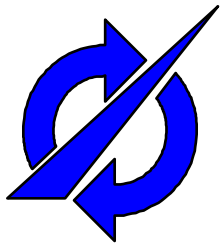
ICR 2016
August 24-26, 2016. Budapest, Hungary



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Smart M3-Based Robot Interaction Scenario for Coalition Work

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Motivation

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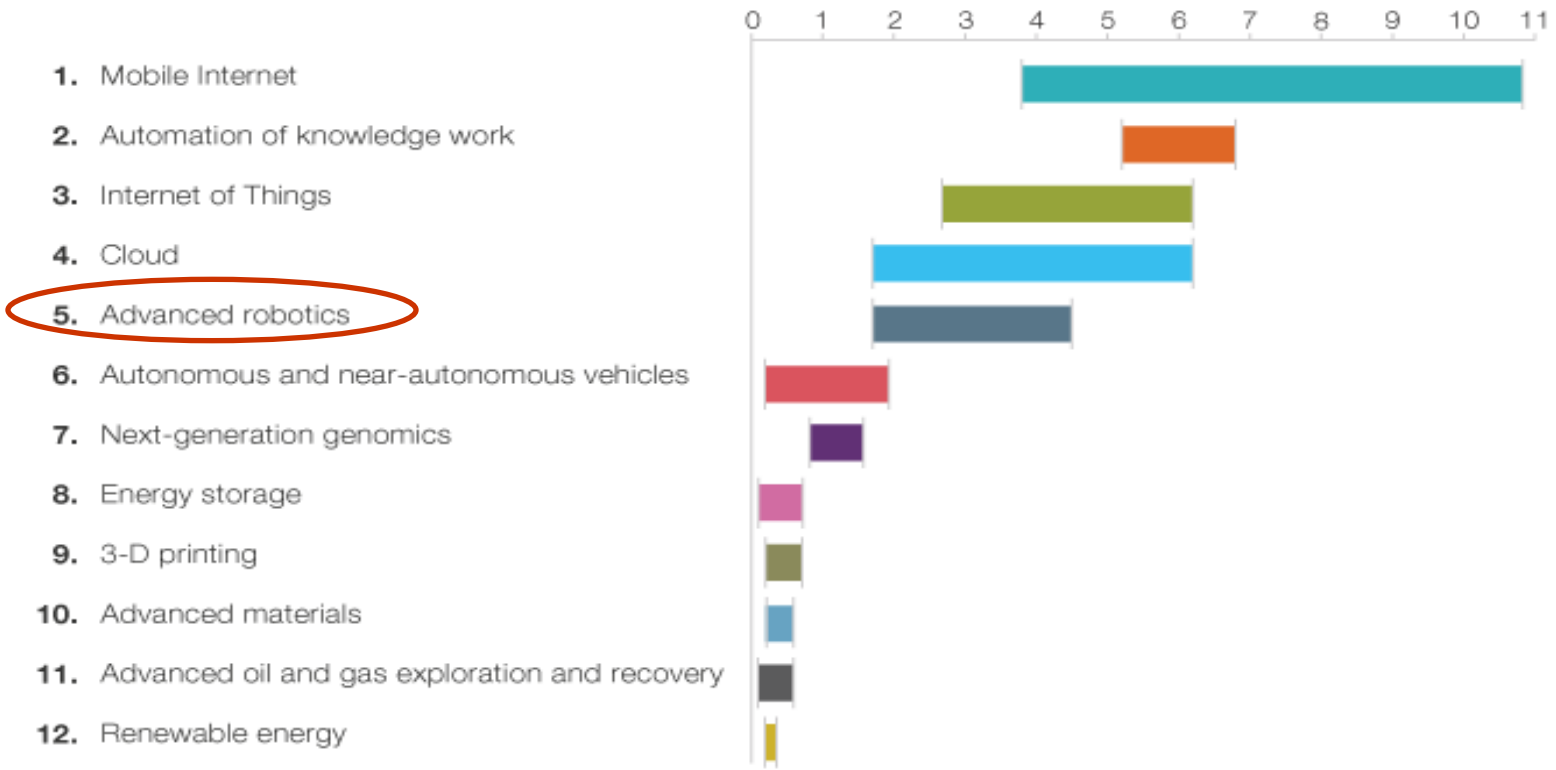
A gallery of **disruptive technologies**

Estimated potential economic impact of technologies across sized applications in 2025, $ trillion, annual



Source: McKinsey Global Institute, Report MGI "Disruptive technologies: Advances that will transform life, business, and the global economy" (May 2013).
http://www.mckinsey.com/insights/business_technology/disruptive_technologies

