



Project factsheet information

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Partner organizations	Janastu, Bangalore
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Project summary	<p>People who are not educated enough, among other reasons, to be comfortable with browsing text can be termed as <i>print-impaired</i>. We propose investigations into web-accessibility for print-impaired with an aim to develop guidelines on authoring web pages. We then identify and demonstrate the feasibility of a model, a web-framework, which can exploit the authoring guidelines to help localize web-content to the print-impaired. We call this project Alipi, meaning the analphabet.</p> <p>Internet has reached over 1 billion people now. Web content is text heavy and requires people to be comfortable reading text authored in alien contexts. The next large segment of people who will soon have access to the Web, through mobile phones or other devices, are likely to be relatively more print-impaired. We estimate that in India alone there are a billion people who are not comfortable reading the web content either due to illiteracy or simply due to estranged nature of much of the web-content. We model a web-framework for a re-narration web that can assist in pulling up more accessible narrations of the content that suits user's literacy and locality profile. We then develop a supporting tool set and demonstrate the feasibility and the utility of this web-accessibility proposal. We now aim to initiate a process of engagement with government bodies and the World Wide Web Consortium on Alipi guidelines for authoring web pages that facilitate re-narration.</p>



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Project Summary

The problem addressed by this project, is the issue of web-accessibility for the print-impaired in the Web 2.0 era. By print-impaired, we mean a large class of people who cannot read the web content due to illiteracy, partial literacy or language issues. It is especially important to address this segment now, since they are likely to attain physical access to the Internet via mobile devices in the near future.

Our proposal was initially to look at W3C¹ WAI-ARIA² recommendations and look into recommendations on similar lines for print-impaired web-application users. As ARIA investigations started, we noticed that the print-impaired did not fit into the existing WAI categories of disabled people, as they are not disabled physically. This lead to possibility of the development of a web-framework that would serve as a “re-narration web”. After basic prototyping work, we have developed a specification; a supporting tool set and several samples of demonstrative content that would indicate, for example, that various government web pages could have the potential of reaching millions of people who are print-impaired.

¹ World Wide Web Consortium, www.w3c.org

² Web Accessibility Initiative (WAI) - Accessible Rich Internet Applications (ARIA) <http://www.w3.org/WAI/intro/aria.php>



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The initial prototyping work and investigations on WAI-ARIA took us 4 months. The next 10 months have been the process of experimentation, tool-set development and specification drafting. Towards the completion of this project time-line we have begun the process of a dialog with organizations working with domestic workers (mostly print-impaired), local Kannada language web-portals and the W3C to help evaluate and adapt Alipi tools and guidelines.

Justification

Servelots has been working, for over a decade, on the information management needs of small organizations who work on community issues. This includes managing web sites and development of an open source web-application framework to cost-effectively provide information-management applications, e.g., to NGOs and schools, which are customizable by these organizations. Often, one aspect of such customization issue is content delivery to semi-literate people involved with the organization.

In developing countries like India, in addition to the visually impaired there is another significant segment of the population, namely the insufficiently literate, who are also a large target community for provisioning screen reading of content. This segment would however benefit from a visually rich application that helps with respect to navigation of a web site while “reading out” the content. Furthermore, a web-scale methodology and a tool for creating and managing locally relevant content are also needed. Local content is relevant for addressing real and up to date information needs.

The Integrated Pastoral Network is an example of a group of people and organizations that work with millions of rural and nomadic shepherds who are print-impaired, i.e., without-alphabet (i.e., “Alipi³”). Organizations who work with domestic workers are another example, as domestic workers in India are likely to be print-impaired. With the influx of mobiles among these people, we can foresee increased access to the Internet and that in a short few years they are likely to upload audio, video and pictures to the web. Our proposal indicated a desire to see that the web-content can be rendered accessible to communities such as these.

Project objectives

The objective of the proposal is an investigation into approaches that help the print-impaired access the web pages that are often dominated by text.

³Alipi - “Lipi” is alphabet and aLipi are the un--alphabeted (i.e., the analphabet). Thus, Alipi is the short name for the proposed model for Web Accessibility for the Print-impaired.



In our initial project proposal, we had mentioned the following as our objectives:

1. Understand the scope and extent of WAI-ARIA standards in the context where communities configure their own Web application.
2. Provide an open source accessibility standards-conforming Web 2.0 development platform for content and data management on the Web that reflects on experience of both visually handicapped and the rural semi-literate.
3. Simultaneously content provision -both for visually handicapped and illiterate who demand a visually rich navigation- during both the development of their application and its deployment for others.

