Crafting next generation of language documentation tools

A year of engineering

Mat Bettinson - the University of Melbourne
Introductory Context

Digital tools

- Rising awareness of the need to invest in new collaborative software (Thieberger, 2016)

- *Towards language Documentation 2.0* @ ICLDC 4 offered several thought experiments to imagine new capabilities including ‘network fieldwork’ (Bettinson, 2015)

- The last two years since ICLDC 4 have seen spectacular technological change which is highly relevant to how we set about building the next generation of digital tools
Aikuma
Quick recap

- *Aikuma* is a native Android app for recording, respeaking and translating oral narrative
- *Aikuma* is also an umbrella project for research into digital tools to deliver language documentation at scale
- In 2011, the ‘native’ mobile app was the only feasible way to build an app
Web Technologies
A new way to build software

- Traditional ‘native’ software development -> platform-specific apps, c.f. SIL’s tools
- Web sites are platform independent but they usually don’t work offline
- There has been a global movement towards apps built from web technologies (WT), e.g. JavaScript + HTML.
- The modern web app replicates the look and feel of native applications
The next generation?
Features of next-gen tools
- Collaborative
- Online and *offline* aware
- Cross-platform
- On mobile devices
- Unified data model

<table>
<thead>
<tr>
<th>Feature</th>
<th>Trad. installed</th>
<th>Trad. Web</th>
<th>Next-gen WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Online &amp; offline</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Cross-platform</td>
<td>Sometimes</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>On mobile</td>
<td>✓ (not cross-platform)</td>
<td>✓ (not offline)</td>
<td>✓</td>
</tr>
<tr>
<td>Unified data</td>
<td>✗</td>
<td>✗</td>
<td>?</td>
</tr>
</tbody>
</table>
Research questions
Things we learn by doing

- Are web-technologies suitable for building the next-generation of desktop and mobile tools?
- How may we build a set of re-usable language-specific components?
- What is the research potential of new methods of engaging participants with mobile apps?
- How can we enable direct design from quasi-developers? (such as tech-savvy linguists)
- What is an effective model for participatory development with communities?
Three New Apps
A year-long deep dive into development*

* Or a year of not writing a thesis, as Nick would say
Aikuma-NG
A transcription app for laypersons

- **Problem**: Transcription software is difficult to use & platform specific, even for widely-performed tasks like making captions for videos

- **Audience**: Laypersons (community members), research participants and more

Adapted from John Hatton @ ICLDC 3
**Aikuma-NG**

Available on the Chrome Web Store
Aikuma-NG
Engineering in the field

- Transcription apps are a well-known case
- Building an app to be used by community members is an entirely different story...
Aikuma-NG
Integrating oral-based workflows (BOLD)
Aikuma-NG

Key findings

- Hypothesis confirmed: Next-gen tools should be built with WT!
- Ridiculously fast-moving tech: App tech stack is obsolete already!
- Ease-of-Use: Unless most people will use it then you shouldn’t see it. ‘Tags’ is an example of a flexible UI concept.
- Adopt & adapt from prior exemplars, e.g. Elan, SayMore etc.
- Engineering in the field: no plan survives contact with the enemy participants. See this as an opportunity.
- Lack of engagement from users, must be pro-active in soliciting feedback.
Aikuma-NG
Related & next-steps

- The Center for the Dynamics of Language (CoEDL) Transcription Acceleration Project (TAP) aims to employ machine learning to accelerate linguistics transcription.

- Another project will see an Aikuma-NG inspired tool built for Alveo research archive: http://alveo.edu.au

- Aikuma-NG’s successor for laypersons is not clear. It should be re-made as a Progressive Web App and under stewardship of an organization.

...oh look!
Aikuma-Link
Remote collaboration

- **Problem**: Researchers can’t easily collaborate with participants after returning from fieldwork
- **Audience**: Linguistic researchers, students etc.

Aikuma-Link stems from the thought experiment offered in *Towards Language Documentation: Imaging a Crowdsourcing Revolution* (Bettinson, 2015) @ ICLDC 4.
Aikuma-Link

Key findings

- Multimedia activities can be performed even on fairly low-end phones 😊
- Mobile UI design requires considerable attention to issues such as screen size and orientation 😞
- Link-based onboarding is enormously promising! 😊
- We need to find better models for data exchange between components 😞
- Further work: More interaction design on mobile activities based on touch and voice rather than typing (particularly in consultation with linguists)
Components
A quick diversion...

- Some components are common to language apps
- We sought and found an effective way to build reusable components
- Someone building an app can use a component that has been significantly refined:
Zahwa
Mobile app for social recipe documentation

- **Problem:** Documenting procedural discourse is difficult and there are few ways to share and promote traditional practice.
- **Audience:** Laypersons (community members), research participants and institutions such as schools.

- **Challenge:** Building an app for someone other than yourself!
Problem

What problem do you want to solve?

Suppose that someone wants to prepare a traditional recipe from their heritage, but does not remember the details or have access to a published version of the recipe. They want to reconnect with their family and to advise. They have a recipe that they passed down through the generations, but don't have the required ingredients, in order to see the approximate ratios. A picture of the process would be helpful also. Plus an audio recording of someone explaining the process.

Personas

Describe the key people who are involved. Make up some names. Discuss their motivations.

Taos left the village of her childhood when she was 8. Now she is 23 and lives in Algiers with her family and studies at the university. When she is in the dorms she cooks meals with other young women. One time while preparing food they were talking about their childhoods and Taos, her grandmother’s delicious cooking. Because they had similar experiences, the young women decided to collect and share these traditional recipes. Next holidays, Taos is visiting her grandmother, and decides to photograph the stages of preparing each recipe. (YOUNGER PERSON)
Simple playback UI

Swipe to seek
State-based workflow
Phrase-aligned translation

Non-trivial support for portrait and landscape orientations
Zahwa
Key findings

- Adopting the Ionic mobile/PWA framework allowed us to concentrate on our unique components 😊
- This technology stack allows us to easily spin up a new minimal app with a suite of common language-data related components*
- **Further work:** We require a common linguistic data API to facilitate inter-component and inter-app communication...

... described in more detail in *Developing a Suite of Mobile Applications for Collaborative Language Documentation* (Bettinson, Bird, 2017) at ComputEL-2 next week;
11AM Tuesday, Campus Center, Room 203E (CC203E)

* Example bare bones app made for the CoEDL TAP workshop: [https://github.com/Lingomat/WeWrite](https://github.com/Lingomat/WeWrite)
Thanks for listening!

Mat Bettinson
mbettinson@unimelb.edu.au
@sinomat

https://zahwa.aikuma.org

Related research: http://www.aikuma.org/research.html

Technical aspects of this research at ComputEL-2:

*Developing a Suite of Mobile Applications for Collaborative Language Documentation* (Bettinson & Bird, 2017)

11AM Tuesday, Campus Center, Room 203E (CC203E)