Introduction: Cyber-Physical-Social Systems

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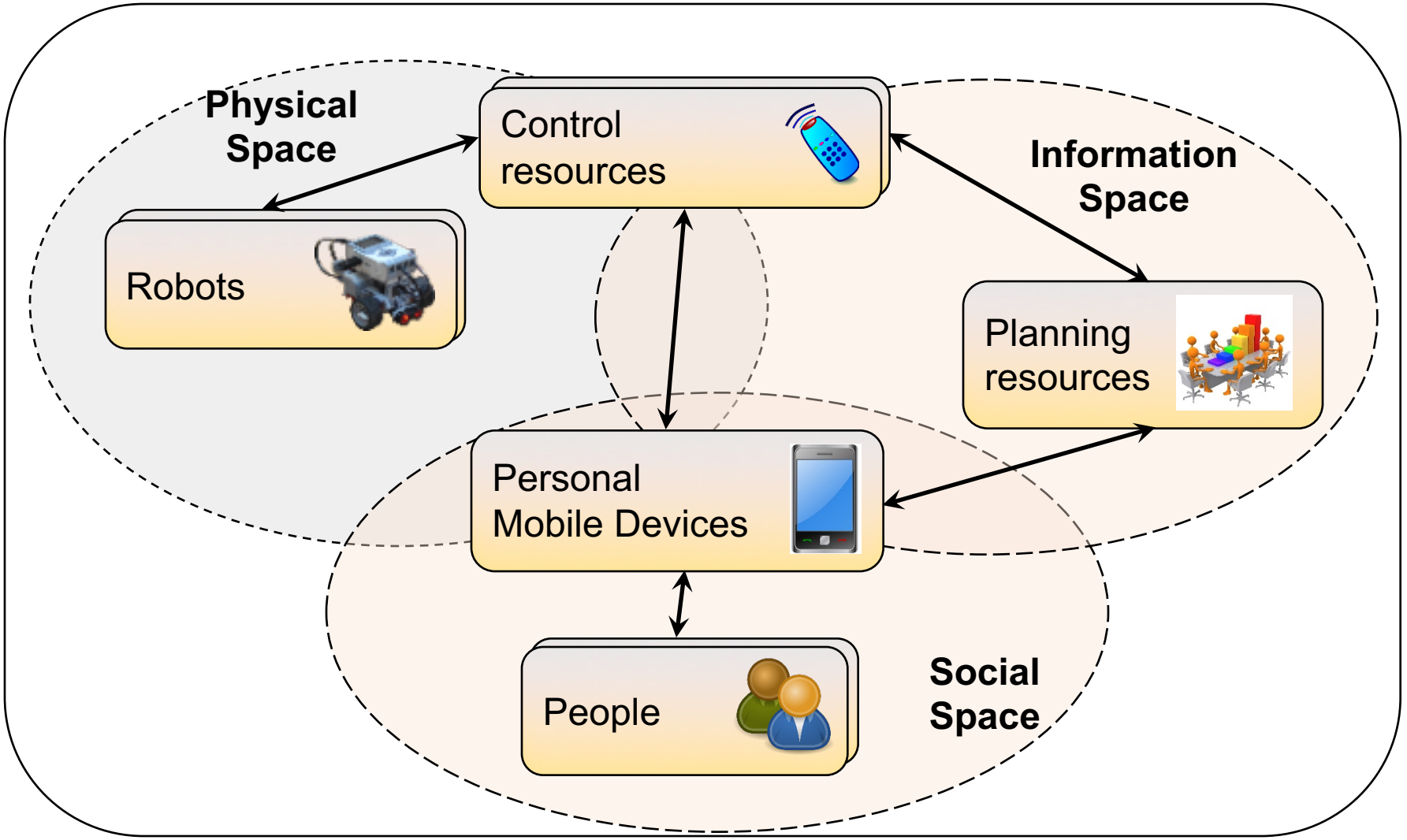
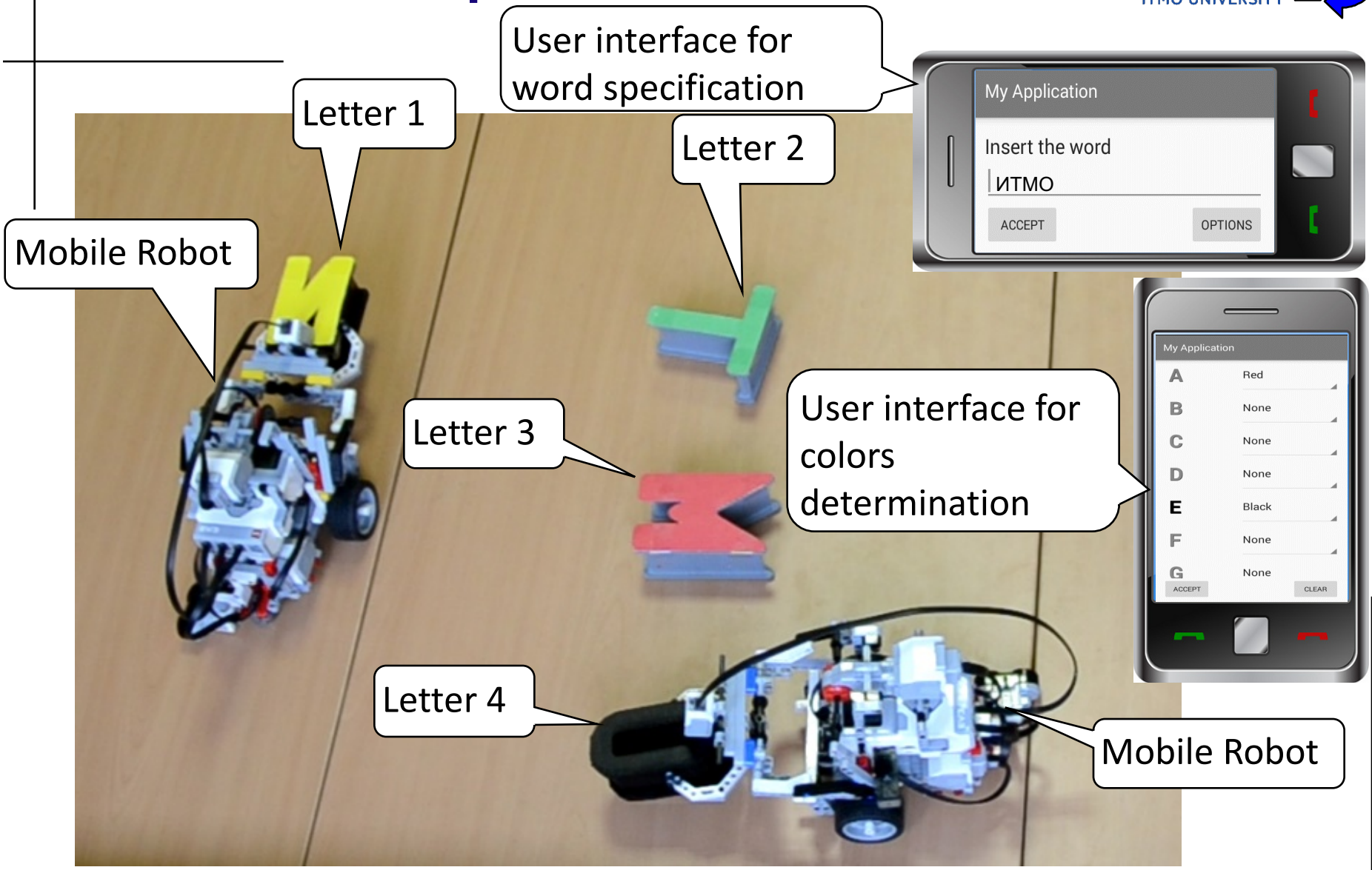
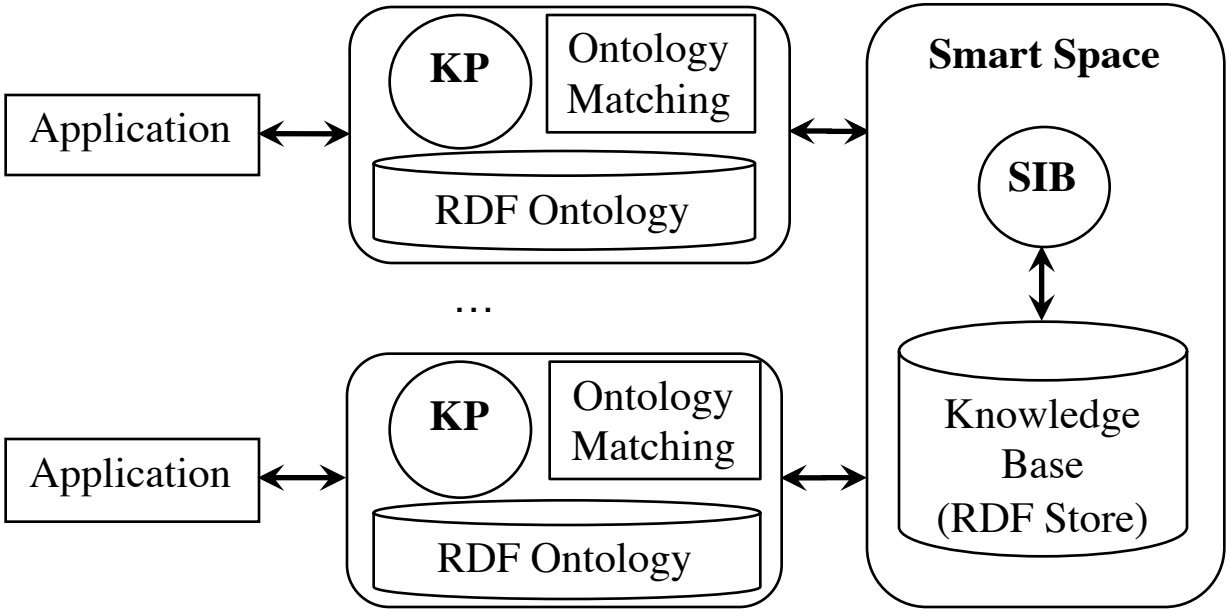