Although, we started work on these objectives, we have later on done groundwork on *Alipi* as a model and a guidelines proposal to help address the issue of web-accessibility for the print-impaired. The above objectives have therefore morphed respectively into these three objectives:

- a. Propose guidelines that can become a first set of standards for authoring web pages so as to aid the accessibility for print-impaired.
- b. Provide an open-source tool-set that illustrates how pages that conform to such authoring guidelines can be exploited through content re-narration by community engagement, which further allows context specific rendering of content for the print-impaired.
- c. Study the co-existence of both the WAI guidelines for visually handicapped and Alipi guidelines for the visually able but print-impaired during the authoring of the web-pages and their context specific print-impairment friendly rendition of the content.



Project implementation

Project objectives	Activities	Time required for activities implementation	Overall assessment
1. Understand the scope and extent of WAI-ARIA standards in the context where communities configure their own Web application.	WAI-ARIA readings and incorporating WAI-ARIA into Pantoto Communities software	Mar 2010 to July 2010	Pantoto Communities software is open source and familiar to the project team. This software was modified to incorporate WAI-ARIA standards so that every instantiation meets the standard. As our goal was to investigate how WAI-ARIA could be extended to include the print-impaired, we hit a roadblock of sorts as there were no reference W3.org standards for inclusion of print-impaired.
	Alipi – Ground work to study web-accessibility for print-impaired	June 2010 to October 2010	Start an investigation of Alipi – a web-framework for re-narration web. An enthusiastic brainstorming few months that helped us consolidate on the workings of Alipi
	Alipi – prototyping and documentation of guidelines	March 2011 to July 2011+	A reference document and a toolset is available that can help the larger community experience the re-narration web.
2. Provide an open source accessibility standards conforming Web 2.0 development platform for content and data management on the Web, which reflects on experience of both visually handicapped and the rural semi-literate.	Revisit Pantoto communities open source software with WAI ARIA in mind.	May 2010 to July 2010	The work with trying to re-code Pantoto communities software so that WAI-ARIA can be extended to deal with print-impaired was illuminating as it lead to a road block in understanding who could enable the print-impaired, in a rich Internet application context
	Alipi toolsets	Feb 2011 to July 2011	Open source versions of Alipi tool sets that can illustrate the re-narration web possibility. There is still some effort to demonstrate that accessibility for visually impaired can ride on Alipi recommendations. However, we can foresee that it is possible.



Project objectives	Activities	Time required for activities implementation	Overall assessment
3. Simultaneously provisions both for visually handicapped and illiterate who demand a visually rich navigation, during both the development of their application and its deployment for others.	Use case studies: 1. Domestic workers rights (minimum wages act) 2. Fire safety web page that renders itself differently for different users such as mobile users, non-English speakers and people who cannot read.	Jan 2011 to July 2011	The web pages now follow WAI guidelines and therefore render themselves to visually impaired as well as to print-impaired via Alipi. However, visually impaired can now also utilize Alipi provisions and visit sites that would otherwise not be available for them. Alipi guidelines do not conflict or contradict the WAI guidelines and do not affect the assistive technologies that are already in use. However this needs a further study with communities that are affected. We ran short of time to engage visually impaired in authoring or experiencing Alipi tools.

Statement of Alipi

Alipi work as outlined here has three sections that describe the model and a section on implementation related work.

A1 Accessibility guidelines for the print-impaired

The W3C WAI recommendations discuss accessibility issues and address them by providing accessible design solutions such as a text equivalent for images and other multimedia content to make it accessible for visually impaired users; or a non-text equivalent for text targeting a deaf audience for instance. However, the need of Alipi in addressing accessibility is different. Print-impaired users are people able to use their vision and their hearing capabilities, but have difficulties accessing written text. A non-disabled user navigates within the web page and understands its structure instantly by relying on image connotations or paragraph titles for example. It is however frustrating for a print-impaired user to use assistive technologies such as content readers in order to understand the page structure:

