

A Framework for Creating Speech Games for Cognitive Profiling

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Questions

1. **Given that speech is a fundamental method of communication:**

- Why are there so few web-based “speech applications”.
- Why are there hardly any “speech-only games” on the web.

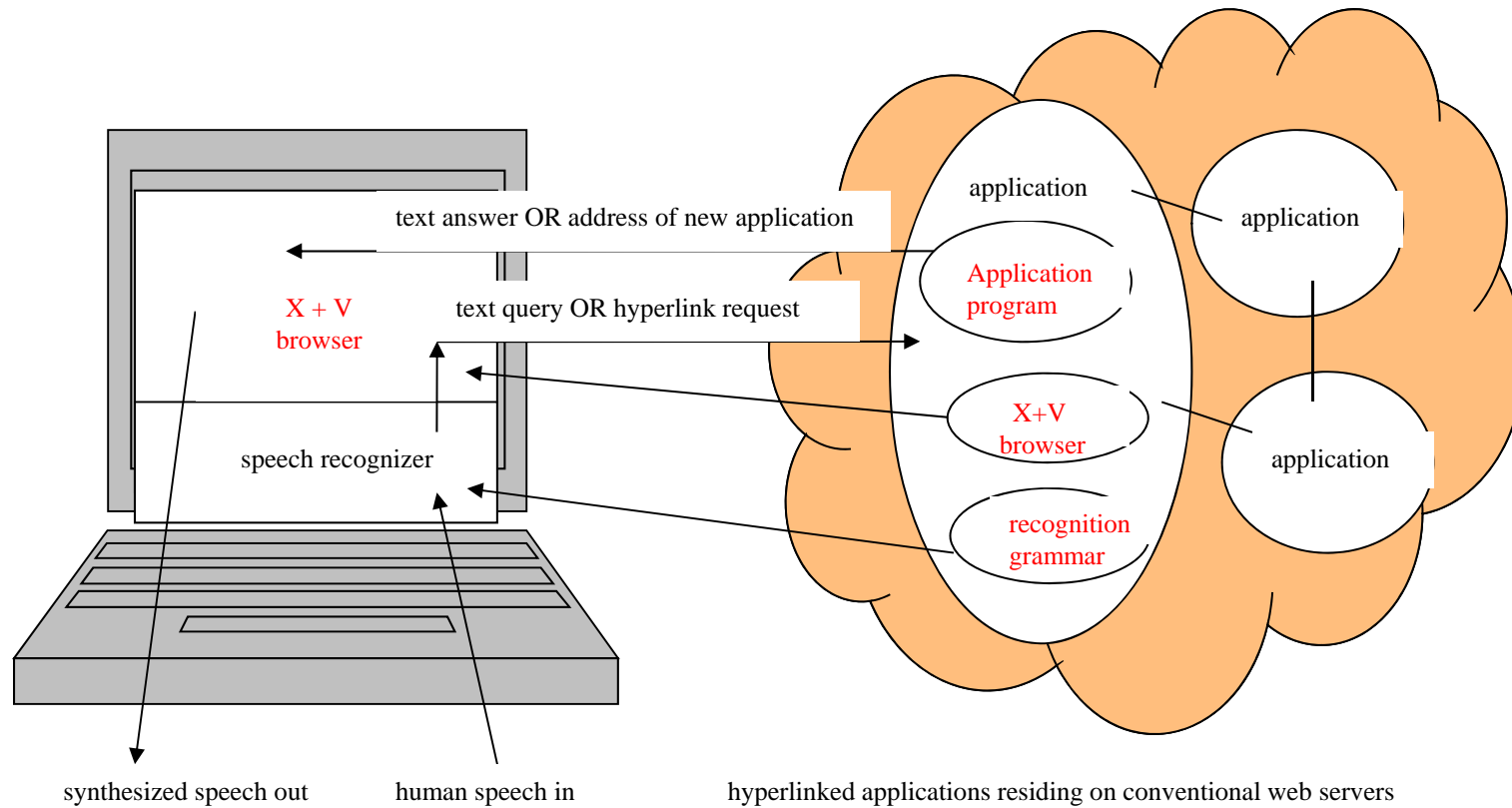
2. **Possible Answers**

- Although speech-recognition is a mature technology it is not readily available.
- VXML/X+V/SALT/etc. as currently used involve writing the whole application in the mark-up language.
- Consequently people think that building a speech application and deploying it on the web is harder than it is.

