Proposal Book [- IUI - All]

Proposal Data

Acronym	eGlasses
Full name	eGLASSES – The interactive eyeglasses for mobile, perceptual computing
Duration	36
Topic	IUI
Keywords	electronic glasses, eye-tracking, perceptual computing, assistive technology

Coordinator contact point for the proposal

Name	Jacek Ruminski
Institution	Gdansk University of Technology, FETI, Dept. of Biomedical Engineering
Address	Narutowicza 11/12, 80-233 Gda?sk
Country	Poland
Phone	48583472678, 48503114114
Email	jwr@eti.pg.gda.pl

Consortium Partners

C/P	Institution	Contact	Other	Country	Legal Status	
C	Gdansk University of Technology, FETI, Dept. of Biomedical Engineering	Jacek Ruminski	Jerzy Wtorek, Adam Bujnowski, Tomasz Kocejko, Mariusz Kaczmarek, PhD candidate, engineer/technician	Poland	Public research organisation	**Ind.Eff.:**79 **Ind.Cost:**402,408 **Ind.Bud.:**402,408
P	University of Applied Sciences Upper Austria/ Media Interaction Lab (MIL)	Michael Haller	Clemens Holzmann, Florian Lettner, David Lindlbauer	Austria	Public research organisation	**Ind.Eff.:**60 **Ind.Cost:**229,800 **Ind.Bud.:**229,800
P	Hochschule Luzern/ iHomeLab	Martin Biallas	Alexander Klapproth, Rolf Kistler, Alexey Andrushevich	Switzerland	Public research organisation	**Ind.Eff.:**19 **Ind.Cost:**231,100 **Ind.Bud.:**231,100
P	University of Lorraine / LCOMS	Benoît Martin	Yann Morere, Pierre Pino, Guy Bourhis, Isabelle Pecci	France	Public research organisation	**Ind.Eff.:**48 **Ind.Cost:**204,000 **Ind.Bud.:**78,000
P	University of Luxembourg / Interdisciplinary Centre for Security, Reliability and Trust	Thomas Engel	Rod McCall, Nicolas Louveton, Post -doc	Luxembourg	Public research organisation	**Ind.Eff.:**32 **Ind.Cost:**286,698 **Ind.Bud.:**249,352

Abstract:

The eGlasses project is focused on the development of an open platform in the form of multisensory electronic glasses and on the integration and designing of new intelligent interaction methods using the eGlasses platform. This is an initial development focused on long-term research and technological innovation in perceptual and super-perceptual (e.g. heart rate, temperature) computing. It is an emerging technology that is also focused on the creation of mobile, perceptual media. Perceptual media refers to multimedia devices with added perceptual user interface capabilities. These devices integrate human-like perceptual awareness of the environment, with the ability to respond appropriately. This can be achieved by using automatic perception of an object's properties and delivering information about the object's status as a result of reasoning operations. For example, using the eGlasses, it will be possible to control a device, which is recognized within the field of view using the interactive menu, associated with the identified device. Other examples include presentation of a recognized person name, recognition of people with abnormal physiological parameters, protection against possible head injuries, etc. The platform will use currently available user-interaction methods, new methods developed in the framework of this project (e.g. a haptic interface) and will enable further extensions to introduce next generation user-interaction algorithms. Furthermore, the goal of this project is to propose and evaluate new and intelligent user interactions, which are particularly useful for healthcare professionals, people with disabilities or at risk of exclusion, and to create and evaluate behavioural models of these mobile users. The main scientific and technological objectives of the project are to design and evaluate the following: - eye-tracking hardware and algorithms for a user, who is mobile in a noisy real world environment, - algorithms for perceptual media and for super perceptual computing, - methods for locating objects and guiding vision towards the identified objects, - methods of interactions with users and objects (menu of activities for the identified person or object), - a haptic interface in a form of a peripheral proximity radar, - methods for the recognition of the user's own gestures and recognition of gestures of the observed person, - methods for context-aware behavioural studies, - methods for reference applications. The result of the project will be an open platform in the form of multisensory electronic multimedia glasses and a set of new methods for intelligent user interactions, especially in the context of perceptual media.

Relevance:

This project is related with most of the topics addressed in the call, especially: - it proposes multiple modes of interaction (video, sound, touch, gestures, and derived information including heart rate, respiratory rate, etc.), seamlessly combining them; - it offers solutions as assistive technology, including healthcare professionals, the elderly, disabled people and also those with very limited communication means (e.g. paralyzed people); - it provides solutions to realize remote tasks, especially in the context of perceptual media controlling recognized devices and performing operations for identified persons, - it provides opportunity to create behavioural models and performs empirical studies of a user's behavior (different means of perception in the context of spatiotemporal location), - it brings together researchers and research communities working on distinct modes of interaction or from different backgrounds (computer science, electronics, biomedical engineering), and finally - it creates a new and open platform, which will be available to other researchers, who could extended the platform to develop further adaptive and multi-modal interactions.