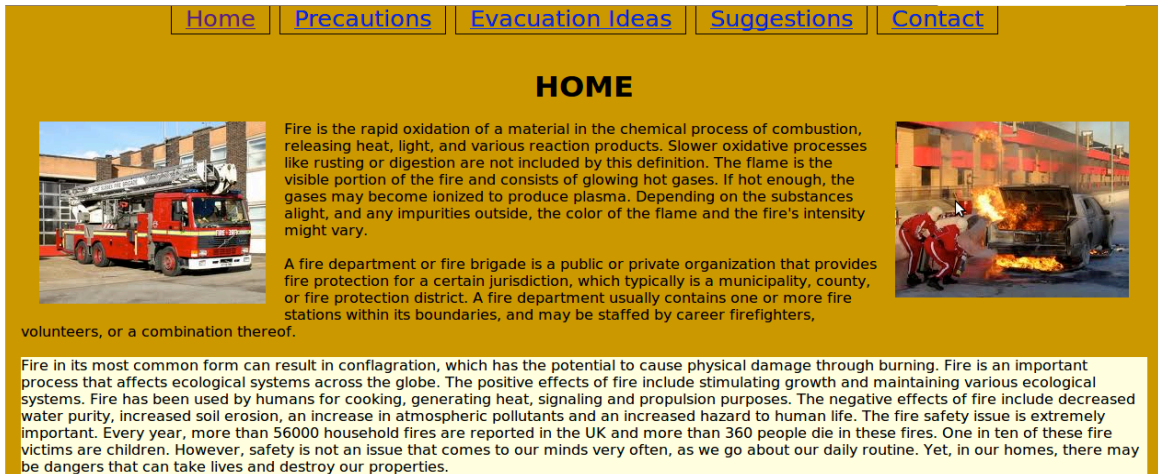
Using an auditory description is not adapted to their needs since they can see and would rather rely on their vision than their hearing. Another barrier is the language. In fact, if the spoken/written language were not familiar to the user, it would not help them understand what is going on. Thus, the idea of Alipi accessibility guidelines is to allow a lay out a web



page's content in a certain way that allows print-impaired users to understand its structure by indicating connectedness of fragments in a page.

A1.1 Associations

As mentioned above, Alipi indicates the structure of a web page and explicitly defines the relationship between fragments of its content elements. The screen-shot below, from the fire safety page (c.f http://a11y.in/a11ypi/idea), represents one example of how to make obvious these relationships. Here, as a user points to the "fire image", a fragment of the page text that is associated with this image is highlighted. This association can be utilized by, for example, a text to speech tool such as a screen reader to read the text associated to the image. In the next section, we will see other ways in which these associations can further assist the case of print-impaired.



These relationships can be established by several HTML techniques. Here we indicate a simple technique called the **id-class method** that we use to mark-up these associations.

Id-Class Method

The Id-Class (or HTML tagging) method consists of using simple HTML attributes to add some sort of meta-information to the content of a web page. It is a simple solution to relate objects in a page inspired from the CSS classes. A same style can be applied to various



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elements, possibly completely unrelated, by adding the same class attribute to these elements. And this is very similar to the project’s goal.

The only idea missing is to relate some elements to another element like an image or a title. To this end, the id attribute also natively present in HTML can be used. Following this method, a group of elements with the same class name can be related in a semantic way to a unique element in the page⁴. The following mark-up (see box below) shows that image of fire brigade that is identified by “image1” id is also effectively labelled as “asso0”. Now notice that there is a fragment of text that is labelled as belonging to class called as “asso0”. This utilization of HTML id and class effectively indicates the associations that we need.

```
<body> <div id="asso0" class="header">

</div>
<div id="div1" class="header asso0">
A fire department ... thereof.
</div>
</body>
```

This association only says that elements are related. It does not, by itself, give any information about how the elements should be rendered in the browser. Thus, using the Id-Class, several items can relate to one object by using its “Id”. Within the same page, this relationship is straightforward. To link resources on different pages, namespaces are to be utilized. In other words, the Id-Class association can extend beyond a page:

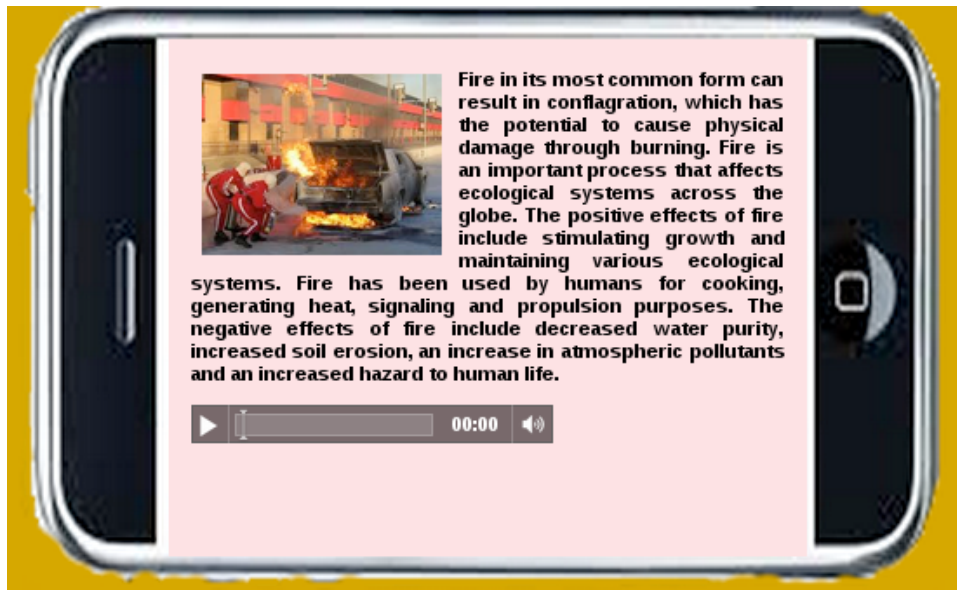
```
<div xmlns:ex="http://www.example.com/index.html" >
  <div class="ex:id_value"> text image audio or another </div>
</div>
```

where “id_value” is the id of an element placed on the page referred to by the namespace. We note here that the URL “protocol” already accommodates pointing to fragments of a page using the #id notation. For example <http://a11y.in/a11yPi/idea/firesafety.html#div0> refers to the element at <http://a11y.in/a11yPi/idea/firesafety.html> that can be identified by its “id” attribute having the value: div0.

