Dear Pierre,
Thank you for taking the time to meet with Mathieu and I this morning.
Please see below my application to join the delegation to Tokyo in June.
Let me know if I can provide other information.
Best regards,
Caroline

Candidature

Nom : CAO   Prénom : Caroline

e-mail : Caroline.cao@imt-atlantique.fr   Téléphone : 0608842766

Laboratoire/équipe : LS2N PACCE

Thématique de Recherche : human-robot interaction, skills acquisition, VR/AR, decision support, haptics, image-guided surgery, robotic surgery, team communication, interface design, human factors and ergonomics, extended social interaction

Projet avec NII++

Partenariat envisagé et nature de la relation (à créer, déjà existante mais à renforcer, ...)
I envision a joint project with an already-established collaborator at the Tokyo Institute of Technology, School of Engineering, Department of Industrial Engineering and Economics, Prof. Hiroyuki Umemuro of the Affective Laboratory (http://www.affectivelaboratory.org/index.php/en/)
Even though I have known Prof. Umemuro for many years, having hosted one of his PhD students for 3 months in the past, we have not yet collaborated on a research project. We have synergistic research interests, in particular, using haptics to enhance human-human and human-robot interaction in the real and virtual environments. I have already discussed with Prof. Umemuro the proposed research project that I would conduct in his lab as a visiting professor for 6 months.

Courte description du projet scientifique proposé pour développer cette coopération

Research Focus

Robots that can work collaboratively, and safely, with humans in a shared physical space is highly desirable in a variety of industrial settings, from manufacturing and materials handling to retail and healthcare. Robots that are designed to team with humans are called co-robots (collaborative robots) or cobots, as they have direct physical interaction with the human operator in accomplishing a task. Seamless teaming of cobots with humans is increasingly important as a research focus for funding agencies such as the National Science Foundation (NSF) and Departments of Defense (DoD) in the USA, as is the case for the French/European equivalents in funding and research focus. DoD Broad Agency Announcements topics in the past few years have included "trust in autonomous systems, cross-cultural trust, and socio-digital influence", while NSF listed "the future of

work at the human-technology frontier" as one of its 10 big ideas for future investment.

Until recently, my research focused exclusively in the medical domain, having been credited by my peers as a pioneer in the application of human factors in the design and development of enabling technology (haptic feedback, fluoro-free imaging, 3D visualization, simulation and training, etc.) for minimally invasive surgery. As robotic technology is rapidly becoming common place in our work, and play, environments, I see many opportunities for expanding my current efforts in robotic surgery research to address fundamental issues in cobot design in general. I have begun to explore several basic concepts in human-robot interaction, such as trust in robots and automation (_Topolski, C., Mensah, A., Cao, C.G.L. (2018). Trust in robot-assisted surgery. Presented at the BMES 2018 Annual Meeting, Atlanta, GA, October 17-20, 2018._), and the use of haptics for collaboration in virtual environments (_Wang, J., Chellali, A., Cao, C.G.L. (2015). Haptic communication in collaborative virtual environments. Human Factors, 58(3), 496-508._) The idea of using haptic cues to convey information, and allow meaningful communication beyond the context of collaborating on a specific task, has significant implications for cobot design and implementation in society in general. Examples of social cobots include robotic companions that support the emotional well-being of the elderly, and hugging robots that enhance social interactions of people in remote geographical locations.

 The idea of using haptics to enable affect[1] communication remotely has been dormant for me since 2012 (_Balestra, M. & Cao, C.G.L. (2012). Affective interactions: Developing a framework to enable meaningful haptic interactions over geographic distance. Proceedings of the Applied Human Factors and Ergonomics International 2012. San Francisco, CA, July 19-23, 2012._). It was rather a novel idea in human-robot interaction research, and in designing collaborative work in virtual environments. I believe the timing is now ripe for this line of research, and for many funding agencies.

For this project, I plan to devote my time to further develop the theory and application of **affect communication** through haptics for cobots. I will learn from Professor Hiroyuki Umemuro in the Affective Laboratory of the Department of Industrial Engineering and Economics at the Tokyo Institute of Technology, the largest and most prestigious science and technology institution in Japan.

Professor Umemuro is the PI of the Affective Laboratory at Tokyo Tech. The interdisciplinary research of the lab covers several themes: trust on intelligent systems; affect feedback; gerontechnology; social capital theory; and affective management. The lab collaborates with partners in the automotive industry (e.g., Mazda), consumer electronics industry, as well as management consulting companies to investigate the process of developing (and losing) trust in intelligent and personalized systems. Research results aim to develop technology that improves the quality of life for the elderly population and society in Japan. I expect to learn a great deal from my experience working in a different cultural context yet still dealing with similar challenges in cobot design and implementation. I also intend to strengthen the relationship between our two labs and institutions for the purpose of recruitment and exchange of students and researchers.

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[1] A set of observable manifestations of a subjectively experienced emotion (Merriam-Webster).