Scenario Description



Smart-M3 Platform Description

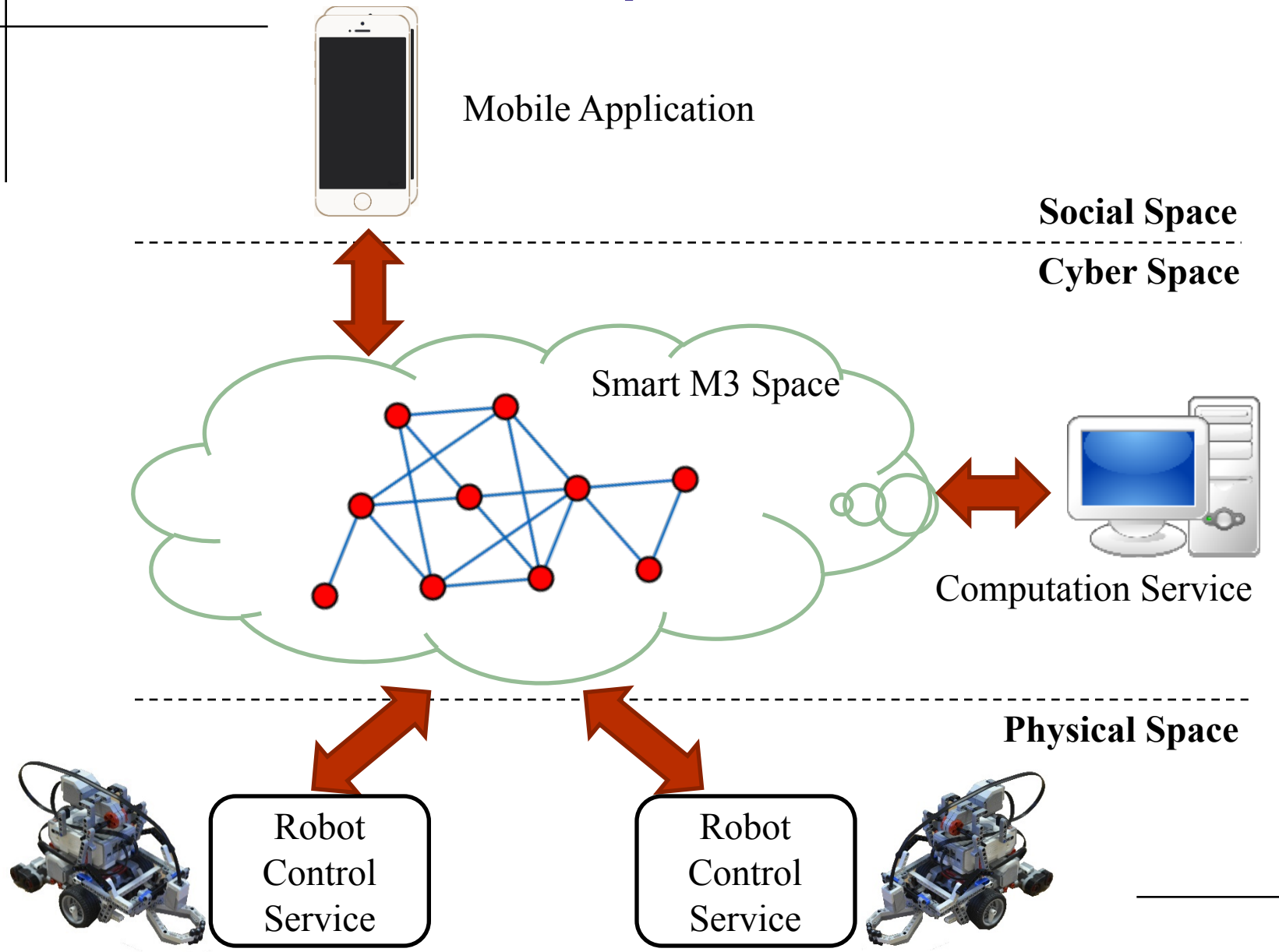
- Smart-M3 includes:
  - SIB: Devices and software entities (applications) **can publish their embedded information** for other devices and software entities through simple, shared Semantic Information Brokers.
  - The interface for managing information in the SIB is provided by Knowledge Processors (KP)
- The understandability of information is based on the usage of the **common RDF ontology** models and common data formats.



