CSE 477

Project Ideas
January 13, 2009

Project Idea Pitches

- Two (or at most three ppt slides)
- Components
  - Basic problem that is being addressed
  - Overview of technological solution
  - Technologies that are involved
  - What would be built
  - Major challenges
  - How it would be evaluated

Andy Turner

PCG SR

Pull Cord Generator
Smart Recharger

- Problem: Low cost human power generation.

  - Makes excellent use of available muscle power.
  - Improper charging of batteries ruins them.

- Solution:
  - Integrate power conditioning and user feedback using additional electronics, micro-controller and a simple display.
- Technologies:
  - Batteries – Determine the proper recharge profiles for Lead Acid 'wet cells', NiCad, and Lithium Ion batteries.
  - Electronics – Measurement and Power – sense system activities, condition power flow appropriately.
  - Micro-Controller – Coordinate the activities of the electronics and provide user feedback.

- Product:
  - One of:
  - Integrated inside the generator.
  - Auxiliary box.
- Challenges:
  - Potenco has not yet released their product for purchase (est mid 2009).
  - Determining and verifying the recharge profiles.
- Evaluation:
  - Does the product 'correctly' recharge batteries?
  - Is the device robust and fool proof?

Guy Bordelon

CSE 477 Project Idea

- Cuba is ravaged by tropical storms
- More people are buying cell phones
- SMS storm alerts to subscribers
- UW Dept of Atmospheric Sciences data
- Software application that reads forecast data
- Internet-based software application that sends SMS alerts

CSE 477 Project Idea

- Bureaucracy
- Finding Participants
- Could be evaluated using field testing

Trevor Bosaw

Text Viewer

- Problem: Even with limited internet in extremely rural areas, information is still very difficult to receive. There doesn't seem to be many easy ways to quickly receive moderate amounts of information (for example, almanac info for farmers).
- Technology solution: Simple, cheap text viewer (similar to kindle, but less features). No direct internet connection, but would connect to computer via usb, drag text files (or something similar) to volume.

Text Viewer

- Technologies: Hardware of device, usb, website server
- Challenges: cost of device, intuitive and simple device interface, intuitive website (to be able to quickly find and download necessary information)
- Evaluation: Data on a single (or multiple) town's usage of the device would be taken, including how they were able to contribute/download from the website.

Charlotte Robinson

Distribution: Reducing Gov'nt Corruption

Problem: Food, other goods, or services are transferred from government sources to sometimes corrupt district magistrates to be distributed. (IE, school incentives, etc)

Solution: Corruption might be lessened by automated and reliable delivery systems and computerized record keeping. Electronic record keeping would provide a way to track what is going where and make individuals more accountable.

Distribution: Reducing Gov'nt Corruption

Technologies Involved: Data storage/networking/potential low-cost devices for record entry/signatures.

What Would Be Built: UI for data entry/ record lookups.

Major Challenges: Getting govn't workers to embrace system / having people track results.

How to Evaluate: Data collection in India / (surveying citizens, comparing against current numbers).

Clint Tseng

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goods and services

may be difficult to sell/trade goods and services between reasonably close rural villages and towns

therefore, build a 'craigslist for the developing world'

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goods and services

organic enough to deal with connectivity
mesh/p2p networking

simple enough to deal with clarity
visual interface; audio/video options

evaluation is easy; collect usage data

Tom Sommerville

Genealogical/Social Identification

- Problem: Maintaining records of individuals is difficult when there is no unique identifier. The problem is made worse by the fact that information is often incomplete or missing (unknown birthdates, inconsistent names, etc.)

- Solution: Create a system that combines a map of a person's familial relationships with another of their social relationships, along with other information such as social positions, to uniquely identify that person. Collect information about a person's family tree, as well as neighbors and friends, and their social roles, to create the maps.

CSE490D

Tom Sommerville

Genealogical/Social Identification

- Technology: Map Matching
  Mobile (Android?) Interface

- Challenges: UI Design
  Designing Questionnaire
  Developing Matching Algorithms
  Determining ways to accommodate missing data such as birthdates
  Determining ways to accommodate inconsistent data
  Maintaining Data Security

CSE490D

Tom Sommerville

Genealogical/Social Identification

- What to Build: Database for Identity Data
  Mobile Interface (Android?)
  Interview Questionnaire for Identity Establishment
  Interview Questionnaire for Identity Testing

- Evaluation: Health Workers and other organization representatives whom use the data to ID individuals
  Individuals who use the system to track their genealogy

CSE490D

Tom Sommerville

Beth Gusenius

Birth Records &
Neonatal Risk Detection

Beth Gusenius

Birth Records & Neonatal Risk Detection

- Problem: Many births in the developing world occur without the assistance of a medical professional. Often attendants do not have the training to recognize significant risk factors, such as low birth weight.
- Solution: Provide community health workers and/or rural communities with a way of reporting infant's vital statistics health care professional for evaluation.
- Technology: Web-enabled cell or possibly an Android implementation

Birth Records & Neonatal Risk Detection

- Challenges
  - Designing practical UI for non-literate users
  - Connectivity
  - Cost
- What to Build
  - Create form/survey to collect vital information, possible Android implementation, & durable, low-cost scale
- Evaluation
  - Feedback from community health workers and health care professionals, Comcare project

Jennifer Hanson

Potable Water in the Developing World

Description

•Clean water is essential for life, yet large segments of the world lack this vital resource. It is quite costly and often privatized in the developing world.

•99 percent of water on Earth is unavailable or unsafe for consumption.

•About 1.2 billion people lack safe water.

•2.6 billion do not have access to adequate sanitation.

Importance

•Water is essential for poverty reduction, agriculture, food and energy production, and recreation.