⁴ See Johanna Royer’s report on HTML tagging on <http://alipi.janastu.org/>



The associations also make it easier to deliver a web page as a slide show or effectively as an audio/video rendition, on smaller screens such as those of mobile phones and tablets. For instance, the fire safety page mentioned above can be rendered by serializing the associated information fragments on a mobile device. A snapshot of which can look like this:



A2 Re-Narration Web for Contextualization, Localization or Translation

Another aspect that is significant to print-impaired is the process, and the possibility, of the web-content that can be “localized” by a community that is interested in narrating some web-page fragments to a locality of interest. For example, people from Karnataka in India, have only a few documents available in Kannada, their native language; and cannot access most web pages that are in English unless they are very comfortable with English.

The solution to this issue provided by Alipi is **re-narration**: a given document can be rendered to address a certain community either by translating the whole document in another language or by making its content more understandable (e.g explaining what a certain law is about), or simply by rendering some of its components (e.g providing an audio description for a text or adding a connotation to a video). Alipi provides re-narration tools and documentation at www.alipi.janastu.org. This document gives guidance on how to make a valid re-narration and explains how re-narrations would evolve within the Alipi community.



Take the Fire Safety web-page example above. The following is a blog about this page:

Blog of Aravind

post saturday



ಅಗ್ನಿ ಶಾಮಕ ವಿಭಾಗ ಒಂದು ಸಾಮಾಜಿಕ ಅಥವಾ ವಯುಕೀಕ ಸಂಸ್ಥೆ ಆಗಿದ್ದು ಇದು ಅಗ್ನಿ ನಂದಿಸುವ ಕಾರ್ಯವನ್ನು ಮಾಡುತ್ತದೆ. ಎಲ್ಲ ಜಿಲ್ಲೆಯ ಊರುಗಳು ಇ ಸಂಸ್ಥೆಯನ್ನು ವಳಗೊಂಡಿರುತ್ತವೆ. ಪ್ರತಿವೆಂದು ವಿಭಾಗ ಒಂದಕ್ಕಿಂತ ಹೆಚ್ಚು ಶಾಕಗಳನ್ನೂ ತನ್ನ ಸೀಮೆಯಲ್ಲಿ ಹೊಂದಿರುತ್ತದೆ. ಪ್ರತಿ ಶಾಕೆಯು ನುರಿತ ಸಿಬ್ಬಂದಿ ಹಾಗೂ ಸ್ವಪ್ರೇರಿತ ವ್ಯಕ್ತಿಗಳನ್ನು ವಳಗೊಂಡಿರುತ್ತದೆ.

In this post on Blog of Aravind, two fragments about fire safety are written about. However, in addition to typical blogging of content, Blog of Aravind's post intends to indicate certain semantic relationship to the Fire Safety page discussed above. In particular, that the image of the fire engine in this post is a recommended replacement image for people from Karnataka who visit the original site; and that the paragraph written in Kannada is a recommended replacement for people who prefer to read Kannada - rather than English.

Alipi recommendations suggest that these intentions in Blog of Aravind's post be accommodated in a way that the browsers of tomorrow can process such meta-information. This meta-information, that some fragments of this post are intended as replacement suggestions for other fragments in other pages - and recommended for a target group, can be provided via HTML tag attributes (or Microdata, etc) . The HTML source of this page can look like:

```
<h2>Blog of Aravind</h2>
<h3>post saturday</h3>

<br />
<p id="kn"
foruri="http://www.ally.in/allypi/idea/firesafety.html:div1"
rec="lang:kn">ಅಗ್ನಿ ಶಾಮಕ ವಿಭಾಗ ಒಂದು ಸಾಮಾಜಿಕ ಅಥವಾ ವಯುಕೀಕ ಸಂಸ್ಥೆ ಆಗಿದ್ದು
ಇದು ಅಗ್ನಿ ನಂದಿಸುವ ಕಾರ್ಯವನ್ನು ಮಾಡುತ್ತದೆ. ಎಲ್ಲ ಜಿಲ್ಲೆಯ ಊರುಗಳು ಇ ಸಂಸ್ಥೆಯನ್ನು
ವಳಗೊಂಡಿರುತ್ತವೆ. ಪ್ರತಿವೆಂದು ವಿಭಾಗ ಒಂದಕ್ಕಿಂತ ಹೆಚ್ಚು ಶಾಕಗಳನ್ನೂ ತನ್ನ ಸೀಮೆಯಲ್ಲಿ
ಹೊಂದಿರುತ್ತದೆ. ಪ್ರತಿ ಶಾಕೆಯು ನುರಿತ ಸಿಬ್ಬಂದಿ ಹಾಗೂ ಸ್ವಪ್ರೇರಿತ ವ್ಯಕ್ತಿಗಳನ್ನು
ವಳಗೊಂಡಿರುತ್ತದೆ.</p>
<br />
```



