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Project acronym: ECHORD++

Project title: European Clearing House for Open Robotics Development

Funding scheme: Collaborative project (IP)

Call identifier: FP7-ICT-2011-9

Challenge:

Objective: ICT-2011.2.1 Cognitive Systems and Robotics

Project website address: www.echord.eu

D3.5.4
4th six- monthly report on experiment progress and on reviews

Due date of deliverable: [30/04/2017]
Actual submission date: [26/05/2017]

Start date of project: 01/10/2013   Duration: 53 months

Organisation name of lead contractor for this deliverable: SSSA
Deliverable author: Annagiulia Morachioli and Francesca Cecchi

Contents

1. Executive summary

The aim of the document is to present the collection of information about the progress of the selected Experiments from Call 1 and Call2 during the 4th six-monthly report. The progresses will be displayed through one table for Call 1 and one table for Call 2. The table consists of the following information for each experiment, that summarizes the progress of the last 6 months:
- Self-assessment status;
- Deliverable status;
- Milestones status;
- Technological KPIs status;
- Impact KPIs status;
- Dissemination KPIs status.

The status is represented by a traffic light having the color of:
- Green: the progresses are on line with the expectations;
- Yellow: the progresses have some delays and/ or the quality of the work is slightly below the expectations;
- Red: the progresses are really delayed and/or the quality of the work is deeply below the expectations.

For yellow and red traffic lights, justifications will be reported.

2. Summary of the progresses

The summary of the progresses of Call1 and Call 2 reported below comprehends the timeline between September 2016- April 2017.

For what concerns Call 1, the evaluation reported is the one developed by the evaluators (one external and one from the core consortium) during the one-day on-site review meeting that was held at the end of each experiment. At present time, 14 out of 15 experiments have been officially evaluated: Exotrainer will held the review meeting on the 3rd of May thus the status reported is the one obtained by the information present on the portal.

Call1

	Milestone	Deliverable	Technical KPIs	Impact KPIs	Dissemination KPIs
TIREBOT	🟢	🟢	🟢	🟢	🟢
MOTORE++	🟢	🟢	🟢	🟢	🟢
LINARM++	🟢	🟢	🟢	🟢	🟠
LA ROSES	🟠	🟠	🟠	🔴	🔴
GAROTICS	🟢	🟠	🟢	🟢	🟢
MARS	🟢	🟢	🟢	🟠	🟢
PICKIT	🟢	🟢	🟢	🟢	🟢
SAPARO	🟢	🟢	🟢	🟢	🟢
3DSSC	🟢	🟠	🟢	🟢	🟠
2F	🟢	🟠	🟢	🟢	🟢
DEBUR	🟢	🟠	🟢	🟠	🟠
COHROS	🟢	🟢	🟠	🔴	🔴
DEXBUDDY	🟠	🔴	🔴	🟠	🔴
EXOTRAINER	🟢	🟠	🟢	🟠	🟢
MODUL	🟢	🟢	🟢	🟢	🟢

Justifications

LINARM++
- dKPI #4 and #5 not fulfilled

LA ROSES
- Milestones #4 (end of test phase) has not been commented properly
- Deliverables #D3.4 (Test report) not provided.
- tKPI #3 (image guided surgery) and #4 (accuracy on the positioning for the integrated system with robot arm and end effector) not justified properly
- iKPI #2 (creation of a spin off) and #3 (certification/CE marking) not fulfilled
- dKPI #1 (first press release) #2(second press release) #3 (third press release) #4 Twitter, Facebook, website, #10 RO-MAN 2016, #12 MEDICA, not commented and no information provided

GAROTICS
- Deliverables D4.10: The GARotics exploitation plan lacks the key information to understand how the machine price is established, the benefits and turnover for each partner, and the selling strategy.

MARS
- iKPI: #4.1 (increased safety), no safety apart from lightweight, not possible to detect humans/obstacles/animals in the path of the robot. #8.1 and #8.2 Cross-domain transfer: idea just presented.

