



Enterprise Mobility: Benefits of Multimodality in Mobile Force Automation

Introduction: Enterprise Mobility Challenges



The recent proliferation of smart-phones & sophisticated mobile devices is making the promise of Enterprise-Mobility a reality. Enterprises realize the need for access to information on the move and are long sold on the benefits of mobility. They are making huge investments in building mobile infrastructure. But, they are finding the path to total mobility, fraught with organizational roadblocks and technological challenges.

At a broad level, Enterprises face two kinds of challenges in mobile enabling their applications today:

Application Development & Management

Mobile devices come in a variety of form factors, display sizes and platforms using different networks. Consequently, enterprises are forced to develop multiple applications to cater to these multiple devices and platforms. Managing these multiple devices and applications across the enterprise is a resource-intensive effort that is cumbersome and expensive.

Usability and Adoption

Depending on the data collected in the field, field users have to type in a lot of information on their mobile devices. They find it extremely unwieldy to navigate through multiple screens and enter varied data using a tiny keypad. Most commonly, this forces them to take manual notes that must be transcribed later, thereby defeating the efficiencies of a mobile solution. Even if they manage to avoid manual notes, the whole process of data capture is labor and time intensive making the promise of enhanced productivity from mobility unfulfilled. In many cases, a majority of the field users is not proficient in computer usage and as such are wary of adopting sophisticated mobile solutions due to unfamiliarity. Their reluctance increases the investment in training and advocacy of mobile application use, which diminishes the return on investment (RoI) from mobile solutions. Many times, field-users find themselves in situations

where their hands are occupied in field operations and they cannot interact with mobile applications (to access or capture information) in a hands-free mode. For field users who face this situation often, the utility of a mobile solution would be minimal.

All these challenges lead to the erosion of the cost-benefits expected through implementation of mobile solutions.

Solution: Multimodal Interaction

Multimodal interaction or Multimodality goes a long way in addressing these challenges associated with usability and adoption. Multimodal interaction is characterized as use of multiple input modes such as speech, stylus (pen), touch, key-pad and gestures to interact with mobile devices.

Multimodality provides the users with a more natural, flexible and better way of interaction. Well designed multimodal systems combine multiple modes to create interfaces that are efficient, productive, easy to adopt and robust when compared to unimodal systems.

Case for Multimodal Interaction



The significant advantage of multimodal interaction is that of enhanced efficiency or increase in productivity. Field users can get more work done using fewer resources in less time. The resulting improvement in efficiency is instantly recognizable in scenarios involving data input related to location, number, size, orientation and shape of an object. Field users can easily sketch shapes and scenarios and use speech to specify dimensions and numbers. Consider the example of an Insurance claims application that provides the field-agent the ability to photograph the incident, annotate using electronic-ink to highlight areas of the incident using stylus (or touch) and use speech to capture observations. He or she can complete the incident-report in a fraction of the time as compared to entering all the details into a conventional form-fill application. The resulting rich compound document contains a more valuable and complete data-record of the incident.

The second significant advantage of multimodal interaction is easy and fast adoption. The natural and intuitive interfaces create a higher inclination among the user-base to use the system. Speech based instruction and directions make it easier to train new users and accelerate adoption, thus simplifying and reducing the training time and cost. Consider the example of a pharmaceutical sales representative: It would be a lot easier for him or her to say “*Make an appointment at 10 AM with Dr. Bernard*” than to go through a mystifying manual that describes the steps to create an appointment using an application.

Multimodal interaction provides users with the choice of different input and output modes. This flexibility allows users to operate in different environments (hands-free, noisy etc) where a single mode may not be ideal. For example: a field technician can have his or her mobile device read out (text-to-speech) the customer information and service history while driving to the customer location or have instructions read out while repairing the equipment.

Multimodality increases the robustness of the applications by minimizing data entry errors and common mistakes during mobile interaction. Multimodality provides what is called “mutual disambiguation” one mode of input will act as a check for other input modes. e.g. visual cues will highlight any discrepancies in speech input recognition and provide an opportunity to the user for the data-quality check prior to submission.