Proposal Book [- IUI - All]

Proposal Data

Acronym	IMOTION
Full name	Intelligent Multimodal Augmented Video Motion Retrieval System
Duration	36
Topic	IUI
Keywords	Multimodal Sketch and Speech Interface, Video Motion Queries, Augemted Video, Motion Feature Extraction, Multimodal Video Retrieval

Coordinator contact point for the proposal

Name	Prof. Heiko Schuldt
Institution	University of Basel
Address	Department of Mathematics & Computer Science, Bernoullistrasse 16, CH-4056 Basel
Country	Switzerland
Phone	+41 61 2670558
Email	heiko.schuldt@unibas.ch

Consortium Partners

C/P	Institution	Contact	Other	Country	Legal Status	
C	University of Basel	Prof. Heiko Schuldt		Switzerland	Public research organisation	Ind.Eff.:96 Ind.Cost:461,352 Ind.Bud.:461,352
P	Koç University	Prof. T. Metin Sezgin		Turkey	Public research organisation	Ind.Eff.:92 Ind.Cost:118,438 Ind.Bud.:118,438
P	University of Mons	Dr. Stéphane Dupont		Belgium	Public research organisation	Ind.Eff.:51 Ind.Cost:190,275 Ind.Bud.:190,275

Abstract:

Video is increasingly gaining importance as medium to capture and disseminate information. This is not only the case for personal use but also –and most importantly– for professional and educational applications. With the enormous growth of video collections, effective yet efficient content-based retrieval of (parts of) videos is becoming more and more essential. Conventionally, video retrieval relies on metadata such as manual annotations, or inherent features extracted from the video. However, the most decisive information that distinguishes video content from static content, the movement of individual objects across subsequent frames, so far is largely ignored. This is particularly the case for so-called augmented video where additional spatio-temporal data on the movement of objects (e.g., captured by dedicated sensors systems) is available in addition to the actual video content. The IMOTION project will develop and evaluate innovative multi-modal user interfaces for interacting with augmented videos. Starting with an extension of existing query paradigms (keyword search in manual annotations), image search (query by example in key frames), IMOTION will consider novel sketch- and speech-based user interfaces. In particular, novel types of motion queries will be supported where users can specify motion paths of objects, via

sketches, gestures, natural language interfaces, or combinations thereof. Several types of user interfaces (voice, tablets, multi-touch tables, interactive paper) will be supported and seamlessly combined so as to smoothly migrate a session from one type of user interface to another during the process of specifying and refining a query. This will be based on novel approaches to representation learning and the extraction of high-level motion descriptors from augmented videos, based on a motion ontology. In addition, IMOTION will develop novel index structures that jointly support traditional video features and the additional motion metadata. A major contribution will be the quantitative and qualitative evaluation and user studies of the intelligent multi-modal interfaces and query paradigms developed in two concrete use cases – sample applications from which the project will select include, but are not limited to, augmented sports videos where users search on the basis of trajectories of player or ball movements, educational videos from the natural sciences where users search for animal movements inside a horde or a swarm, or sketch-based searches for currents in the sea captured by sensors integrated into buys. The IMOTION consortium will openly publish the augmented video collections and the motion metadata created in the course of the project's evaluation activities.

Relevance:

The main contribution of IMOTION is the development and evaluation of novel multi-modal user interfaces for speech- and sketch-based motion queries in video collections, and the development of models to seamlessly combine these modalities (either by jointly using several modalities of by switching from one to another). Key to the success of the project is the support of sketches for expressing motion paths of objects or individuals. In addition, also speech-based queries that specify motion patterns will be supported. This brings completely new perspectives for users when interacting with video content. The IMOTION system will not be limited to concrete use cases but will allow multi-modal sketch- and speech interfaces for motion queries in video collections be used in a broad range of applications and support their users' specific, non-conventional needs in a way that that has not yet been supported. Applications include educational/classroom use, personal information systems, and professional use. Representative data sets, i.e., collections of augmented video content created within the project, and associated evaluation metrics will be released to the research community. This will allow other researchers to extend and enrich the project results and will also facilitate the reproducibility of the quantitative evaluation results.

