011-aegis-international-workshop-and-conference