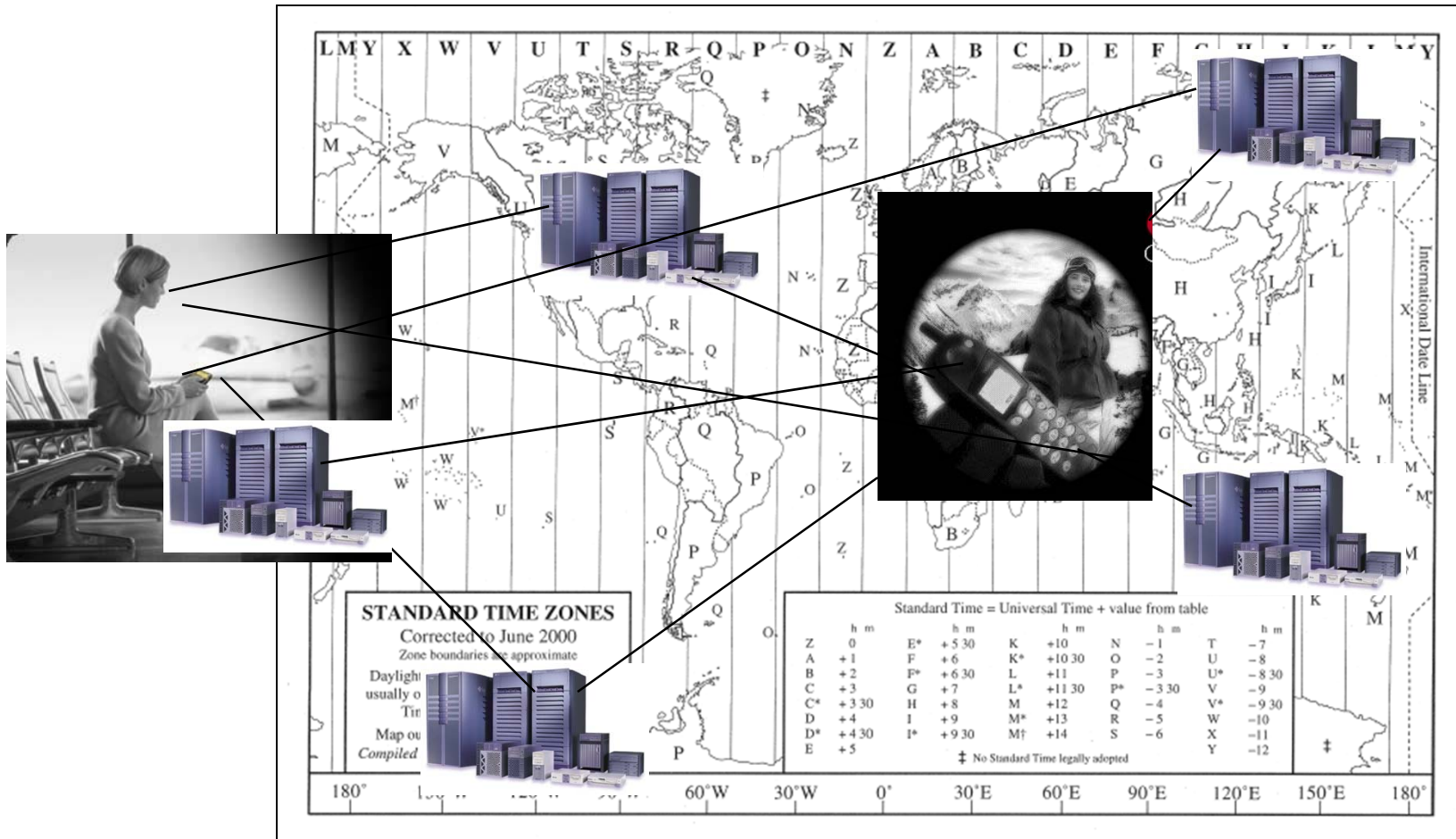
An alternative method - SpeechWeb

- Use VXML/X+V etc. to only build a generic speech interface, and use any other programming language to build the text input/output application.
- No need to know VXML/X+V or any details of how the application is accessed over the Internet by the speech interface.
- Only need to specify a grammar for the input language to specialize the speech browser for an application.