3DSSC
- Deliverables
- dKPI: D1.2 provides only a short description of the implementation, no actual demonstration; D2.1 provides only a superficial overview of the architecture; D3.1 not clear the performances of the robotic platform; SB the storyboard provides a project outline not as expected; the MMR provides al ink to a video of the working prototype which is not what expected (more details about achievements were required).

2F
- Deliverables: the deliverables have been always submitted with at least 2 weeks of delays up to 3 months.

DEBUR
- Deliverables: the deliverables have been always submitted with at least 1 weeks of delays up to 4 months.
- iKPI: the majority of iKPIs have not been verified.
- dKPI: 3 up to 10 activities have not been achieved.

COHROS
- tKPI: #3 (quality of the trajectory) have not been verified, poor quality of #1 (speed up in development/programming/setup), #2 (number of trajectory key points), #4 (speed up in execution) and #7 (safety consideration for certification purposes).
- iKPI: the following have not been verified: #1 (Impact on Cloos: reduction of development costs by estimated up to 25%), #2 (Impact on Cloos: Reduction of production costs for end consumer), #3. (Impact on Cloos: programming will be made easier - less application support from Cloos will be necessary), #4. (Impact on Cloos: secure and possibly increase market share. Support work places in Europe) and #5. (Competitors)
- dKPI: unsuccessful customer information newsletter because of the limited involvement of the industrial partner, unable to work out the logistical details of participating a fair due to unavailability of resources on the industrial partner side.

DEXBUDDY
- Milestones: no information provided about #4 and #5
- Deliverables: the general quality of deliverables is poor: few details, very hard to follow the progresses.
- tKPI: the final demo is only engineered for a specific example.
- iKPI: even though they have a new project with Siemens, they did not pay attention enough to impact.
- dKPI: none dKPIs were fulfilled.

EXOTRAINER
The project will be evaluated on May 3rd 2017.

	Self-Assessment	Milestone	Deliverable	Technical KPIs	Impact KPIs	Dissemination KPIs
DUALARMWORKER	🟢	🔵	🟢	🔵	🔵	🟠
Injerobot	🟢	🟢	🟢	🔵	🔵	🟢
SAGA	🟢	🟢	🟢	🟢	🟢	🟠
Flexsight	🟠	🔵	🟠	🔵	🔵	🔵
Max Es	🟢	🔴	🟠	🔵	🔵	🟢
AAWSBE1	🟠	🟢	🟠	🟢	🟠	🟢
Wires	🟢	🟢	🟢	🟢	🔵	🟢
Keraal	🟢	🟢	🟠	🟢	🟢	🟢
Saferun	🟢	🟢	🟢	🟢	🟢	🟢
Radioroso	🟠	🟢	🟠	🔵	🟠	🟠
Homerehab	🟢	🔵	🟠	🟠	🔵	🔴
Fastkit	🟢	🔵	🟢	🔵	🟠	🟠
Cocomaps	🟠	🔴	🔴	🔴	🔵	🔴
Grape	🟠	🔵	🟢	🔵	🔵	🔵
Catch	🟠	🔴	🟠	🔵	🔵	🟢
Hyq-Real	🟠	🟢	🟢	🟢	🔵	🟢

DUALARMWORKER

Summary:

Two telcos have already been developed and a third one is programmed for Wednesday 24th of May.

The motion planning system has been tested: Moveit! Package has been used and they worked on adding the functionality of closed kinematics.

The Dual Arm Closed Kinematics Planner has been tested in the real robot to manipulate one A380 rib. Two different motion planning system have been used in the experiments: an Octomap server and the move_group component of Moveit!. The tests showed that octomap_server performed better but further experiments are needed.

The two grippers have been designed: a pneumatic and a multifunctional one.

Finally, the last version of DACKP V1.2 ensures a fast calculation of the dual-arm trajectories. A database to store successfully calculated trajectories is being developed in order to re-use them instead of re-calculate them every time the robot repeat the same operation.

The experimenters always provide useful videos to assess their progresses.

In parallel a journal article has been submitted on 14th of April.