Note the use of “foruri” attribute to point to the image in the original Fire Safety page and the “rec” attribute to indicate a recommendation or a target group.

Narration Choice

Now assume that there are other such posts out there on the Web that are possible localization of fragments of this page for different contexts. These can be pulled up by a browser, possibly through a search engine service, and a relevant choice of alternative narrations can be offered to the person browsing the Fire Safety site. For example, when a person from India visits the Fire Safety site, a notification can look like:



The top bar in yellow is indicating that there are two choices of alternative narratives.

One in Hindi language and another in Kannada language.

If the user chooses the Kannada option, the page can render by using the recommended narratives for Kannada, which could look like:



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FIRE SAFETY

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HOME

Fire is the rapid oxidation of a material in the chemical process of combustion, releasing heat, light, and various reaction products. Slower oxidative processes like rusting or digestion are not included by this definition. The flame is the visible portion of the fire and consists of glowing hot gases. If hot enough, the gases may become ionized to produce plasma. Depending on the substances alight, and any impurities outside, the color of the flame and the fire's intensity might vary.

ಅಗ್ನಿ ಅಮಕ ವಿಭಾಗ ಒಂದು ಸಾಮಾಜಿಕ ಅಥವಾ ವಯುಕಿಕ ಸಂಸ್ಥೆ ಆಗಿದ್ದು ಇದು ಅಗ್ನಿ ನಂದಿಸುವ ಕಾರ್ಯವನ್ನು ಮಾಡುತ್ತದೆ. ಎಲ್ಲ ಬೆಲೆಯ ಉರುಗಳು ಈ ಸಂಸ್ಥೆಯನ್ನು ಒಳಗೊಂಡಿ ತ ಹೆಚ್ಚು ಅಾಕಗಳನ್ನೂ ತ್ತನ ಸೀಮೆಯಲ್ಲಿ ಹೂಂದಿರುತ್ತದೆ ಸತೆ ಅಾಕೆಯು ನುರಿತ ಸ್ವೀಂದಿ ಹಾಗು ಸ್ವಪ್ರೇರಿತ ವ್ತಕಗಳನ್ನು ವಳಗೂಂದಿರುತ್ತದೆ.

Fire in its most common form can result in conflagration, which has the potential to cause physical damage through burning. Fire is an important process that affects ecological systems across the globe. The positive effects of fire include stimulating growth and maintaining various ecological systems. Fire has been used by humans for cooking, generating heat, signaling and propulsion purposes. The negative effects of fire include decreased water purity, increased soil erosion, an increase in atmospheric pollutants and an increased hazard to human life. The fire safety issue is extremely important. Every year, more than 56000 household fires are reported in the UK and more than 360 people die in these fires. One in ten of these fire victims are children. However, safety is not an issue that comes to our minds very often, as we go about our daily routine. Yet, in our homes, there may be dangers that can take lives and destroy our properties.

Note that fire engine image and one of the paragraphs in the page are substituted with the respective content from Blog of Aravind’s post that was recommended for Kannada people. When there is alternative content in audio, the user can opt to listen to the audio or choose the default audio via a text-to-speech tool.

Again, now a mobile device can render this on small screens:





Another accessibility issue might reside within the page's content itself. For instance, let's consider the "Ayodhya Verdict"⁵, which is an 8132 page work only available in English. See <http://elegalix.allahabadhighcourt.in/elegalix/DisplayAyodhyaBenchLandingPage.do> This work is "inaccessible" because it is a technical document, very lengthy and hard to understand

An effective solution to this accessibility deficiency would be a derivative to this document, created by a competent community in a way that it is understandable by an audience less skilled in jurisprudence. As an example, one possible re-narration of the "Ayodhya Verdict" would be a short summary of the verdict in a regional language made by a lawyer. This latter document would be more accessible because it is less technical, is shorter and is easier to understand. Example: <http://www.scribd.com/doc/38464799/Justice-S-U-Khan> and a news article, <http://www.ndtv.com/article/india/ayodhya-verdict-allahabad-high-court-says-divide-land-in-3-ways-56063>, on a popular news media web-site that one may subscribe to.