The SpeechWeb architecture



Local Recognition Remote Processing (LRRP)



A video demonstration of SpeechWeb

www.youtube.com (and type in “speechweb”)

or go directly:

<http://www.youtube.com/watch?v=Axa-n4etdZE>

The SpeechWeb web site

www.myspeechweb.org

To create a SpeechWeb application

- **Copy three files into a web directory**
 1. The X+V browser
 2. A sample grammar
 3. A sample program
- **Modify four lines in the X+V browser**
- **Change the grammar for your application's input language.**
- **Replace with a program, written in any language, to process the input and return a text output.**

The X+V browser

- `<html xmlns="http://www.w3.org/1999/xhtml" xmlns:vxml.....`
- `<head>`
- `<title id="title" />`

- `<!-- the name of the speechweb application and its opening statement are specified here -->`
- `<script type="text/javascript">`
- `var appName = "Monty";`
- `var appFullName = "speechweb.cs.uwindsor.ca/applications/Monty";`
- `var greeting = "Hello. My name is Monty. I know a joke.";`
- `</script>`

- `<!-- main vxml form for handling the user/application dialogue -->`
- `<vxml:form id="vxml_main">`
- `<vxml:field name="vxml_field" modal="true">`
- `<vxml:grammar type="application/x-jsgf" src="Monty.jsgf" />`

- `<vxml:prompt cond="greeting.length > 0">`
- `<vxml:value expr="showMessage('greeting', greeting)" />`
- `<vxml:value expr="greeting" />`
- `<vxml:value expr="greeting = "" />`
- `</vxml:prompt>`
- etc

Recognition grammars

```
<question>      = what is your name  
                  | where do you live  
                  | what do you know  
                  | tell me a joke  
                  | can I talk to <person>  
                  | etc ;  
  
<person>        = judy | solarman | pete ...
```

The programs can be as simple as you want

```
interpret "what is your name"  
  = "My name is Monty."
```

```
interpret "where do you live"  
  = "I hang out in one of Frosties computers. "
```

```
interpret "what do you know"  
  = "I got a joke or two. Not much else."
```

```
interpret "tell me a joke"  
  = "Did you hear about the two professors....."
```

Existing SpeechWeb applications written by (mostly undergraduate) students

- **Question/answer applications**
 - Solar man, Geoman
 - PeTe: Periodic table
 - Monty/Judy etc.
- **Speech interface to Wikipedia**
- **Visual/speech games**
 - Tic-tac-toe
 - Hangman
 - Colour sequence and Stroop colour test
 - Battleships etc.
- **Speech-only games**

Using speech-only games to create cognitive profiles of children

- **Funded by NSERC and a FedDev grant**
- **We have built additional speech browsers:**
 1. Android – using Google' speech recognition service.
 2. Android and Windows using CMU's PocketSphinx speech rec. library
- **We have created a generic architecture for collecting user data over several sessions.**
- **We are beginning to create guidelines for building speech-only games.**

Speech-only games

- **Single sentence memory.**
- **Transitive relations:** “a runs faster than b, b runs faster than c”. “Does a run faster than c?”
- **Simple math questions.**
- **Repeat colour sequence.**

Current work

- **Survey verbal tests/tasks used by Psychologists**
- **Develop a new speech browser which integrates statistics-based speech recognition with grammar-based**
– required for natural-language applications.
- **Develop new speech-only games, e.g.**
 1. Verbal Stroop
 2. Word association
- **Integrate data collection with the data mining part of the FedDev project.**