Soutiens envisagés : NII Internship Program, A2020 Challenge International et

Sabbatiques, …

I expect the collaboration between TIT and LS2N to begin with an exchange of researchers supported by the A2020 Challenge International et Sabbatiques, so that we can learn the cultural norms and expectations of research in each other's native environments, to better supervise visiting students from each other's labs. Going forward, exchanges of doctoral students and postdoc fellows as interns will be supported by the NII Internship Program.

Qui devez vous rencontrer (chercheurs, équipes, laboratoires, ...) ?
During the mission in Tokyo, I wish to meet with Prof. Umemuro and his team, other researchers at TIT who are working in similar areas, and their industry partners.

· Quels travaux souhaitez vous présenter ? Préciser le(s) sujet(s) et la cible de votre exposé
I would like to present my work on team communication in robotic surgery, haptic sensory augmentation using vibrotactile feedback, trust in human-robot interaction, and future work on human-robot social interaction.

Quelle autre "structure" (laboratoire, université, industriel, ..) pensez vous rencontrer. Précisez vos contacts

In Tokyo, at the Shibaura Institute of Technology:

Ryota Horie
Associate Professor, Electrical Engineering and Computer Science
Functional Control Systems
Department of Information and Communications Engineering
(https://shibaura.pure.elsevier.com/en/persons/ryota-horie)

Yoshiko Okada
Associate Professor, Department of Teacher-Training
(https://shibaura.pure.elsevier.com/en/persons/yoshiko-okada)

Midori Sugaya
Associate Professor, Electrical Engineering and Computer Science
Functional Control Systems
Department of Computer Science and Engineering
(https://shibaura.pure.elsevier.com/en/persons/midori-sugaya)

Outside of Tokyo, other researchers that I would like to meet with if possible are:

1. Gifu University: Kazunori Tirada, Associate Professor of Informatics, Department of Electrical, Electronic and Computer Engineering (https://www.ai.info.gifu-u.ac.jp/terada/index-e.html)

2. Okayama Prefectural University: Tomio Watanabe, Professor, Department of System Engineering, Faculty of Computer Science & System Engineering (http://hint.cse.oka-pu.ac.jp/~watanabe/index_e.html)

3. University of Tsukuba: Hirotaka Osawa, Assistant Professor, Faculty of Engineering, Information and Systems (https://trios.tsukuba.ac.jp/en/researcher/0000003388)

End of application material.

On Feb 20, 2020, at 15:01, Pierre.Cointe <Pierre.Cointe@imt-atlantique.fr> wrote:

Mission A2020 – NII à Tokyo de juin 2020

Objectif

Dans le but d'accroître nos synergies avec le National Institute of Informatics (NII) et ses partenaires, Atlanstic 2020 organise une mission à Tokyo d**u 11 au 17 juin 2020** (agenda exact à préciser).

Cette mission sera constituée d'une délégation d'une dizaine d'enseignants-chercheurs. Son objectif, très opérationnel, est de vous permettre de rencontrer vos alter-egos tokyoïtes pour mener des projets collaboratifs et amplifier nos échanges croisés : permanents, (post)doctorants et masters.

Pour les membres des laboratoires LS2N, LARIS, LERIA et LIUM, le coût de cette mission sera intégralement pris en charge par le RFI Atlanstic2020.

Programme

La mission comportera des rendez vous pour l'ensemble du groupe et des temps de rencontres individuelles.

Les rendez vous programmés incluent une participation aux journées portes ouvertes du NII le 12 juin, un atelier d'une demi journée entre les chercheurs du NII et A2020 le 13 juin, une rencontre avec The Graduate University for Advanced Studies (SOKENDAI), des visites du JFLI et du JRL, une réunion avec le service pour la science et la technologie de l'ambassade de France.

Comment participer ?

Il est demandé aux "candidats missionnaires" d'avoir clairement identifié un ou plusieurs contacts au sein des équipes/laboratoires de recherche associés au NII. L'un de nos objectifs étant de concrétiser des projets coopératifs sur la période 2020-2022 en rencontrant la ou les équipes partenaires.

Morgan Magnin actuellement en sabbatique au NII est à votre disposition pour vous donner des informations supplémentaires sur l'institut et faciliter vos prises de contact.

Pour candidater à cette mission merci de me retourner avant le **jeudi 27 février** le mini-questionnaire ci-dessous.

Pierre Cointe

Candidature

- Nom :   Prénom :

- e-mail :   Téléphone :

- Laboratoire/équipe :

- Thématique de Recherche :

Projet avec NII++

- Partenariat envisagé et nature de la relation (à créer, déjà existante mais à renforcer, ...)

- Courte description du projet scientifique proposé pour développer cette coopération

- Soutiens envisagés : NII Internship Program, A2020 Challenge International et Sabbatiques, ...

- Qui devez vous rencontrer (chercheurs, équipes, laboratoires, ...) ?

- Quels travaux souhaitez vous présenter ? Préciser le(s) sujet(s) et la cible de votre exposé

- Quelle autre "structure" (laboratoire, université, industriel, ..) pensez vous rencontrer. Précisez vos contacts