

Offre de Stage de Master 2 Recherche (English version below)

Interactions collaboratives et multimodales pour la formation m dicale en r alit  virtuelle

Mots cl  : R alit  Virtuelle, Interactions multimodales, Interactions collaboratives, compagnonnage, formation m dicale

Contexte

Ce stage s'inscrit dans les domaines de l'interaction homme machine et de la r alit  virtuelle (RV) appliqu s   la formation m dicale. Il vise   concevoir des interactions multimodales et collaboratives permettant   un formateur d'enseigner des gestes techniques en m decine   un apprenant dans un environnement virtuel. Il sera r alis  dans le cadre du projet Show-me (Virtual reality mentee-mentor multimodal collaboration for surgical skills training) financ  par l'Agence Nationale de la Recherche (ANR) en collaboration avec le LabForSIMS, le CHSF, le LIMSI et le LS2N.

Probl matique

Les internes en m decine sont traditionnellement form s sur la base du mod le de compagnonnage en s'entraillant sur les patients au cours des stages hospitaliers encadr s par des experts. Cependant, pour des raisons  thiques et de s curit  des patients, comme conclut par le rapport de la Haute Autorit  de Sant  2012 "jamais la premi re fois sur le patient", le d veloppement de nouveaux paradigmes de formation m dicale innovants bas s sur la simulation devient un n cessit  et une urgence. Pour assurer cette transition p dagogique, les simulateurs bas s sur les technologies de la r alit  virtuelle peuvent jouer un r le important. Cependant, leur d veloppement reste complexe et potentiellement c teux. Il est donc n cessaire de concentrer leur conception et leur utilisation sur les besoins r els de formation des professionnels de sant .

L'objectif du projet ANR Show-Me est de concevoir de nouvelles techniques d'interaction multimodales et collaboratives et des interfaces utilisateurs innovantes permettant   un tuteur expert de partager ses comp tences, de superviser et de guider un apprenant   travers un environnement de formation collaboratif et multimodal en r alit  virtuelle pour un meilleur transfert des comp tences m dicales techniques. Cela permettra de garder le formateur dans la boucle et de profiter ainsi des avantages du mod le de compagnonnage mais dans un environnement plus s r.

L'objectif du pr sent stage est de r aliser des  tudes sur le terrain afin de mieux comprendre les interactions apprenant-formateur dans les situations de formations actuelles. Ces  tudes permettront de guider la conception d'un premier prototype d'environnement virtuel collaboratif et multimodal pour la formation m dicale en compagnonnage   travers la r alit  virtuelle.

Travail   r aliser

1. R aliser une  tude de l' tat de l'art du domaine,
2. R aliser des  tudes sur le terrain dans les blocs op ratoires et les centres de formation (facilit es par les partenaires du projet) afin de mieux comprendre les situations de formation actuelles,
3. D finir un premier mod le d'interactions multimodales et collaboratives susceptible de supporter la formation m dicale en telementoring dans un environnement virtuel,
4. Concevoir et  valuer une POC du syst me, en se basant sur des simulateurs de formation m dicale d j  velopp s au sein du laboratoire IBISC,
5. Publier les r sultats dans une conf rence nationale ou internationale.

Comp tences et qualit s requises

Niveau M2 ou derni re ann e en  cole d'Ing nieur, Bonne ma trise de la conception/programmation (si possible Unity/C#), connaissance des interactions multimodales, de la r alit  virtuelle, de la m thodologie de conception centr e utilisateur, avoir un go t pour la recherche, le travail d' quipe et les  changes pluridisciplinaires.

Conditions du stage

Le stage se d roulera au laboratoire IBISC. Une plateforme exp rimentale (plateforme EVR@) et des EV pour la simulation chirurgicale sont mis   disposition. Le stagiaire sera en interaction avec les doctorants et les autres stagiaires de l' quipe. Il sera  galement convi    participer   certaines r unions avec les cliniciens et   faire des observations sur le terrain dans les h pitaux et les centres de formation m dicale partenaires.

Dur e : 6 mois (entre F vrier et Octobre 2021, selon disponibilit s)

Gratification minimale l gale (environ 560 /mois)

Un financement est disponible pour poursuivre ces travaux en th se de doctorat pour un excellent(e) candidat(e).

Master of science Internship offer

Multimodal collaborative interactions for medical training in virtual reality

Keywords

Virtual Reality, Multimodal interactions, Collaborative interactions, mentoring, medical training

Context

This internship is in the fields of human machine interaction and virtual reality (VR) applied to medical training. It aims to design new multimodal and collaborative interactions allowing a mentor to teach technical medical skills to a mentee in a shared virtual environment. This is part of the Show-me project (Virtual reality mentee-mentor multimodal collaboration for surgical skills training) funded by the National Research Agency (ANR) in collaboration with LabForSIMS, CHSF, LIMSI and LS2N.