- Smart-M3 allows user KP to:
  - add,
  - remove,
  - change, and
  - subscribe,

on information in SIB.

Approach: Ontology-Based Robots Interaction in Smart Space



Lego® Mindstorms EV3 Kit

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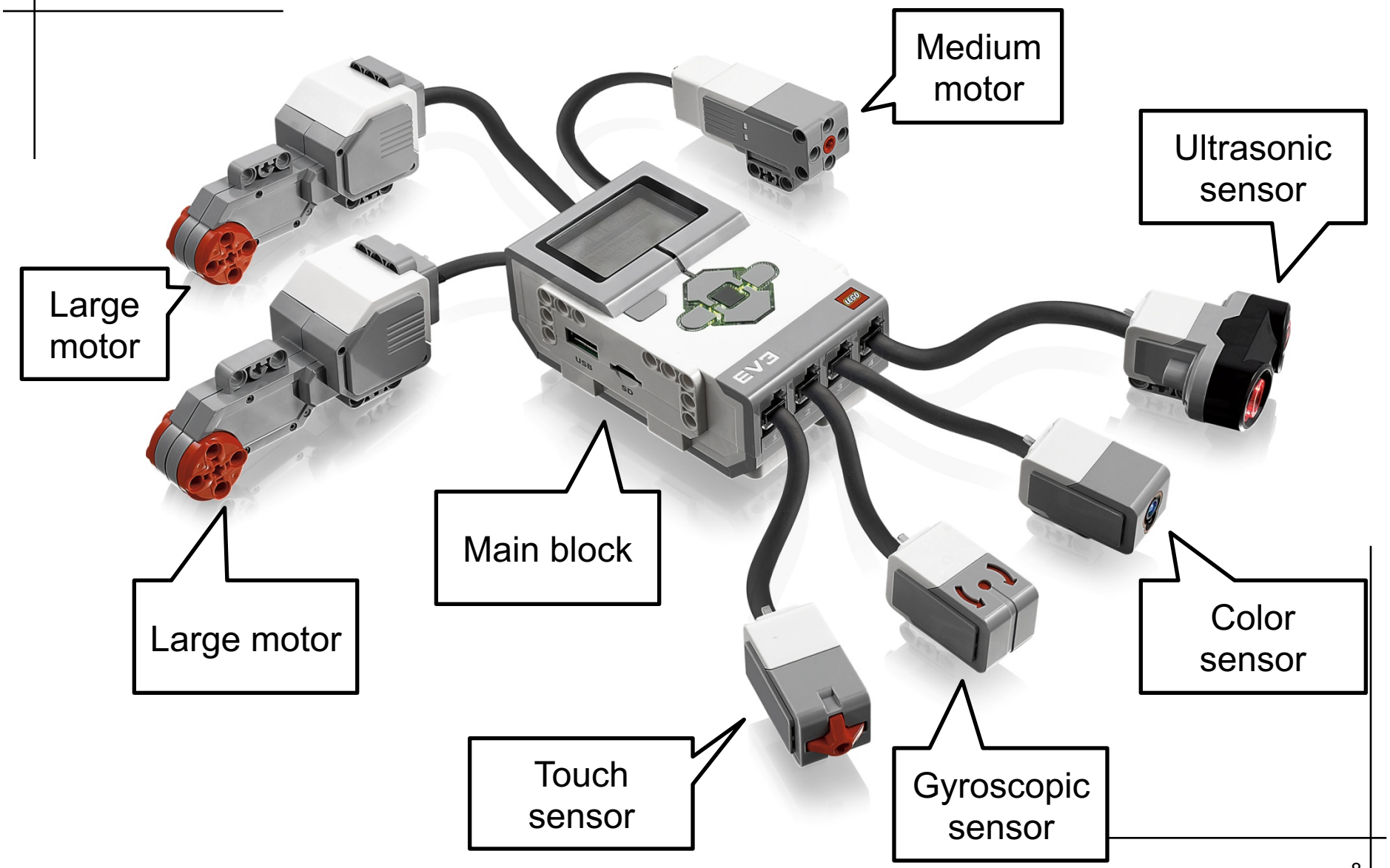

