SmartMatatu: Sensors for Public Transport

powered by and introducing
Echo Sense

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I. BACKGROUND:
ECHO MOBILE PLATFORM AND CHANNELS

1. NO POVERTY
2. NO HUNGER
3. GOOD JOBS AND ECONOMIC GROWTH
4. DECENT WORK AND EQUITY
5. INDUSTRY, INFRASTRUCTURE AND INNOVATION
6. CLEAN WATER AND SANITATION
7. RENEWABLE ENERGY
8. LIFE BELOW
9. SUSTAINABLE CITIES AND COMMUNITIES
10. CLIMATE ACTION
11. PEACE AND HAPPINESS
12. PARTNERSHIPS FOR THE GOAL

Channels:
- SMS
- USSD
- Web
- Android
- IVR
ECHO’S IMPACT

>15 Countries
>110 Organizations
>1.2M Respondents
>20M Messages

www.echomobile.org
www.sense.echomobile.org
POWER TO THE PHONE

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IoT is the network of physical objects (devices, vehicles, buildings and other items) embedded with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data.

- Wikipedia
WHAT’S NEXT? SENSORS!

WHAT’S NEXT? SENSORS!

- Transparency
- Efficiency
- Cost saving
- Accuracy
SENSOR DATA PLATFORMS?
II. INTRODUCING:

Echo Sense
A sensor data analysis platform built for quick deployment in the Google cloud

Get up and running today, or start developing.

CONTRIBUTE ON GITHUB

Or...

- Read the Echo Sense documentation [here](#)
- Talk to our team at sense@echomobile.org
HOW TO USE ECHO SENSE:

1. Select hardware
2. Create Sense instance (server) & configure devices
3. Set rule conditions, automate alerts
4. Produce charts on demand or export data
5. Integrate your apps or MIS via Sense API
WHY ECHO SENSE?

FLEXIBLE SETUP: Designed for implementation across sectors. Use out of the box or customize.

FOR DEVELOPMENT: Built in East Africa based on over a decade of experience building software for development.

OPEN SOURCE: MIT Licensed. Use and extend freely.
III. Use Case:
SMARTMATATU PROJECT

One-year RCT

Funding:

Private Enterprise Development in Low-Income Countries

Tech & implementation:

Mitigating Market Frictions by Monitoring Employees in SMEs: A Field Experiment in Kenya’s Public Transport Sector

David Schönhölzer, Erin Kelley, Gregory Lane and Peter Waiganjo Wagacha

This project develops and tests a fleet management system for Kenya’s semi-formal public transport system. The pilot study shows that firms with this system are more easily able to track their employees’ productivity and safety performance, which allows owners to incentivize better driving behavior.

Background

For millions of individuals in the developing world, commuting to work is a risky endeavor: with 1.24 million people dying in traffic accidents each year, they are the leading cause of death among individuals aged 15-29. In Kenya, public transport makes up a majority of traffic, and public minibuses, called matatus, make up a large share of traffic accidents.

An important possible cause of the reckless driving responsible for many accidents is the contractual structure under which matatu drivers are hired. Each night, the drivers are required to give the matatu owner some target amount of cash. As a result, matatu drivers face a lot of pressure to earn a high daily revenue, and thus have a strong incentive to engage in risky driving.

The matatu business is not only dangerous but also unproductive. Matatu owners have high costs for maintenance, repair and insurance, and their profit margins are low. In addition, keeping track of their matatu driver’s income by calling or checking on him in person can be very time-consuming. These repair and monitoring costs increase as owners oversee more and more matatus, leading to inefficiently small firms in this industry.

Intervention – Introducing a Tracking Device for Matatus

Our project addresses these two problems – safety and productivity in small matatu firms – by developing and piloting a new monitoring technology. This technology consists of a sensor device that uses GPS and accelerometer technology to measure speed, location, mileage, sudden deceleration and acceleration. As a result, owners can...
DEVELOPMENT PROBLEM
DEVELOPMENT PROBLEM

- 1.24 million annual deaths
- 20-50 million injuries
- Leading COD for 15-29 y/o
- Up 83% by 2020 in lower/middle income countries.
SOLUTION: SMARTMATATU SYSTEM

1. [Image of a device]
2. [Image of a computer screen showing data viewer]
3. [Image of a mobile phone screen showing data]

www.echomobile.org
www.sense.echomobile.org
NEXT FOR SMARTMATATU

10 test buses in Nairobi

50 pilot buses by July

250 RCT buses by August

www.smartmatatu.com
NEXT FOR ECHO SENSE

HARVEY MUDD COLLEGE

RainCatcher

➔ Developers - Contribute on GitHub!
➔ Practitioners - Get in touch! sense@echomobile.org

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THANK YOU!

Please get in touch!

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APPENDIX: ECHO SENSE FAQ

Who can use Echo Sense? How much does it cost?
Anyone. Echo Sense is free to use, customize, and deploy under the MIT open source license.

What can Echo Sense be used for?
A wide variety of applications may be deployed using Echo Sense. Agricultural applications include monitoring soil acidity and moisture, the temperature on drying tables, local weather patterns, etc. Other applications may leverage structural sensors to monitor the usage of assets or buildings, or location-tracking devices to monitor movement patterns and behavior of vehicles, etc. At the basic level, Echo Sense supports any usage involving the deployment of low-cost sensors to monitor one or more aspects of a program, project, or location over time.

What devices can I use?
Any sensor that can be configured to send data to a remote server can be used. Currently HTTP is the primary communication protocol, but Echo Sense has been used with devices communicating via TCP and UDP with the aid of a light-weight TCP/UDP server.

I want to deploy an Echo Sense project, what do I do?
Get in touch with the Echo Mobile deployment team by reaching out to sense@echomobile.org. Alternatively, organizations with an in-house developer can spin up an instance and customize it, or use it off-the-shelf right away.

How can I get involved?
Developers can join the Echo Contributors team on Github, fork the repository, and start developing. Want to get involved in another way? Send us an email.