Research problematic

Medical interns are traditionally trained through the companionship model by practicing on real patients during hospital internships supervised by experts. However, due to clear ethical and patient safety issues, as concluded by the 2012 Haute Autorit  de Sant  report "never the first time on the patient", the development of new innovative medical training paradigms based on simulation becomes a necessity and an emergency. To support this transition, simulators based on virtual reality technologies can play an important role. However, their development remains complex and potentially expensive. It is therefore necessary to focus their design and use on the real training needs of healthcare professionals.

The ANR Show-Me project aims to design multimodal and collaborative interaction techniques and innovative user interfaces allowing an expert tutor to share his skills, supervise and guide a learner through a collaborative training environment and multimodal in virtual reality for a better transfer of technical medical skills. This permits to keep the mentor in the loop and thus to benefit from the advantages of the companionship model but in a safer environment.

The objective of this internship is to carry out field studies in order to better understand current learner-teacher interactions. These studies will guide the design of a first prototype of a collaborative and multimodal virtual environment for companionship medical training in virtual reality.

Work description

1. Conducting a literature review of the research field,
2. Conducting preliminary field studies to better understand current training methods in operating theaters and training centers (facilitated by project partners)
3. Defining a first model of multimodal and collaborative interactions capable of supporting medical training through telementoring in a virtual environment,
4. Designing and evaluating a POC of the system, based on medical training simulators already developed within the IBISC laboratory,
5. Publishing the results in a national or an international conference.

Qualifications

Master 2 or last year in an engineering school, good experience with HCI, UI design and programming (Unity 3D/C#), knowledge in multimodal interactions, virtual reality, user-centered design, high interest in research, teamwork and multidisciplinary work.

Work conditions

The work will be carried out within the IRA² team at the IBISC Lab. An experimental platform (EVR@) and existing virtual environments for surgical simulation will be available. The trainee will be in constant interaction with the team's PhD students and other interns. He/she will also be invited to participate in research meetings with the project partners and to conduct field studies in the partner hospitals and training centers.

Duration: 6 months (ranging from Feb to Oct 2021)

Compensation: minimum legal compensation (around 560€/month)

Funding is available to continue this research work in a PhD thesis for an excellent candidate.

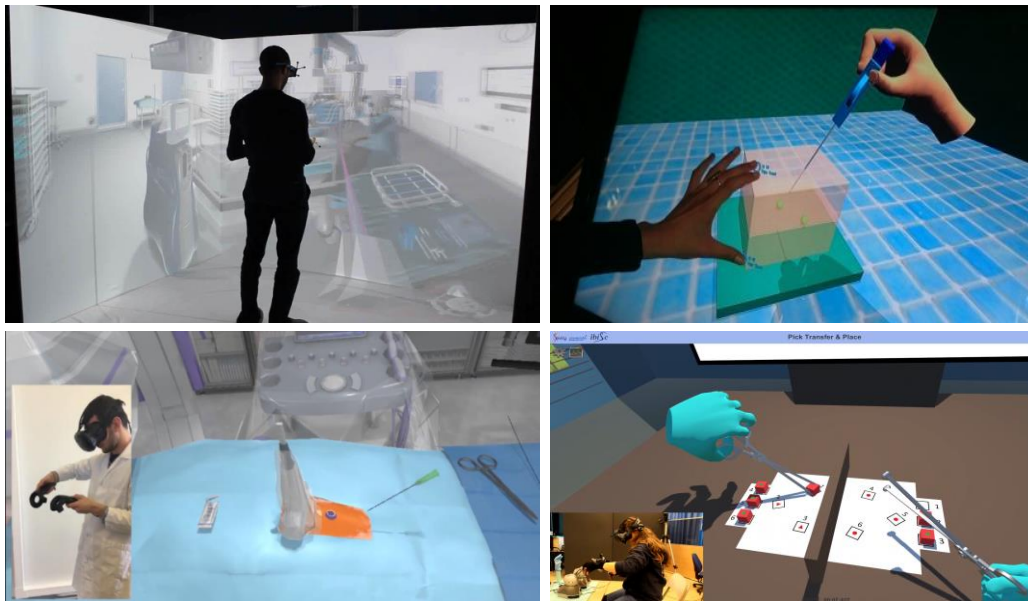


Figure 1 : Exemples des simulations et technologies pr sentes sur la plateforme EVR@ (CAVE, casques, syst mes de eye tracking, gants de donn es, bras   retour d'efforts,  crans tactiles...)

Examples of simulations and technologies (CAVE, HMDs, eye tracking devices, data gloves, haptic devices, touch screens ...) used in our EVR@ platform

Contact

Merci de faire parvenir une lettre de motivation, un CV, les relev s de notes du Master 1 et/ou Master 2, et deux lettres de recommandations recherche   :

Please send your application letter, a CV, two research recommendation letters, and Master transcripts (M1/M2) to:

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