Justifications for yellow or red lights

- dKPI: #1 (website) not commented

Injerobot

Summary:

Injerobot is progressing very well and it is on time with the schedule (except for the Milestone #2, as already described before). The experimenters are almost always on time with the upload of the required documents and are responsive to the requests made by the moderators. They were asked to improve D2 with further description of technical feasibility and functionality and with further specifications and they upload a new version in the requested time fulfilling the missing parts. They should be able to go the RIF in Bristol in the next months (a period in July-August) to test the developed technology.

SAGA

Summary:

The progress of the project is adequate and satisfactory. There are delays in the constructions of the drone prototypes. However, such delays are reasonable. The technical deliverables are detailed and robust. The dissemination activity is also suitable. The period monitoring reports had some delays that have been addressed by the experimenters. The overall progress is encouraging.

Justifications for yellow or red lights

- dKPI: No Written report of Networking associations (ZLTO). Deadline 1/3/2017 and No Info. Organisation of events (IEEE TC AgRA Webinar).

Deadline: 1/1/2017. Also Written Report with Confagricoltura (same deadline)

Flexsight

Summary:

From a mere technical point of view, the work presented up to now (mainly described through D1,1 and periodic report) seems valuable and interesting, focusing on a new hardware for object detection and recognition.

However, reports of work are constantly presented after deadlines, as regards the D2.1 or the fourth periodic report, even after warnings provided to Experimenter directly by mail. These delays should be considered in evaluation of fourth period.

Justifications for yellow or red lights

- Self-Assessment March-April not provided
- Deliverables 2.1: missing

Max Es

Summary:

It is unclear whether the project is on track, Experimenters have not been good at communicating, in particular on technical aspects. Deliverables (and the single milestone they had so far). have been excessively shallow, lacking the necessary details, in particular in terms of: defining the test scenario, and providing system specifications. Experimenters were told that a more open, and proactive on their side communication was necessary on technical aspects. Upcoming monitoring calls will allow to better assess progress.

Justifications for yellow or red lights

- Deliverables: SB not well developed, D1.1 same comments as for milestone, D2.1 does not provide functional analysis but a short system functions. description.
- Milestones: Title is misleading, the milestone is not about design but about use case and evaluation scenario definition. A short document was produced. It is woefully shallow and insufficient. They were told to provide additional details in the last monitoring call. (Red, shifting to green if they fix it).

AAWSBE1

Summary:

The experimenters produced and/or uploaded some documents with significant delays, furthermore some documents were poorly described. Moderators asked some improvements on the documents but no resubmission was performed. Extent of scientific and technical progress achieved so far remains unclear

because of the poor technical and scientific soundness of reports. Nevertheless, experimenters sent a video by E-Mail showing the AASBWE1 prototype working and able to distinguish between wired and battery operated waste in real time.

It is important to improve the technical and scientific level of the documentations. The experimenters should (must) upload materials on the portal instead of sending E-Mails or claim technical problems with the Echord ++ portal interface.

Justifications for yellow or red lights
- Self-Assessment: delays
- Deliverables: Delays in providing SB and D1.1
- iKPI: delays and the redesign report is still missing

Wires

Summary:

Solid progress shown by the Experiment so far. No problems on tKPIs or iKPIs.

The Experimenters have always shared all the relevant information with the moderating team. Progress is on track with the schedule, the Experimenters have designed and tested the sensors and platform realized and all the information have been efficiently shared. When asked, Experimenters added videos and descriptions of their current work. Technical progress is good.

Regarding the Dissemination, there is a delay of the CAPIEL and ANIE associations.

Keraal

Summary:

The overall project is on track. No major problem in deliverables and Dissemination milestones. Moderators often pushed experimenters to provide more technical details. About ethical approval issue, it is not clear to moderators why they are delaying this process. The experimenters tried to provide relevant information but still not much clear about ethical approval. Progress is on track with the expected deadlines, the Experimenters have been testing the technology with all rehabilitation exercises. The provided link to demonstrate exercises is not working. Moderators are in contact with them, overall the results are encouraging.