Lego Mindstorms Robot Example

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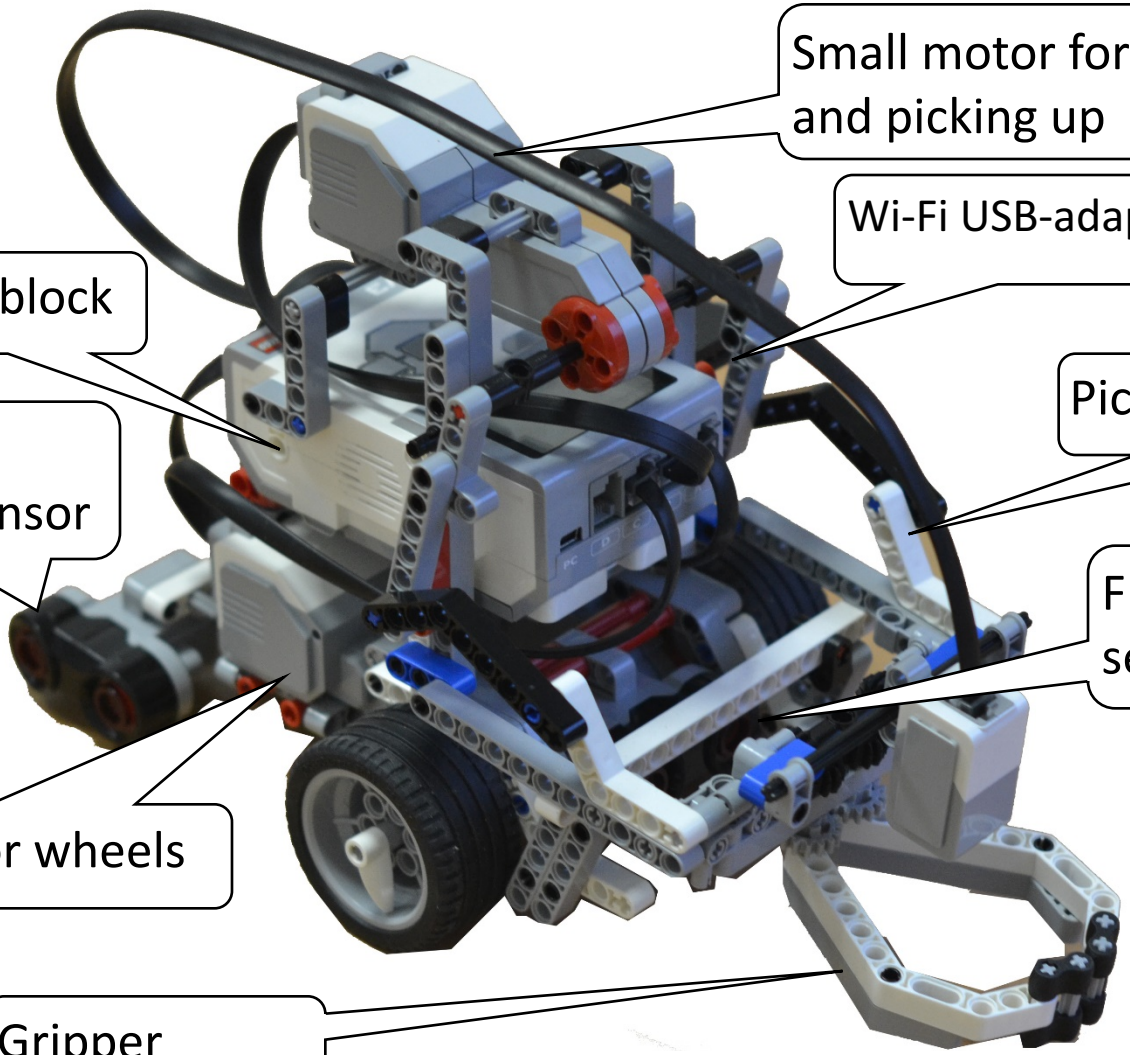
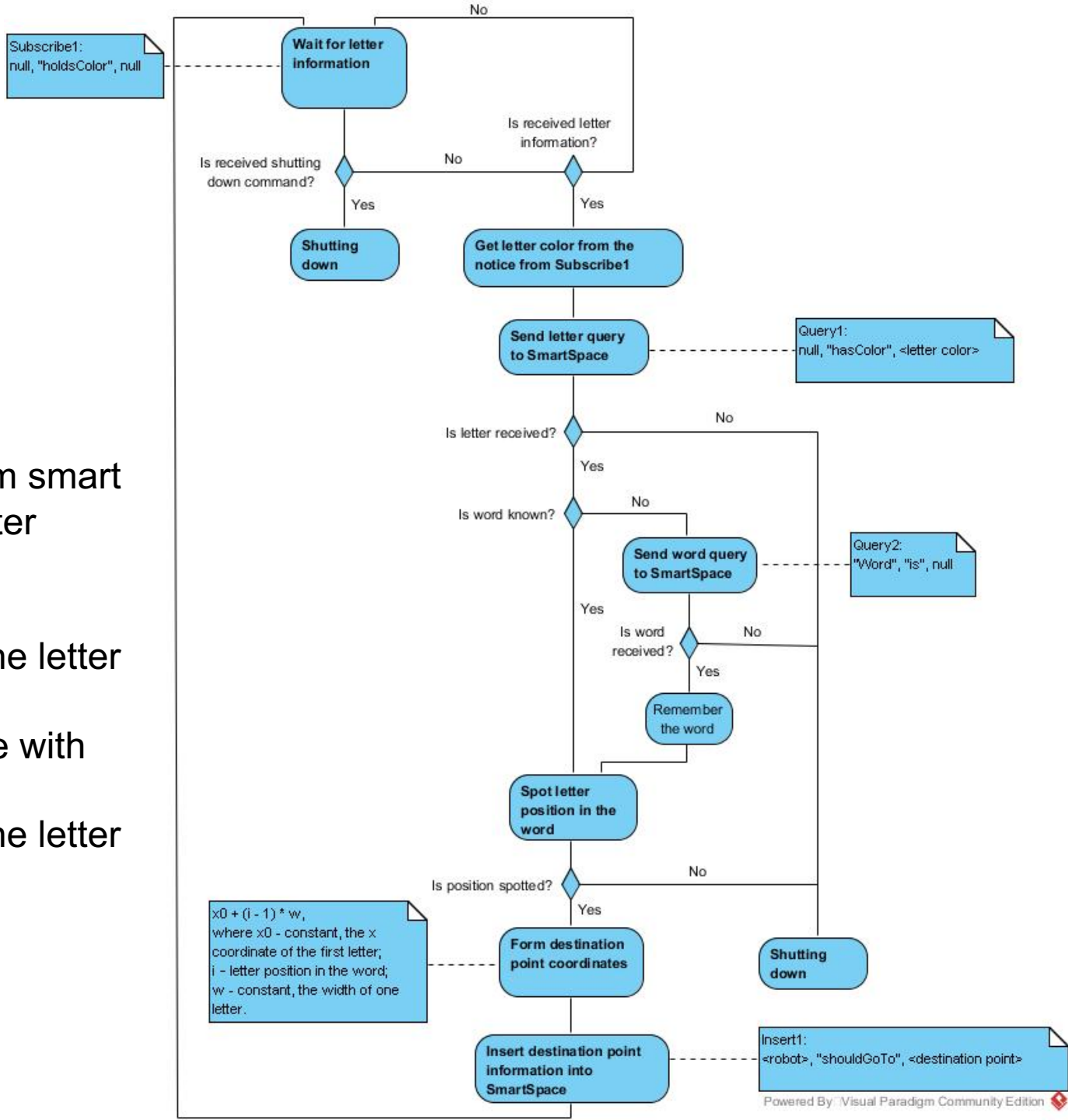


