Enhancing the Man-Machine-Interface of Accelerator Control Applications with Modern Consumer Market Technologies

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Motivation

• Today’s consumer market is a major technology driver

• In particular:
  – Smartphones and tablets
  – Game consoles
  – Augmented reality devices
Unique Features

• **App** established as novel application class

• Staying **online** everywhere all the time

• Versatile **Man-Machine-Interface (MMI)** available providing
  – Touch gesture (2D) recognition
  – Motion gesture (3D) recognition
  – Speech recognition
  – Gaze recognition
Imagine ...

Control a device

Manipulate a set value

Close valve V0

Accept

Decrease

Increase

Discard

Operate an over-head display

Note: The next generation of operators might no longer be familiar with detailed, mouse-controlled applications
Web2cToGo Project

Web2cToToolkit

Example Web-Applications

Web2cToToolkit - compliant Web-service
Web2cToGo Implementations

• **Platform - neutral**
  – Native mobile apps
  – Browser-based app
  – Native Java application

• **Hybrid**
  – Embedded Web2cToGo Web-Desktop (HTML, CSS, JavaScript)
Web2cToGo Environment

- Mouse
- Touch
- Voice
- Virtual Touch

Indicators for Video- / Audio Recording

Select Application

Toolkit Bar (only temporarily visible)

Display Toolkit Bar

Web2cToGo Web-Desktop (Application Explorer)

Touch-Sensitive Navigation Bars
Web2cToGo MMI: Touch

- **Swipe "top ↔ bottom"**
- **Tap "up"**
- **Tap "down"**
- **Pinch "open"**
- **Tap "left"**
- **Pinch "close"**
- **Tap "tile n"**
- **Swipe "left ↔ right"**
- **Tap "right"**

**Swipe "right → left"**
("left → right")

**Browse to next (previous)**
application
Web2cToGo MMI: Touch

Capture Events → Recognize Gesture → Execute Command

Web2cToGo App

prompt
Web2cToGo MMI: Voice

“Browse right”
Web2cToGo MMI: Voice

- Web2cToGo App
- Record Audio File (2.5s)
- Upload Audio File
- Convert Audio Format
- Analyze File
- Publish Commands
- Execute Command

≈ 3 - 4s

80% - 90%
Web2cToGo MMI: Virtual Touch

LCD projector

Camera

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Web2cToGo MMI: Virtual Touch

≈ 2 - 3s
Web2cToGo: Next Steps

• Support more MMI types and provide
  – Motion gesture (3D) recognition
  – Gaze recognition

• Test Web2cToGo in combination with Google Glass

• Design and implement Web2cToGo-compliant apps for specific use cases

• Field test involving control room operators and service technicians
Web2cToolkit Home

http://web2ctoolkit.desy.de
Web2cToGo Client-Server Architecture

Web Client

- Web2cToolkit Web-Client (HTML, CSS, XML, JavaScript)
- Web2cToGo Web-Desktop Client (HTML, CSS, XML, JavaScript)
- Web2cToGo App (e.g. Java/Android) / PhoneGap Device Interface (mobiles platforms only)

Web Server

- Web-Server / Java Servlet Container (e.g. Apache / Tomcat)
- Web2cToolkit Web-Servlet / Web2cToGo Web-Desktop Servlet (Java)
- Control System Interface (e.g. TINE)

HTTP