Smart Connect
A Communication Link for Peripheral Health Facilities

Eleanor O'Rourke
Department of Computer Science and Engineering
University of Washington

Juan José Amador, Richard Anderson,
David Lubinski, Krysta Yousoufian
PATH

- Seattle-based NGO founded in 1970
- Developing appropriate health technologies
  - Emerging epidemic diseases
  - Maternal and child health
  - Vaccination initiatives
- Working in 70 countries, with 1000 employees worldwide and 400 in Seattle
Richard’s Trip to PATH Nicaragua
Peripheral Health Posts
Data Usage
Communication Problem

- Communicating with peripheral health posts is a challenge
  - No internet
  - Cell phones not reliable
  - Far from health center

- Health Post Data is valuable
  - Information reported daily and weekly
  - Communication essential for ensuring quality of care
Our Approach

- Use infrastructure that already exists: Cellular Network
  - Communicate data through SMS messages
- Create a facility-based communication appliance
- Use external antennas to boost signal
Smart Connect

- Screen
- Key Pad
- Power Plug
- Antenna
- Temperature Sensor
- SIM Card
Communication Model

Health Post

Database

Internet

Health Center
SILAIS
Summer Internship at PATH

- Learn about current communication processes
- Determine which data is most important
- Design application
- Perform an initial test in Masaya health posts.
Health Post Visits

Pacayita

Valle de la Laguna

Humberto Alvarado
Data Communication

- Epidemiological Surveillance
- Vaccine Refrigerator Temperatures
- Laboratory Results
- Many More...
Epidemiological Surveillance

- Minimal data reported
  - Disease code, gender, age
- Data is recorded on paper forms
- Forms are brought to health center
  - Try to report data daily, often report weekly
- Transportation is time consuming and costly
- Phone calls are costly, and cell service is often not available
Smart Connect  UI Prototypes

1. Surveillance
2. No surveillance data today
3. Test Message

Enter Disease Code:

Enter Gender:
1. Male
2. Female

Enter Age:
1. 0-6d
2. 7-27d
3. 28d-11m
4. 1 year
5. more than 1 year

1. Vigilancia
2. No hay datos de vigilancia hoy
3. Mensaje de Prueba

Entrar Código de Enfermedad:

Entrar Sexo:
1. Masculino
2. Feminino

Entrar Edad:
1. 0-6d
2. 7-27d
3. 28d-11m
4. 1 año
5. más de 1 año
## Connected Devices

<table>
<thead>
<tr>
<th>Nombre</th>
<th>IMEI</th>
<th>Estado de Alerta</th>
<th>Configurado?</th>
<th>Temp. Actual</th>
<th>Último Informe</th>
</tr>
</thead>
<tbody>
<tr>
<td>FoneAstra IMEI:23456789</td>
<td>23456789</td>
<td>☑</td>
<td>☑</td>
<td>5° C</td>
<td>1 minuto atrás</td>
</tr>
<tr>
<td>SmartConnect IMEI:357541000479909</td>
<td>357541000479909</td>
<td>☑</td>
<td>☑</td>
<td>7° C</td>
<td>1 hora, 58 minutos atrás</td>
</tr>
<tr>
<td>SmartConnect IMEI:357541000480063</td>
<td>357541000480063</td>
<td>☑</td>
<td>☑</td>
<td>3° C</td>
<td>8 minutos atrás</td>
</tr>
<tr>
<td>SmartConnect IMEI:357541000485658</td>
<td>357541000485658</td>
<td>☑</td>
<td>☑</td>
<td>28° C</td>
<td>7 horas, 6 minutos atrás</td>
</tr>
<tr>
<td>SmartConnect IMEI:357541000485690</td>
<td>357541000485690</td>
<td>☑</td>
<td>☑</td>
<td>31° C</td>
<td>7 horas, 3 minutos atrás</td>
</tr>
<tr>
<td>FoneAstra IMEI:98765432</td>
<td>98765432</td>
<td>☑</td>
<td>☑</td>
<td>17° C</td>
<td>12 minutos atrás</td>
</tr>
</tbody>
</table>
### Surveillance Data

