



NIFTi

Project ID: 247870

Funded under: [FP7-ICT](#)

Natural human-robot cooperation in dynamic environments

From 2010-01-01 to 2013-12-31, closed project | [NIFTi Website](#)

Project details

Total cost: EUR 8 578 321	Topic(s): ICT-2009.2.1 - Cognitive Systems and Robotics
EU contribution: EUR 6 610 986	Call for proposal: FP7-ICT-2009-4 See other projects for this call
Coordinated in: Germany	Funding scheme: CP - Collaborative project (generic)

Description

Working together to assess real-life urban disaster sites

[NIFTi](http://www.nifti.eu/) investigates how natural behavior in human-robot cooperation can arise. The project operationalizes natural cooperation as balancing operational and cooperation demands in a cognitive architecture (CA), to minimize human cognitive task load and optimize joint work flow. The CA combines projections with cognitive user models and plans to predict why changes in human behavior (due to attention, task load) may occur. The CA uses these predictions to anticipate how it should adapt acting and communication to align with the human. NIFTi focuses on cooperation in the USAR (urban search and rescue) domain, to restrict what actions, forms of communication and user aspects need to be taken into account.

Objective

NIFTi puts the human factor into cognitive architectures. NIFTi investigates how natural behavior in human-robot cooperation can arise. NIFTi operationalizes natural cooperation as balancing operational and cooperation demands in a cognitive architecture (CA), to minimize human cognitive task load and optimize joint work flow. NIFTi designs CAs by closely coupling cognitive user models to how the architecture understands the environment, how it performs actions, how it communicates. The architecture acquires maps which combine perceptual- and conceptual information. These maps capture where what is in the environment, and project this to how acting is affected. The CA combines projections with cognitive user models and plans to predict why changes in human behavior (due to attention, task load) may occur. The CA uses these predictions to anticipate how it should adapt acting and communication to align with the human. The CA bases planning and execution in a cognitive control model. Control uses attention, characteristics of agent morphology, and skill acquisition, to guide autonomous action execution in a cooperative context. The CA achieves balance by actively interconnecting content across modules. Content in modules is not isolated. In the NIFTi CA design, controllers interconnect content across modules, percolating content changes throughout the CA. Changes guide processing in a module; interconnectivity ensures behavior changes coherently system-wide. Controllers are learnt off- and online, using reinforcement learning and statistical (relational) learning. Adapting to a human thus permeates the entire architecture. NIFTi focuses on cooperation in the USAR domain, to restrict what actions, forms of communication, and user aspects need to be taken into account. USAR end users join NIFTi to yearly evaluate its approach in real settings, using an integrated CA on a new robot with adaptive active/passive locomotion to jointly explore a disaster area.

Related information

Top Stories

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Documents and Publications

[Proceedings of the NIFTi summer school Yr3](#)

[NIFTi Leaflet](#)

Coordinator contact

Kruijff GEERT-JAN, (Project coordinator)

Tel.: +49-681-85775-5153

Fax: +49-681-85775-5338

[E-mail](#)

Coordinator

DEUTSCHES FORSCHUNGSZENTRUM FUR KUNSTLICHE INTELLIGENZ GMBH

Germany

TRIPPSTADTER STRASSE 122

EU contribution: EUR 1 509 322

67663 KAISERSLAUTERN

Germany

[See on map](#)

Activity type: Higher or Secondary Education Establishments

Administrative contact: Walter OLTHOFF

Tel.: +49-631-20575-500

Fax: +49-631-20575-502

[Contact the organisation](#)

Participants

EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH

Switzerland

Raemistrasse 101

EU contribution: EUR 984 100

8092 ZUERICH

Switzerland

[See on map](#)

Activity type: Higher or Secondary Education Establishments

Administrative contact: Roland Siegwart

Tel.: +41 44 632 23 58

Fax: +41 86 079 214 49 27

[Contact the organisation](#)

BLUEBOTICS SA
PARC SCIENTIFIQUE DE L EPFL
1015 LAUSANNE
Switzerland
[See on map](#)

Switzerland

EU contribution: EUR 539 000

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

Administrative contact: Nicola Tomatis

Tel.: +41 21 693 83 14

Fax: +41 21 693 83 15

[Contact the organisation](#)

CESKE VYSOKE UCENI TECHNICKE V PRAZE
JUGOSLAVSKYCH PARTYZANU 1580/3
160 00 PRAHA
Czechia

Czechia

EU contribution: EUR 702 560

[See on map](#)

Activity type: Higher or Secondary Education Establishments

Administrative contact: Igor Mraz

Tel.: +420224352 014

Fax: +420224310784

[Contact the organisation](#)

STADT DORTMUND
FRIEDENSPLATZ 1
44122 DORTMUND
Germany

Germany

EU contribution: EUR 99 248

[See on map](#)

Activity type: Higher or Secondary Education Establishments

Administrative contact: Andrew Kunter

Tel.: +49 - 231 - 47 77 65 12

Fax: +49 - 231 - 47 77 65 80

[Contact the organisation](#)

FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
HANSASTRASSE 27C
80686 MUNCHEN
Germany

Germany

EU contribution: EUR 1 012 280

[See on map](#)

Activity type: Research Organisations

Administrative contact: Elke Rupp

Tel.: +498912053183

Fax: +49891205773183

[Contact the organisation](#)

MINISTERO DELL'INTERNO

Piazza del Viminale 1

00184 ROME

Italy

[See on map](#)

Italy
EU contribution: EUR 66 960

Activity type: Higher or Secondary Education Establishments

Administrative contact: Marco Frezza

Tel.: +39 06 46538396

Fax: +39 06 46525286

[Contact the organisation](#)

UNIVERSITA DEGLI STUDI DI ROMA LA SAPIENZA

Piazzale Aldo Moro 5

00185 ROMA

Italy

[See on map](#)

Italy
EU contribution: EUR 729 424

Activity type: Higher or Secondary Education Establishments

Administrative contact: Luigia Carlucci Aiello

Tel.: +39 06 77274134

Fax: +39 06 77274131

[Contact the organisation](#)

NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO

ANNA VAN BUERENPLEIN 1

2595 DA DEN HAAG

Netherlands

[See on map](#)

Netherlands
EU contribution: EUR 968 092

Activity type: Higher or Secondary Education Establishments

Administrative contact: Ger Luijten

Tel.: +31(0)3463 56415

Fax: +31 (0)346 353 977

[Contact the organisation](#)

Subjects

[Network technologies - Robotics](#)

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