•It is a women's issue-Time spent gathering household water, traditionally a women's task, robs women and girls of getting an education or engaging in meaningful work.

•It is a children's issue-water is essential for healthy development.

•It is a national security issue-many conflicts arise from disputes over arable land and water.

Potable Water in the Developing World

Description of the application
•A simple communal water purification system could be devised.
•It could contain a water purification component, a cost counter (ie a gas pump only for water), and a tab system.
What does it do?
•The owner could purify the water, charge a nominal fee per volume purchased, and monitor payments.
•The purification component would remove harmful bacteria, parasites, calcium, heavy metals and other toxins.
What is it good for?
•The system could allow the economically disadvantaged an opportunity to purchase cheap and safe water.
•It could foster home businesses and increased entrepreneurship opportunities for those in impoverished communities.
Who will care?
•This system could benefit those in need of clean water and cannot afford to purchase current options.
•This system could benefit those who could form the home business.

Heather Underwood

Project Proposal:
Deaf Education

Heather Underwood

- Problem: India and Nepal have large deaf populations. Deaf children have little or no access to education and are often seen as outcasts.
- Solution: Develop a sense of community among the deaf in these areas. Provide education to deaf children from deaf children. Foster a national form of sign language.

- Technologies:
  - Video phones, better video/picture SMS technologies
  - DVDs focusing on promoting literacy and sign language (as well as basic health education), video manipulation, editing, replay.
  - Wireless connectivity, long distance networking
- Challenges:
  - Power, connectivity
  - Cooperation among deaf population and reaching deaf populations in rural areas
  - Communication, literacy, text to sign translation
  - Deaf-targeted UI for education and communication

- What to build:
  - Cheap portable DVD player
  - Robust video phones that can be used with local telephone connections
  - Educational software for deaf children to promote literacy and a national form of sign language
- Evaluation:
  - Feedback from teachers of deaf students in India
  - Determine if a national form of sign language is developing by comparing the signs used in various regions.

Danny Anderson

Mobile marketplace

Problem: Merchants, farmers, and service providers aren't reaching as wide of an audience as they could.

Solution: Build an SMS based mobile marketplace where sellers can upload ads and customers can search any desired good.

Technology: SMS I/O with SQL server. A free phone number should be provided to teach how to use the system, and also a web page and portal to the system. Hopefully this all could be provided as a free service.

Mobile Marketplace

Challenges: Secure use and not exploitable by any party. Fair and equal somehow. Schema to index information.

What to build:
Web page, database, and SMS combined project. Use an existing SMS SQL interface.

Evaluation:
Have buyers remove sold items, track sales.

Sunil Garg

Rural Mapping

- Problem: NGOs are not able to maximize their effectiveness in working with their target populations due to inadequate record keeping, lack of access, and difficult terrain.
- Solution: Build a system that facilitates geotagged data collection which would then allow rich mapping of the population and issues surrounding them, as well as location-enabled services for rural workers.

Rural Mapping

- Technologies: existing NGO information systems, location-enabled mobile devices
- Challenges
  - effective mobile user interface
  - integration with existing systems
  - cost
- What to Build
  - mobile data collection toolkit that is location-enabled
  - collect information that is easily consumed by existing information systems
  - display and visualize the geotagged data in a useful manner
- Evaluation
  - feedback from the NGO
  - data collected from deployments

Additional Ideas

Charlotte Robinson

Translating Existing Medical Data/ Easy Entry

Problem: Currently, healthcare workers may waste time trying to identify someone/re-identify their problem, because of inconsistent methods of identifying someone.

Solution: Develop programs to translate current data into common formatting, and/or a program with easy UI/data entry for translating paper records to computer with low technical expertise.

Translating Existing Medical Data/ Easy Entry

Technologies Involved: Devices for data-entry, surveying.

What Would Be Built: Mobile program for surveying, laptop program for data entry and/or surveying and/or translation of existing records.

Major Challenges: Creating UI for non-technical people to enter/translate data.

How to Evaluate: Data collection in India / (surveying citizens, comparing against current state).

Richard Anderson

- From last week

Video Testimonials

- Problem: Village women end up in urban prostitutions after migrating to cities. Provide a mechanism for giving villages more information about urban migration. (Suggested by an Indian Social Worker)
- Technology solution – digital video of interviews, which are then replayed in village
    - Facilitator based or privately

Video Testimonials

- Technologies: Digital Video, Editing, Video Transmission, Replay
- Challenges
    - Technology : low cost (especially reply)
    - UI: Editing videos, replay by illiterate users
    - Social: handling sensitive topics
- What to build
    - Emphasize editing or replay
- Evaluation
    - Feedback from social workers

Robust Record Keeping

- Problem: Keeping records when people don't have unique identifiers, and information is poor (for example, people don't know their birthdates, names are inconsistent, spelling is not available)
- Solution: Collect a range of information (e.g., relationships), develop algorithms for approximate matching of identities

Robust Record Keeping

- Technologies: Approximate matching in networks, possible Android implementation
- Challenges
  - Developing robust algorithms, designing interview, UI for mobile field use
- What to build
  - Interview system and database for maintaining identity, Android implmentation
- Evaluation
  - Feedback from IHME, Comcare Project

Every flash drive in Africa is infected with viruses

- Problem: Wide spread computer viruses in an environment with limited internet connectivity, pirated software and no updates
- Solution: Transport mechanisms for virus updates via flash drives
- Technology: Anti virus technology, high latency networking

Anti virus software

- Challenges
  - Legacy software, understanding threats, many generations of systems, avoiding creating new threats
- What to build
  - Prototype system that allows virus updates to be propagated via flash drives
- Evaluation
  - Data collected from Africa