# Mobiles for Data Entry 

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- 300 m mobiles in India by 2008, Im per month
- 70-80\% population covered by GSM/CDMA
- Much lower PC/Internet Penetration $\Rightarrow$ Mobile as a ubiquitous portable data entry device even when coverage not there


## Computer Architecture

- "Can Biosurveillance Algorithms coupled with Pervasive Mobile Applications potentially be effective in the early detection of disease outbreaks?"



## Mobile OS Market Share

- Symbian
- Linux
- Windows CE
- Blackberry OS
- Palm OS
- Apple OS
- $6 \%$
- $5 \%$
- $1.6 \%$
- $1.3 \%$


## Typical Mobile Software Stack

## Applications

## Applications

Java
Application Frameworks

## Multimedia

## Communications

## Core OS Services

## Tenet

## Android Software Stack

| APPLICATIGNS |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Home | Contacts | Phone | Browser | ... |
| APPLICATIGN FRAMEWIRK |  |  |  |  |
| Activity Manager | Window Manager | Content Providers | View System | Notification Manager |
| Package Manager | Telephony Manager | Resource Manager | Location Manager | XMPP Service |
| LIBRARIES |  |  | ANDRGID RUNTIME |  |
| Surface Manager | Media Framework | SQLite | Core Libraries |  |
| OpenGL\|ES | FreeType | WebKit | DalvikVirtual Machine |  |
| SGL | SSL | libc |  |  |
| LINUX KERNEL |  |  |  |  |
| Display Driver | Camera Driver | Bluetooth Driver | Flash Memor Driver | Binder (IPC) Driver |
| USB Driver | Keypad Driver | WiFi Driver | Audio Drivers | Power Management |

## D-Tree Solutions

- iPDA like solution to be made available mobile phones with touch screen
- http://www.d-tree.org/



## Application Development

1. Write in $\mathrm{C} / \mathrm{C}++$ for specific OS
2. Write in Java, runs on most phones
3. Use a toolkit:

FRED (Acceltree, Pune, India)

- Ported to most phones

Android (Google)

- Linux phones

OpenRosa (Open source)

- a proposed standard


## Fred diagram



- Forms-based data entry from browsers and mobiles
- Server-side interface to popular DBMS
- Several clients including micro-finance

