Data Management

Lecture 20: CSE 490c



Announcements

- No class Monday, November 12
- No class Wednesday, November 21

Topics

- ODK 2.0 Design
- ODK 2.0 Application
- ODK 2.0 Technical Challenges
- ODK Research Projects
 - ODK Clinic
 - ODK Scan
 - ODK Sensors

Limitations of ODK 1.0

- IMHO the success of ODK 1.0 is due to its focus on a core data collection use case
- But what else did people want?
 - Greater flexibility with user interface
 - Ability to collect data based on previous data
- ODK 2.0 developed as a data management platform requiring greater sophistication in application development and deployment

Open Data Kit learnings and philosophy

- Data collection projects require technical people in charge of managing forms, data, and devices
 - Deployment Architect
- The purpose of the Data Collection Platform is to give the Deployment Architect the ability create and manage survey process
- The Deployment Architect is not an Android developer
 - ODK 1.0 Deployment Architect: Forms designer
 - ODK 2.0 Deployment Architect: Javascript

ODK 2.0 Features

- Fully customizable layout of prompts on the Android device
- More flexible, user-directed, navigation of a survey
- Bi-directional synchronization of data across devices
- Data curation and visualization on the device
- Row-level access filters

I Note

ODK 2.0

The ODK 2 tool suite is targeted at advanced users who are unable to complete their workflows with the ODK 1 tools. If you find that the ODK 1 tools meet your needs then there is no reason to switch.

- ODK Application Designer
- ODK Survey
 - Data Collection app based on HTML, CSS, JavaScript
- ODK Tables
 - Data Curation and Visualization app
- ODK Services
 - Application for syncing data across multiple devices and with server
- ODK Cloud Endpoints

ODK 2.0 Architecture



ODK 2.0 Cold Chain Demo I







ODK 2.0 Cold Chain Demo II



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ODK 2.0 Cold Chain Demo III



ODK 2.0 Cold Chain Demo IV

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ODK 2.0 Cold Chain Demo V



Technicalities: Synchronization

- Basic data structure: Table
- Synchronization through central database
- Important use case is:
 - Online for download (synchronize) of forms and database
 - Offline for data collection
 - Online to upload (synchronize) data
- How are conflicts handled?
 - Flag conflicted rows for manual update
- Common case data collection on distinct rows

Technicalities: Users and groups

- Important requirement from users
 - Different levels of access based on groups
 - Supervisors and enumerators with responsibilities based upon geographic areas
 - Read and write access
 - Permissions based upon groups
- Management of users
 - Rely on standard authentication LDAP
 - Managing authentication and groups increases complexity for deployment architect
 - User management is the critical component of integrating ODK 2.0 with other systems

ODK Research Projects

- ODK Clinic
 - Integrate with Medical Record System
- ODK Sensors
 - Provide drivers to allow sensors as input
- ODK Submit
 - Extend communication model to support a broader range of transport mechanisms to reduce cost
- ODK Scan
 - Use the camera for paper to digital input
 - Restricted forms of input: bubble forms and numbers

ODK Clinic

- ODK Clinic
 - ODK 1.0 integration with OpenMRS
- ODK 2.0 as an Android App for global goods software systems
 - DHIS 2: Health Data Reporting
 - Open LMIS: Logistics Management
- Key integration points
 - Data synchronization
 - User management

ODK Scan

- Problems
 - Data collection from registers
 - Data collection from tally forms
- Key scenarios
 - Counting number of immunizations given at a session
 - Reporting stock counts of medications
- Deployment partner
 - Village Reach
- Value proposition
 - Much faster data aggregation
 - Reduces steps in workflow





ODK Scan Implementation

- Built on an early version of ODK 2.0
 - Allowed richer user interface including a correction UI
 - Multiple data elements per screen
 - More complex data transport model
- Restricted to bubble forms and numbers in a 3x2 grid
- Forms designed for ODK Scan
- Field testing
 - Importance of using a stand for stability and distance

- Image processing steps
 - Fields on form marked on master form
 - Registration marks for alignment
 - Identify data elements
 - Image recognition on data elements



ODK Scan challenges

- Forms in bad condition
- Lighting and contrast
- Image recognition of digits
- Identification of regions if paper was warped
- Synchronization of images with master database



ODK Sensors

- What if data is coming from a sensor and not text input?
- Model of automatically collected data fits in ODK 2.0
 - Direct input
 - Time varying
 - Event Based
- Technical issue
 - How are the drivers managed

• Sensors Architecture



ODK Sensor Applications

- Water carrying study
- Pulse Oximetry
- Managing pasteurization of human breast milk