Another significant advantage of multimodal interaction is that it allows capture and transmission of different kinds of information such as e-Ink annotations on images, barcode and RFID scans, voice notes, and digital signatures that are otherwise not possible in traditional unimodal applications.

Case Study: How a HVAC company benefited from Multimodal Field Service Solution

Company Profile: A leading heating, ventilation and air conditioning (HVAC) company providing services to residential, commercial and industrial customers in USA with hundreds of employees & vehicles out on the road servicing customers every day.



Business Need: Service technicians in the field utilized paper forms to capture information and perform transactions out in the field. But the paper-and-pen based processes could not keep pace with rapidly growing business — the flow of information was too slow and inconsistent, affecting dispatch efficiency. The company was looking for a paperless solution to improve productivity and accuracy throughout field operations that was **easy to use, easy to adopt** and **easy to manage**.

Solution: Openstream's Mobile Force Automation (MoFA) solution built on **cue-me** multimodal platform, provides a comprehensive and integrated enterprise solution comprising field-service automation, inventory management, GPS navigation and a point of sale capability, all on a single handheld device with multimodal capabilities.



- Automated location-based dispatch — work orders are sent electronically to the handhelds with text to speech capability. Technicians can have the handhelds read out work order information while driving
- “Voice form-fill”- Rapid completion of forms via speech-to-text as well as keypad input
- Access to the full range of information — including service history, inventory access, contracts, wiring diagrams and more using speech and/or touch commands and navigation
- Ability to complete, email or print invoices out in the field
- Ability to process credit and debit cards out in the field for real-time payment processing
- On-board navigation for real-time directions, ensuring prompt arrival at the next service location
- Operate in both connected and disconnected modes and automatically synchronize data with back-end enterprise systems securely

Benefits:

- Substantial 12% reduction in labor savings (saving one hour per technician per day due to multimodal application interface)
- Improved productivity for accounting staff : re-purposed 2 full time data entry operators
- Reduced Inventory variance (3% reduction resulting in \$4000/month savings) from elimination of inventory errors
- Elimination of expenditure for maps using real time GPS with multimodal interface
- Substantial fuel-cost savings from more efficient routing of their service-vehicles
- Improved service consistency through field-access to comprehensive installation and maintenance routines while on the job
- Increased operational efficiency and productivity and expedited cash collections by reducing invoice-to-cash delays.





Openstream Multimodal Platform

Openstream's Cue-me is a W3C & OSGi standards based, Multimodal Mobile Application platform.

Cue-me is the underlying technology used in building Openstream's suite of Mobile Force Automation (MoFA) solutions that are multimodal enabled. MoFA solutions are network, platform and device independent and integrate with wide variety of enterprise SOA (Service Oriented Architecture) backend systems. Openstream's multimodal solutions have helped numerous clients worldwide in the areas of: Field Services and Field Sales, Retail, Manufacturing/ Distribution, Telecom, Health Care & Life Sciences, Media /Digital Publishing, Financial Services, Insurance & Utilities.

Using Cue-me open-standards-based tools Enterprises and ISVs can rapidly develop scalable multmodal mobile applications that can be easily deployed and managed across various popular mobile device platforms (BlackBerry, Windows Mobile, iPhone, Android, Symbian, Palm & Linux).

Cue-me multimodal platform integrates speech, touch and type as well as on-device peripherals such as camera, GPS receiver and RFID/Barcode scanners to provide rich, compound documents that are integrated with mobile workflows on multiple device platforms. Cue-me shields mobile applications from complexities of individual speech technologies, native device APIs and platform-specific dependencies. Through Cue-me, mobile applications can leverage capabilities such as voice forms-fill, digital ink annotation and can operate in connected and disconnected modes.

Thus, enterprises today can derive the full benefits of mobile enabling their applications and can also get the seamless ability to automatically synchronize data with enterprise-backend applications in a secure way using multimodal technology as the next leap in mobile interaction.

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