Smart Objects For Intelligent Applications

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SOFIA Motivation and rationale

Main goal of the SOFIA project is to make "information" in the physical world available for smart services - connecting physical world with information world.

Full access to information present in the embedded computing devices has a potential for large impact on the daily lives of people living in this environment.
SOFIA Consortium

Industries and applications

- Mobile devices
- Automotive
- Home entertainment
- Wearable computers
- Building maintenance
- Large IT
- Video surveillance
- Lighting systems
- Emergency support systems
- WSNs
SOFIA - Smart objects
SOFIA - Sharing information locally

What if I know that he is answering the call? Should I turn the sound off? Automatically?

What if I know that he can not hear the incoming call? Should I flash lights? Automatically?

What if I know that music is loud in the room? Could I alarm louder? Use vibration? Automatically?

SOFIA platform makes it possible to mash-up and integrate information between all applications and domains spanning from embedded domains to the Web.
Smart-M3 functional architecture

- Knowledge processor
- Semantic information broker
- Local information storage with RDF-store and information governance functionality
- Device with embedded system
- Knowledge processor
- Application logic and interface supporting the use of common use case ontology and access to information broker

Access protocol (SSAP), with basic operations, e.g. join, leave, insert, remove, subscribe. Etc.

Common ontology models for use cases as information interoperability enabler

Smart-M3 is available as open source
Smart-M3 functional architecture

- Legacy Application Platform
- New Application Platform
- SIB - Local information storage with RDF-store and information governance functionality
- KP - Application logic and interface supporting the use of common data and access to information broker
SOFIA Pilots

- **4 European countries**
- **All project domains represented**
- **6 cross-domain pilots**
- **Initial Dissemination plans for pilots defined**

### Smart Video-surveillance/Bologna, Italy
The UMVS Monitoring Station will prompt subway operators of abandoned bags through the system, taking quick decisions on evacuation procedures & guiding the public through optimal exits, external security teams can interact with the system.

### Media Follows User/Bologna, Italy
Mobile users will be able to seamlessly consume a particular media from different devices while moving around between different locations and use the most optimal resources of each personal environment.

### Smart Home/Eindhoven, Netherlands
In order to generate a Smart Space within a home environment different devices will seamlessly work with one another by exchanging relevant information through the semantic information broker.

### Smart Building Maintenance/Bologna, Italy
A large office complex of three buildings will be equipped with multiple devices and technologies able to make the indoor spaces smart. A Facility company will “Smartify” relevant indoor spaces, building components and equipments.

### Smart Maintenance on the move/Bologna, Italy
End users will experience the improvement on the operative procedures and the overall business of a Global service in a smart indoor space with the use of multivendor mobile devices, wireless sensor networks and different Embedded Systems.

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**SUM-SS - Oulu, Finland**
SUMS-SS will demonstrate seamless usage of the smart spaces including a personal space, a smart home and a smart city. The last two will collaborate with the services provided in a cloud through the Cam4Home Open Platform.

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**DOMAINS**

- Personal Smart Environment
- Smart Indoor Spaces
- Smart City

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**Contributors:**
- NOK/WMC/CONANTE/EUTH
- NOKIA, MWW
- INDRA, MWW
- ARTEMIS JU SP3 / 100017: Smart Objects For Intelligent Applications

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**Date:** 134/127/129
**Leader:** VTT
Car-to-mobile: Media Follows User
Smart Building Maintenance

- Office tenants are alerted via SMS on their office status due to maintenance activities.
- The maintenance company monitors the building status and supervises maintenance activities.
- A mobile device is used to “smartify” the physical space.
- RFID tags are used to identify spaces, building elements, and sensors.
- Maintenance operators are notified for an intervention request and can accept to take it in charge.
- Maintenance operators are supported by wearable devices during on-site interventions.
- Wireless sensor networks (WSN) provide environment parameters, such as temperature, humidity, and water presence.
- Smart Lights provide their status information and react to changes in the environment.
- LumenActive displays dynamic information for visitors.
Mash-up: Smart Maintenance on the move
Virtual Wall, Virtual Graffiti
Smart home
A great idea involving two programmable devices that need to share information!

Create a common ontology model for your use case (or preferably take an existing one)

Write Knowledge Processors using the same ontology

Use Smart-M3 for sharing the information and create “The Bling!”

SOFIA ADK or Native ADK for target device

Smart-M3 design time view

SOFIA ADK

Smart-M3 knowledge processor

M3-SIB

Open Source

Smart-M3 knowledge processor

device
SOFIA ADK Approach

Hide ontology complexity to developers, transforming ontologies into model APIs.

Developers are only focus on the logic, not in communications, discovery, or semantics.

- Ontological representation
- SIB proxy
- TCP/IP, BT, etc. connector

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- Knowledge Processor Interface (KPI)
- Knowledge Processor (KP)

Done by developers

Provided by the ADK
Community

Open Source
We do not want to wall up the technology. All the results coming from this community are open source. Collaborate, and help us improving our results.

Multi-Domain
The aim of the project is to be useful for any domain, so if your domain is not already included, propose new ones. The more the merrier results.

Multi-Platform
Are you programming for Windows, Linux, Android, iOS, TinyOS? Probably your platform is already targeted in the project. If not, please collaborate to include yours.

Multi-Language
We are developing in several programming languages: C, C++, C#, J2SE, J2ME for several platforms. We would like to have an implementation of SOFIA for each one.

Communication Agnostic
Whether your device communicates by Bluetooth, ZigBee, tcp/ip, etc, it is not an issue. The project is flexible to include new ones as plugins.

Smart Engineering/tooling
One of ours goals is to develop better and faster. We are developing a SDK with several tools which help you reduce the time-to-market dramatically.
Web Portal

1. Projects
2. Blog
3. Forum
4. Survey
5. Registry
6. Sofia applications catalog

www.sofiacommunity.org
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