Proposal Book [- IUI - All]

Proposal Data

Acronym	JOKER
Full name	JOKe and Empathy of a Robot/ECA: Towards social and affective relations with a robot
Duration	36
Topic	IUI
Keywords	Interaction with robot/ECA, multimodal dialogue system, social communication, emotion detection and generation

Coordinator contact point for the proposal

Name	Laurence Devillers
Institution	CNRS-LIMSI
Address	Bt 508, rue John von Neumann BP 133 91403 ORsay
Country	France
Phone	0612434312
Email	devil@limsi.fr

Consortium Partners

C/P	Institution	Contact	Other	Country	Legal Status	
C	CNRS-LIMSI	Laurence Devillers	Sophie Rosset	France	Public research organisation	**Ind.Eff.:**105 **Ind.Cost:**529,975 **Ind.Bud.:**232,924
P	LIUM- University of Le Mans	Yannick ESTEVE	Nathalie Camelin, Paul Deléglise	France	Public research organisation	**Ind.Eff.:**48 **Ind.Cost:**333,100 **Ind.Bud.:**86,500
P	UMONS	Thierry Dutoit	Jérôme Urbain, Stéphane Dupont	Belgium	Public research organisation	**Ind.Eff.:**63 **Ind.Cost:**238,950 **Ind.Bud.:**193,950
P	Koç University (KOC)	Metin SEZGIN	Engin Erzin, Yucel Yemez	Turkey	Public research organisation	**Ind.Eff.:**103 **Ind.Cost:**687,125 **Ind.Bud.:**138,798
P	Trinity College Dublin	Nick CAMPBELL	Brian Vaughan	Ireland	Public research organisation	**Ind.Eff.:**45 **Ind.Cost:**310,800 **Ind.Bud.:**307,050

Abstract:

This project will build and develop JOKER, a generic intelligent user interface providing a multimodal dialogue system with social communication skills including humor, empathy, compassion, charm, and other informal socially-oriented behavior. Talk during social interactions naturally involves the exchange of propositional content but also and perhaps more importantly the expression of interpersonal relationships, as well as displays of emotion, affect, interest, etc. This project will facilitate advanced dialogues employing complex social behaviors in order to provide a companion-machine (robot or ECA) with the skills to create and maintain a long term social relationship

through verbal and non verbal language interaction. Such social interaction requires that the robot has the ability to represent and understand some complex human social behavior. It is not straightforward to design a robot with such abilities. Social interactions require social intelligence and 'understanding' (for planning ahead and dealing with new circumstances) and employ theory of mind for inferring the cognitive states of another person. JOKER will emphasize the fusion of verbal and non-verbal channels for emotional and social behavior perception, interaction and generation capabilities. Our paradigm invokes two types of decision: intuitive (mainly based upon non-verbal multimodal cues) and cognitive (based upon fusion of semantic and contextual information with non-verbal multimodal cues.) The intuitive type will be used dynamically in the interaction at the non-verbal level (empathic behavior: synchrony of mimics such as smile, nods) but also at verbal levels for reflex small- talk (politeness behavior: verbal synchrony with hello, how are you, thanks, etc). Cognitive decisions will be used for reasoning on the strategy of the dialog and deciding more complex social behaviors (humor, compassion, white lies, etc.) taking into account the user profile and contextual information. JOKER will react in real-time with a robust perception module (sensing user's facial expressions, gaze, voice, audio and speech style and content), a social interaction module modelling user and context, with long-term memories, and a generation and synthesis module for maintaining social engagement with the user. The research will provide a generic intelligent user interface for use with various platforms such as robots or ECAs, a collection of multimodal data with different socially-oriented behavior scenarios in two languages (French and English) and an evaluation protocol for such systems. Using the database collected in a human-machine context, cultural aspects of emotions and natural social interaction including chat, jokes, and other informal socially-oriented behavior will be incorporated.

Relevance:

The perceptive and social interaction modules use fusion of audio, visual, lexical and semantic features, along with contextual information and user profiles to recognize emotions and make sense of user intentions. Rich user models consider the user's personality (extroversion, optimism, self-confidence, and emotionality dimensions), the user's interactional behavior (liking, dominance, familiarity) and the user's profile (age range, social hierarchy and relation) to dynamically interpret multimodal cues on emotion and social dimensions during interactions (Delaborde and Devillers, 2010). The profile will endow the robot with a comprehension of the user's receptiveness to empathy and humor before selecting a behavior. By learning models of social schemes to induce new behaviors, JOKER recovers gracefully from errors and misunderstandings to create a more natural and effective social interaction. Representative data sets will be collected for English and French. Metrics and protocols will be designed to evaluate our progress in intelligent user interface development The JOKER platform functions in the noisy real-life world. It will be extendable by third-parties to develop further adaptive and multi-modal companion devices for various applications (elderly assistance, educational systems…) being usable, natural, effective and empowering for users.