This real-world analogy of using media-intermediaries is the basis of Alipi's Re-narration concept. Also see filter described in the next section to see how subscriptions are modelled. These attributes are:

Attribute		Description
target	required	indicates properties about the audience the re-narration document is targeting. The target attribute is either a single or several white space separated "property:value" couples. Some of the valid properties can be: <ul style="list-style-type: none"> ✓ lang: indicates the language of the targeted community. ✓ geoloc: indicates its location. ✓ occupation: indicates the profession occupied by the community; example: its a narration for doctors
foruri	required	Indicates the link to the re-narrated element. " about " attribute in HTML can be used instead of a new " foruri "
ren-type	optional	Indicates the type of the re-narration. It represents the L-relatedness between the original document and its re-narration. Its default value is "re-narration", which can be overridden to be more specific. Some possible values are: annotation, summary, abstract...etc.

⁵http://en.wikipedia.org/wiki/Ayodhya_dispute



Attribute		Description
version	required	Indicates the version of the re-narration. Please note that the actual version of the document is obtained by combining the foruri attribute with the version attribute. Indeed, two documents can carry the same version when they are in fact re-narrations for different elements.
ren-date	optional	Indicates the date of the re-narration.
ren-author	optional	Specifies the author of the re-narration.

The following example is a re-narration of an image designated by **foruri**, targeting the community living in India and speaking Kannada, which uses various attributes of re-narration.

```

```

Caveat: Alipi processes re-narrations by picking up elements via their Ids and re-narrating them. However, some pages are not “well” authored. A possible example would be an article carrying a single Id element, and therefore, selecting a particular paragraph to re-narrate means picking up the whole article. To address this deficiency, Alipi can use XPath⁶ when there is no straightforward way to select a single element. However XPath is likely to be less consistent compared to an inscribed Id.

A3 Mediated Filter Services

Filters are a way for a web page to declare certain re-narrators as authorized or recommended or favourites. A filter is an XML file that lists URLs for re-narrators along with meta-data about each URL (the re-narrator’s identification, active subject categories, relative ranking, or Foaf details) so that each page would have its “favourite” re-narrators.

⁶<http://www.w3.org/TR/xpath/>



The Alipi's Filter consists of XML tags. All URLs must follow the [RFC-3986](#) standard for URIs, the [RFC-3987](#) standard for IRIs, and the [XML standard](#). A Filter:

- Begins with an opening <urlset> tag and end with a closing </urlset> tag.
- Specifies the namespace (protocol standard) within the <urlset> tag.
- Include an <author> entry for each URL, as a parent XML tag.
- Include a <url> child entry for each <author> parent tag.

All other tags are optional. A sample Filter schema:

Attribute		Description
<urlset>	required	Encapsulates the file and references the current protocol standard.
<author>	required	Tag associated with each URL entry. The remaining tags are children of this tag.
<url>	required	URL of the page.
<name>	optional	The name of the author or the community of re-narrators
<priority>	optional	The priority of this re-narrator relative to other re-narrators. Valid values range from 0.0 to 1.0. The default priority of an author is 0.5.
<profession>	<optional>	Indicates the profession of the author (e.g sociologist, lawyer...etc)

The following example shows a Filter in XML format:

```
<?xml version="1.0" encoding="UTF-8"?>
<urlset xmlns="http://alipi.janastu.com/Filters">
  <author>
    <url>http://www.example.com/</url>
    <name>Alipi</name>
    <profession>Engineer</profession>
    <priority>0.8</priority>
  </author>
  <author>
    <url>http://www.another\_example.com/</url>
    <name>Janastu</name>
    <profession>Teacher</profession>
  </author>
</urlset>
```



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Using Filters

A page can provide multiple Filters. In order to do so, the **ren-filter** attribute embedded in the <header> tag is to be used. It specifies one or more white space separated filters for the page. The order (from left to right) in which filters are provided indicates their rank. If no **ren-filter** value is provided, the Alipi's default filter is used.

Example of a ren-filter attribute specifying recommended re-narrators:

```
<header ren-filter= "http://example.com/community1.xml  
http://another\_example.com/community2.xml" >...</header>
```

In the example above, it is indicated that the authors belonging to community1 and community2 are recommended. Order in the listing can be indicative of a preference. Here, community1 is rather to be solicited than community2.

A goal of Alipi is to enable localization and contextualization of laws and policy documents that concern the citizens of a country, such as India, so that these documents become available on the mobile phones of the many print-impaired people. Towards this, we have authoring guidelines that document authors can use. Then the re-narration model so an effective process can be initiated via the communities of interest or through those who have a mandate towards such activity. Filters help identify such communities of interest in certain context.