Justifications for yellow or red lights
- Deliverables: Ethical approval request sent to committee still with yellow light

Saferun

Summary:

Solid progress shown by the Experiment so far. No problems on tKPIs or iKPIs. Some concerns were expressed in terms of a lack of technical detail in the deliverables. The concerns have been heard and addressed by the

Experimenters, who have shared relevant information with the moderating team. Progress is on track with the schedule, the Experimenters have been testing the technology experimentally very early on, and results are encouraging.

Radioroso

Summary:

During the monitoring period 3 they asked for 20 days extension, Antoni granted it. They uploaded the deliverable D2.1 with 20 days of delay and the deliverable D5.1 with 17 days of delay. The contents were fine but the work performed within the RadioRoSo project is gradually shifting away from what was proposed originally.

In particular:

- in the proposal, they talked about the problem of performing classification for different object types, instead, in these 3 monitoring periods they considered only one specific type of object: the springs. This implies a reduction in scope of the project. Furthermore, among the different types of objects that were to be classified and manipulated, the proposal emphasized soft, deformable objects, putting forward the consortium's experience on that topic, and motivating that aspect by the necessity to treat protection outfits of workers having to operate in irradiated environments (gloves, pants, etc.). It now appears that such types of objects are not being addressed in the work performed.

- The proposal emphasizes dual-arm manipulation, whereas it appears that the experiment shows to limit work to single-arm manipulation.

- The proposal talks at length of tactile feedback, and clearly motivates the need of developing a new gripper but it is unclear how they designed gripper will allow for tactile feedback.

- The proposal explicitly mentions the necessity to measure radioactivity of the items being manipulated. The outcome of a telco with the experimenters has highlighted that they would not deal with radioactive materials within the project, but that the prototype would be explicitly designed to account for constraints stemming from a radioactive environment (in particular in terms of protection of electronics).

Yannick sent a mail with a request of information regarding the experiment deviations.

The experimenters gave an explanation about some of these deviations:

1. When they had the kick-off meeting the end user Ansaldo NES explained in detail the use cases and that radioactive spring sorting is where our experiment could have the most impact. It is the task that is most demanding for humans and most doable by robots. Even a speedup of 20% will be very significant for them. For these reasons they decided to

focus on this at least for the first round of the experiments. Nevertheless, they already work with the big picture in mind (e.g. arbitrary objects, soft objects). The design of the gripper will be able to grasp both the large arbitrary objects and springs. The prototype will be available in a 1-2 months.

2. Regarding radioactivity handling, they explained that there are available solutions in the market for protecting robots and there are also solutions for localizing radioactivity sources at different levels of granularity (and cost). The only new hardware will be the gripper and it has to be designed to account for these constraints, in fact, for this reason a fluid actuation mechanism has been chosen which allows for placing the electronics far from the gripper in a protected environment.

Justifications for yellow or red lights
- Self-Assessment
- Deliverables: small delay (less than 1 month) but poor quality for large deviation
- iKPI: #1 not OK
- dKPI: only website but without ECHORD++ logo

Homerehab

Summary:
Moderators are concerned that they have not really started working yet. Deliverables up to now have been subpar, waiting for updates to them. Justifications missing for a number of dissemination items. They were shaky on justifications of poor deliverables. We'll have a better understanding of what they have been doing soon, as they have a system design document due early April. We'll see if they've done anything. Not holding my breath. I believe it should be an orange in overall assessment (up to Christophe/CEA), as specs are poorly justified and safety not properly treated. If they fix those two aspects and the design document is good, then green. If not, that's a big fat red. **Need to keep a close eye**. Iñaki made a good impression, but Nicolas was deflecting and proved unable to provide straight answers to most questions. INSTEAD (industrial partner) was not represented during the call.