Computation Service Flowchart Diagram

Main functions:

- Get information from smart M3 space about letter sequence.
- Subscribe for the information about the letter found by a robot.
- Calculate and share with smart M3 space information about the letter destination.



Robot Control Service

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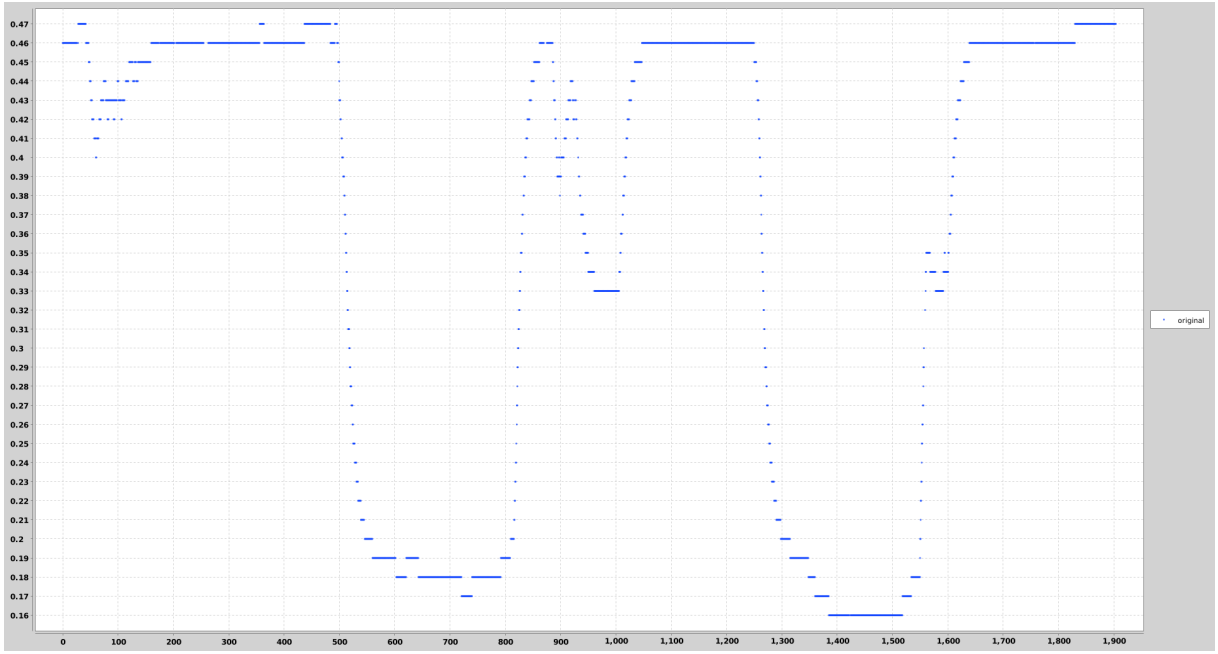
Main functions:

- Control robot movements
- Control gripping of letters
- Share information with smart M3 space about the letter found.
- Get information from smart M3 space about destination for letter found.

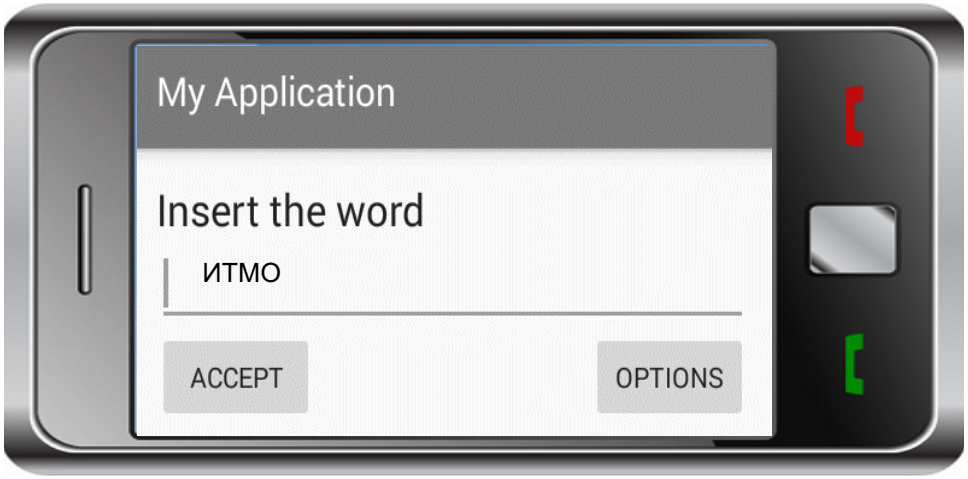
Finding Letter Using ultrasonic sensor (example for letter “M”)



Mobile Application

Main functions:

- Share with smart M3 space information about letter sequence.
- Share with smart M3 space information about correspondence between a letter and a color.



LEGO Robots Collaboration
for "ITMO" word formation
From Letters

Conclusion

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- The paper presents mobile robot interaction scenario for coalition work.
- Scenario aims at word from letter formation.
- Robots are based on Lego® Mindstorms EV3 Kit. Letters have been developed using 3D printer.
- Implementation is based on Smart-M3 information sharing platform that provides possibilities of information sharing based on Semantic Web.

Thank you for Attention. Questions are Welcome

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