For example, in the case of government documents that are put online, it may be natural for the authorities to announce the authorized re-narrators filter on their web-sites. This can become a directive to the Alipi's narration recommendation algorithm using which only the official translations or localization/contextualization are provided as choices to a user. See the page titled ReNarrationAct on alipi.janastu.org web-site to follow our case study of re-narrating a document regarding the law related to minimum wages and using an Android based phone to demonstrate that the print-impaired community of domestic workers can now "browse" this document using the Alipi toolbar on the Firefox browser.

This notion of Filters can also help bring to the Web, a parallel of print and news media organizations. For example, a bangalore.healthren.org can announce a Filter with list of favourites who they recommend as good re-narrators for health related web-pages for the locality of Bangalore, Karnataka. A user can subscribe to this Filter and choose the narratives from this list over others.



Eventually, it can remain as an end-user choice in spite of these suggested or authorized Filters as user can prefer the narrations from a list of friends over those of the authorized or those of the subscriptions, esp., in certain cases.

Positioning of Alipi Accessibility

Let G be a directed graph where the nodes are documents that exist on the web. There is an edge from d_1 to d_2 with a label L , if d_2 is related to d_1 in the sense described by label L . Strictly speaking, d_2 and d_1 could reference the same URI-accessible document, but d_2 could be a transformation of d_1 . For example, d_2 could be a re-rendering of d_1 where d_2 is WAI-accessible to someone with colour-blindness, or d_2 could be accessible to vision-impaired people.

WAI concerns itself with generating relatedness, not with identifying relatedness, i.e. the standard effectively makes it possible to generate d_2 given d_1 . This kind of relatedness is primarily presentational (and thus, implicitly semantically related in a somewhat obvious way).

Alipi concerns itself with more generic semantic relatedness of documents, and also concerns itself with identifying relatedness as well as generating relatedness. i.e. given a document d_1 , it is interested in finding (either by identifying an existing one, or by generating one) a d_2 that is related to d_1 in the sense of L .

This is a really hard problem to solve efficiently for different notions of L -relatedness. Given a document d_1 , how will the set of L -related documents be discovered? Will they be generated (ex: machine translation across languages)? Or will they be fetched based on existing semantic mark-up on d_1 ? Or, will they be fetched based on existing semantic mark-up on d_2 's? Or, will a document repository (e.g.: the web) be crawled to identify the set of L -related documents? If so, given a candidate document d_2 , what metrics will be used to determine if d_1 and d_2 are sufficiently closely L -related? Clearly, different domains and applications will require different standards of L -relationship between d_1 and d_2 .

In light of the previous discussion, to avoid getting lost in an overgeneralised problem, Alipi focuses on a set of different projects in specific sub-domains where L is well defined, and specifies a set of attributes, which enable either the identification, or generation of L -related documents.

Alipi is therefore a web-accessibility project with a difference: it allows users to re-narrate the Web, explaining web-content in ways that are more relevant and accessible for print-impaired and others who are lost in translation.



A4 An Index of On-going Work

Alipi model development was supported by prototype work that gave us the comfort of its feasibility over time. It also alerted us to various possibilities and hardships due to Web security issues in turning this prototype into a publicly available toolbar as a Firefox add-on. The Alipi toolbar is supported by a web-service⁷ that simulates a web-search index that responds to a re-narrations query for re-narrations available for a web-site (an url). The alipi toolbar for Firefox and its avatars for an Android based mobile device are available as git-hub repositories from alipi.janastu.org

A number of face-lifting, scaling and alternative implementations using intermediate services are being considered now so that the next phase of activity can be supported by communities of interest who are enthusiastic about the possibilities of Alipi for their domain of work.

Project outputs and dissemination

Project outputs	Status	Assessment	Dissemination efforts
1 Demo of Alipi idea itself	Completed	http://a11y.in started last year with an illustration of the idea of Alipi.	The web site is used as a reference in all our discussions with the all the stakeholders from print-impaired people to computer science researchers.
2 WAI-ARIA for print-impaired	Not completed	The work with Pantoto communities – an open source RIA framework – has stopped after the shift to Alipi. We need to go back to it and incorporate Alipi with WAI-ARIA w3c guidelines.	The current state of the code is available on http://code.google.com/p/pantoto-mango
3. Alipi toolset	Complete	Alipi concept can be experienced by people already. Not only the Alipi toolbar for Firefox browser but the server side support is also made available for this.	Tool is available on the github site. 1st release at https://github.com/arvindkhadri/alipi/ Check http://alipi.janastu.org for more recent avatars.

⁷ Virtual-labs server hardware made available for prototyping, by Prof Venkatesh Choppella.