Justifications for yellow or red lights
- Deliverables: SB overview of the project not a SB, D2 issue with specifications which are not the one supposed to be (based on the market instead of task), D7 not feature a patient safety protocol
- tKPI: #1 does not have an actual safety protocol for patient, #3 video is not

provided, #4 presentation is not provided
- dKPI: massive delays

Fastkit

Summary:

Seems to be progressing OK so far. Difficult to judge until the prototype has been put together to a significant extent. They have some mobile base, which is functional. Videos of it are not necessarily entirely convincing however, as it seems to lack stability to some extent, which is not reassuring considering it is expected to include a large apparatus on top of it (raising the center of mass, negatively impacting stability). Further, the frame supporting the cable robot has a vertically-elongated form factor, without much structural reinforcement. These points were raised during the monitoring call, to which the team ensured that had conducted a rigidity analysis of the frame, which they agreed to provide to the monitoring team. The video showing a simulation of the robot was oddly disjointed, with detailed models for the mobile platforms, and a largely less detailed model (wireframe, MATLAB) for the cable driven robot. Finally, concerns were expressed by the monitoring team that the Experimenters were looking to short-change what was included in the accepted proposal in terms of navigation solution (namely, they proposed 3D vision-based environmental reconstruction, whereas now that is not part of the plans anymore). There is no doubt that the CNRS partner, in charge of the cable robot, will deliver (he is committed to his work).

Justifications for yellow or red lights
- iKPI: missing information
- dKPI: press release text is not provided

Cocomaps

Summary:

The project has suffered from a number of problems. Delay to pre-payment has had an impact on some of the hardware decisions. Experimenters have changed target hardware platform, as well as model of camera. These changes have caused a number of delays. The Experimenters appear to be committed to the project, and will present a prototype at Hannover Fair. Extent of technical progress achieved so far remains unclear however, and overall status preoccupying.

Justifications for yellow or red lights
- Self-Assessment: They assess themselves as orange. Delays in pre-payment has, according to them, prevented them from purchasing equipment they needed for the Experiment
- Deliverables: Specifications are lacking (orange), state of the art is not

there (red).

- Milestones: No evidence of any of the two milestones due were "achieved."
- tKPI: they were supposed to provide a video and statistical graphs but they have not provided them
- dKPI: No way to verify for #2, 12, and 15.

Grape

Summary:

About the Period Reports the experimenters obtained, right now, two green lights and a red light. The Report for the 4th Period has been uploaded and assessed with a green light.

Although the experiment started with some difficulties and delays, in my opinion now the progress is positive and I hope that no more red lights will be set in the research area. However, experimenters should take care of the actions needed in the portal such as marking as "OK" the activities done.

Website has to be modified including ECHORD funding reference

Justifications for yellow or red lights

- Self-Assessment: Huge delay in the second assessment

Catch

Summary

We've had monitoring call in December 2016. #D1 lacked technical details and it was delivered late. Milstone#1 is not achieved because it is related to approval of #D1. The traffic lights for monitoring period on September2016-October2016 and on November2016-December2016 are green, even if the 2° monitoring periodic report was delivered with one month and a half delay. The 3° monitoring periodic report was delivered to moderators on 18/05/2017 (two months and a half delay) but it is not still uploaded on Echord portal due to Echord portal problems.

Justifications for yellow or red lights

- Self-Assessment: Delays in providing the assessment
- Deliverables: Delays in providing the deliverables
- Milestones: not uploaded

Hyq-Real

Summary

Technical progress is good. There was however a major deviation, as experimenters replaced the expected gas engine with a set of batteries, which

involves a lot less work. The monitoring team negotiated an Experiment Amendment, in accordance with which Experimenters will produce additional work on hydraulic systems. This negotiation has dragged on for a while, but is now essentially resolved. There is a slight delay on an actuator's qualification, but the project's progressing according to schedule otherwise.

Justifications for yellow or red lights
- Self-Assessment: Initial technical criticalities and delays
- Deliverables: Due to the discussion on the deviation, D2.0 deadline has been postponed
- tKPI: MOOG has had problems in integrating the ISA, milestone delayed to this summer with the monitoring team's approval (not a big deal, we checked impact on other deadlines and it is minor).