#### SmartConnect

<table>
<thead>
<tr>
<th>Enfermedad</th>
<th>Sexo</th>
<th>Edad</th>
<th>Casos</th>
<th>Tiempo de Informe</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Masculino</td>
<td>6</td>
<td>1</td>
<td>Sep 6, 2010 11:54:23 AM</td>
</tr>
<tr>
<td>6</td>
<td>Feminino</td>
<td>9</td>
<td>1</td>
<td>Sep 6, 2010 12:29:13 PM</td>
</tr>
<tr>
<td>112</td>
<td>Feminino</td>
<td>1</td>
<td>2</td>
<td>Sep 6, 2010 12:32:50 PM</td>
</tr>
<tr>
<td>47</td>
<td>Feminino</td>
<td>2</td>
<td>1</td>
<td>Sep 6, 2010 12:33:35 PM</td>
</tr>
<tr>
<td>53</td>
<td>Masculino</td>
<td>4</td>
<td>2</td>
<td>Sep 6, 2010 12:49:03 PM</td>
</tr>
<tr>
<td>23</td>
<td>Masculino</td>
<td>3</td>
<td>4</td>
<td>Sep 6, 2010 12:49:20 PM</td>
</tr>
<tr>
<td>71</td>
<td>Feminino</td>
<td>4</td>
<td>1</td>
<td>Sep 6, 2010 12:49:20 PM</td>
</tr>
<tr>
<td>12</td>
<td>Masculino</td>
<td>2</td>
<td>2</td>
<td>Sep 6, 2010 1:04:44 PM</td>
</tr>
<tr>
<td>34</td>
<td>Masculino</td>
<td>1</td>
<td>2</td>
<td>Sep 6, 2010 1:13:02 PM</td>
</tr>
<tr>
<td>2</td>
<td>Masculino</td>
<td>3</td>
<td>3</td>
<td>Sep 6, 2010 1:17:46 PM</td>
</tr>
<tr>
<td>41</td>
<td>Feminino</td>
<td>4</td>
<td>1</td>
<td>Sep 6, 2010 1:18:58 PM</td>
</tr>
<tr>
<td>63</td>
<td>Feminino</td>
<td>1</td>
<td>1</td>
<td>Sep 6, 2010 1:21:57 PM</td>
</tr>
<tr>
<td>52</td>
<td>Feminino</td>
<td>3</td>
<td>4</td>
<td>Sep 6, 2010 1:26:06 PM</td>
</tr>
<tr>
<td>23</td>
<td>Masculino</td>
<td>2</td>
<td>1</td>
<td>Sep 6, 2010 2:00:50 PM</td>
</tr>
<tr>
<td>2</td>
<td>Masculino</td>
<td>3</td>
<td>1</td>
<td>Sep 6, 2010 2:03:34 PM</td>
</tr>
<tr>
<td>1</td>
<td>Masculino</td>
<td>1</td>
<td>1</td>
<td>Sep 6, 2010 2:06:06 PM</td>
</tr>
<tr>
<td>5</td>
<td>Feminino</td>
<td>2</td>
<td>1</td>
<td>Sep 6, 2010 2:12:37 PM</td>
</tr>
<tr>
<td>11</td>
<td>Masculino</td>
<td>1</td>
<td>1</td>
<td>Sep 6, 2010 2:14:48 PM</td>
</tr>
<tr>
<td>4</td>
<td>Feminino</td>
<td>3</td>
<td>1</td>
<td>Sep 6, 2010 2:27:02 PM</td>
</tr>
<tr>
<td>2</td>
<td>Feminino</td>
<td>2</td>
<td>2</td>
<td>Sep 6, 2010 2:32:19 PM</td>
</tr>
</tbody>
</table>
Initial Trial

PATH Managua

Pacayita

Valle de la Laguna

Humberto Alvarado
Feedback

• Understood concept and believed the project to be valuable

• Positive response to UI
  • Some suggestions for wording improvements

• Some Challenges connecting to cellular network in most rural areas
Questions?