Connecting the Unconnected

Romy Blankendaal, Gossa Lô & Stefan Schlobach
Slides from Anna Bon & Victor de Boer
Still, 4 billion people in the world remain “unconnected”

http://internetcensus2012.bitbucket.org/paper.html
Constraints to knowledge sharing: a few examples from West Africa

- Low levels of literacy
- Many different languages spoken
- Poor infrastructures: (no electricity in the villages, no internet, only radio/2G mobile)
The Case of: Knowledge sharing for Food Security in Rural Africa through adaptive, collaborative technology (ICT) development, 2009 - ongoing

User centered approach

Apps for Food Security in Mali – W4RA and AOPP team up

From 9 to 14 October 2015, W4RA team visited Mali, to kick-start a new research project to support farmers to improve resilience and food security. The project aims to develop mobile applications that provide real-time information on weather, crop prices, and market trends to help farmers make informed decisions.

W4RA team and researchers from the University for Development Studies, Ghana held a Living Lab workshop in the rural community of Guabuliga, Northern Ghana.
A market information system for Malian farmers

RadioMarché

Données du marché locale

Interface Web

Communiqué

Text-To-Speech

Interface vocale/GSM

Agent Sahel Eco

Buyers

Radio Communautaire

Bambara
Kasadaka: a rapid prototyping platform for the rural poor
KASADAKA(.com)

Benefits:
• Low-power, cheap hardware
• Rapid Prototyping + deployment
• Access information
  – Voice services
  – SMS-based
  – Visual
• Data store (Linked Data)

André Baart
(Bsc project)

Onno Valkering
(Msc Project)
Field trip to Northern Ghana
The Web, a platform for Information and knowledge sharing

examples from the field:

- Find local customers
- Treat/prevent animal disease
- Combat soil degradation
- Predict rainfall
- Know more about regreening
Use case

Contextualized story board project DigiVet

Supporting farmers, veterinarians and owners to maintain a healthy farm, by the use of an ICT tool (DigiVet).

This research fieldwork was supported by the University for Development Studies in Ghana.

The outcome – heatmap

The examination will have access to the DigiVet software. The outcome of the application’s test will be shown, together with a heatmap of places where the same symptoms have been found. Based on this information, the vet can make a better estimate what medications are needed to cure the animal.

Step A: Activating the application

- Farmer Kofi notices one of his animals fell ill.
- Luckily, there is a DigiVet in his village. He types into the DigiVet software and answers to the different questions regarding the sick animal that are asked in his local language by the voice coming from the small ICT device.
- Answering the question is done by tapping on the touchscreen, which shows an image of the animal.
- Kofi types into the system and his language of choice is recognized. The voice guides him through the different questions.
- “Welcome farmer Kofi, please select the species of the sick animal:”
- “Yes”
- “Now enter whether the symptoms can be seen on the body or not. The red part of the screen means no, the green part of the screen means yes:”
- “Yes”
- … etc.

Black box or Kasadaka

The Kasadaka is an inexpensive voice-application server, developed specifically for rapid-prototyping under rural conditions. It consists of (i) a Raspberry Pi, (this is a low-cost, credit-card sized computer that uses a standard keyboard and mouse) (ii) a USB- Dongle with connects the black box to the local GSM network, allowing to stream audio and receive inbound phone calls using a local sim card, and (iii) a Waka Waka, or solar battery. The server is powered by Linux and runs Asterisk, a free and open source framework for building (voice-based) communications applications. The cost of this hardware device is currently about 100 EUR. The Kasadaka is tested under rural conditions:

- No internet connection, temperatures of up to 42 degrees Celsius in the shade, electricity outages, and using local mobile networks in Ghana.

Gossa Lô, Myrthe van der Wekken & Romy Blankendaal

Network Institute Academy Assistant project 2015

Multi-disciplinary team

Knowledge-based system (CommonKADS)
Three KASADAKA use cases

- Poultry vaccination service (Mali)
- Seed market (Mali and Burkina Faso)
- DigiVet (N-Ghana)
# Use Case: Poultry vaccination service

## PLAN DE PROPHYLAXIE RELATIF AUX MALADIES PRIORITAIRES DE LA POULE

<table>
<thead>
<tr>
<th>Period</th>
<th>Maladie de NEWCASTLE</th>
<th>Maladie de GMBORO</th>
<th>Bronchite infec.</th>
<th>Variole aviaire</th>
<th>Départage interne</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Prise vaccination à la 1er et à la 6ème jour (dose au choix de 10 doses) avec PESTOS ( vaccin injectable contre Newcastle flanc de 980 et 1500 doses pour traction et trempe)</td>
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<tr>
<td>2</td>
<td>Il est aussi un vaccin vivant complet qui n’appelle PESTOS + H3D (vaccin injectable contre Newcastle et Bronchite infec. 980 et 1000 doses pour traction et trempe)</td>
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<td>3</td>
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<tr>
<td>5</td>
<td>Prise vaccination le 5ème jour avec GMBORO (vaccin injectable)</td>
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<td>6</td>
<td>7</td>
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<tr>
<td>8</td>
<td>1er rappel une semaine après prime avec IKADEM (dose de 100 doses)</td>
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<tr>
<td>9</td>
<td>10</td>
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</tr>
<tr>
<td>11</td>
<td>1er Rappel avec GMBORO 7 jours après la prime vaccination</td>
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</tbody>
</table>

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Amadou Tangara  
FARM RADIO  
INTERNATIONAL MALI
Welcome to the Seed market application. Would you like to
1) Sell 2) Buy 3) Have more information

What type or seeds
1) Rice 2) fonio 3) nere 9) back

What quality of seeds
1) De base 2) R1 3) R2 9) back

What is your Cercle
1) Tominian…. 9) back

You are offering...
Is this correct?
1) yes, 2) no

Please enter phone nr.
(phone)

You will now return to the main menu. You can also hang up
DigiVet

**Domain:** A knowledge based system to support rural farmers in Ghana in diagnosing their sick animals.

**Task type:** Diagnosing
**Input:** symptoms animal diseases
**Output:** decision whether or not to go see a veterinarian
DigiVet

Interviews:
Dutch veterinarian
Three Ghanaian veterinarians

Scoring:
Urgent/ non urgent symptoms
Basic and specific questions
Threshold symptoms
DigiVet: Demo

Languages used:

• PHP
• HTML / CSS
• SQL
• JavaScript
DigiVet
DigiVet

Difficulties:

Symptom classification

(type of disease, urgent or not)

Experts at a distance

→ hard to collect good information

→ different methods
to cure diseases
Conclusion: How can we connect the unconnected?

- Develop offline (voice-based) information services
- Close collaboration with local population
- Better access to expert knowledge