Project outputs	Status	Assessment	Dissemination efforts
4. Training	In progress	A training event is scheduled in July with Domestic workers	Invites NGOs working with domestic worker rights and domestic workers they work with.
5. Alipi on a mobile	Complete	Alipi tools work on an Android phone and is now being tried by end users. First impression is pleasing.	Android (mobile device) phone and tablet will be used directly with print-impaired people.
6. Publication and conferences	Complete and in process	Talks and presentations at RMLL 2010; HTML5DevCamp Bangalore; NITCA, Sydney, RMLL 2011; IAMCR 2011 Istanbul; And a document for W3C in works. Also short-listed for a policy regulation for the “South” meeting.	Research community and new media and policy activists
7. Re-narrations	Complete	Alternative narratives in a number of Indian languages are available on a site setup to illustrate the use of Alipi for domestic workers.	Internet community and future mobile print-impaired users

All work is available through <http://alipi.janastu.org>

And other reports, experience notes and announcements will be updated on this site.

Lessons learned from project implementation

The project team decided that the activities should be paused to be able to reflect about the problem of accessibility for print-impaired with fellow researchers and friends in the open source community. As a result of that reflection period, a subsequent need to shift the project focus was identified. The team acknowledges that although this reflection time was well spent, it put the team in a difficult situation to be able to reach the June 30 deadline, once the concept was finally consolidated, by end of 2010.

Another lesson is that there are last minute surprises once some thing starts working and we have to go out in the field for demos and user experience studies. In our case, the Ipad



we had was not usable as it does not support Firefox browser – the browser for which the Alipi tool was developed. We had to switch the Ipad to an Android based phone so the development can happen on a mobile device which could be used for our case-study with domestic workers.

The parallel streams of activity involved the development of the model, implementation activity that demonstrates the feasibility of the model today and use case studies that effectively study the community acceptance in the future! In addition to the various cycles of interdependence that result in such an activity, we also have to simulate certain services that are expected to manifest in the future - such as crawling and indexing of the re-narration relatedness of web-page fragments and even caching page rendition so that an acceptable tool responds with an acceptable speed. These activities become important as the case studies involve print-impaired people who are not already Web-savvy. Moreover, attending to a number of usability aspects and scalability becomes necessary as we intend the tools to be become reference tools when we start discussion with standards related bodies.

Project management and sustainability

We intend to continue developing this project while delegating work to Janastu and other partner organizations. We (via Janastu) are in the process of becoming a W3C member so the Alipi re-narration web will enter a global dialog towards becoming a recommendation for authoring pages for digital inclusion / accessibility for print-impaired. We expect that browsers implementations will incorporate core support once it is a recommendation. The communications related to this activity will continue over the next year via Janastu and Maraa – our collaborating non-profit organizations.

Servalots is also developing a business concept based on Alipi work which we hope will bring us clients who can use Alipi in localized contexts and also popularize it on the web.

Impact

Alipi work is a framework for including the marginalized sections into the Internet world. Alipi authoring tools are eventually expected to enable print-impaired people to also contribute content in-addition to being able to access some of the web content that was other wise hard to reach.

In the guidelines to complete this report, The ISIF secretariat suggested the Impact Study categories (Communication & Leisure; Culture & Language; Education; Employment & Income; Governance; and Health). We believe that Alipi can have a positive impact on all of them, as printed-impaired users will be able to access the content provided.



We are currently in the process of studying the impact of Alipi on domestic workers. This study is likely to be completed by the end of September. This study also involves developing capacity-building training material.

Alipi is likely to also impact various related activities. We are already in the process of looking into management of tweets on twitter⁸ – for print impaired.

Alipi team is now experienced with browser-extension development, supporting server side api's and crawling the blogs for re-narrations. They are also familiar with Android app development. Also the experience of user-feedback workshops and documentation work leading to global dialogs has already influenced the team in the way they are willing to do technical documentation work.

Overall Assessment

The project was directly influential in setting us on the Alipi track. The time spent on the project, we feel, has long term returns for the organizations involved. The funding amount we feel was just right for a project of this nature which involves various parallel activities from research discussions, use-case discovery and evaluation, and a phased development of the tools through incremental experimentation.

At the end of the project, we feel that we are at the beginning of a long engagement of maturing the Alipi “deployment” and experiencing the interaction of a variety of people and communities. Towards this, we have already taken steps towards obtaining W3C membership and having commitment by Janastu to do the follow-up work for the coming year. We have also disseminated the idea with enthusiastic response in various forums and are looking forward to develop a business around the work done in the project.

Continuity of funding might have helped further this work with the same tempo, which is significant in further engaging the development resources for this work that is of the nature of public good – albeit with some research focus.

Recommendations

Generally well-handled funding process and the amount was a well-computed amount of fund for our project.

⁸ In discussion with Maraa.