![Celtic-Plus Smart Connected World logo]

![MERCO Project Consortium logo]

MERCO

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Partners:

AVS Systeme AG, Switzerland

Chalmers University of Technology, Sweden

Ericsson AB (EAB), Sweden

ETH Zurich, Switzerland

Intelliconcept AG, Switzerland

Semcon AB, Sweden

Touchtech AB, Sweden

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Project Website

https://www.celticplus.eu/project-merco/

http://www.icvr.ethz.ch/research/projects/active/active/merco/index_EN

http://t2i.se/merco/

Mediated Effective Remote Collaboration

With growing geographical distribution of the workforce, there is an increasing need to support distributed brainstorming. Group members in different locations often find it necessary to brainstorm together. As an outcome of the MERCO project, this can now be achieved digitally. Our work is motivated by a need for facilitated brainstorming systems enabling remote participants to be equally involved as collocated participants. We developed DigiMetaplan, a distributed system which employs off-the-shelf devices only and offers a set of interactive digital techniques to aid distributed brainstorming. Our work is inspired by a widespread facilitated brainstorming method called Meta-Plan; however, some of our techniques go beyond that method. Our system supports various collocated and remote configurations, e.g. 4-0, 3-1, and 2-2, but our focus is on 3-1 distributed teams.

Main focus

Creative problem-solving is widely employed in companies to address strategic questions, product and service innovation, and process improvement. Creative problem-solving is generally a sequence of two distinct phases: a divergent (or idea generation) phase where ideas are generated by individuals and then collected, followed by a convergent (or idea refinement) phase where these ideas are discussed, evaluated, and manipulated in a group process of discarding, selecting, or grouping. To research and advance the state of *product-design-oriented idea generation*, we developed DigiMetaplan, a distributed

system which employs off-the-shelf devices only and offers a set of interactive digital techniques to aid distributed brainstorming (Fig. 1). In this project, empirical studies with DigiMetaplan directly involved partner company experts. Hence, the MERCO project yielded a set of realistic *indicators-of-success* for distributed brainstorming. These indicators-of-success are closely related to classical measures of usability and collaboration.

Approach

DigiMetaplan is a framework that supports brainstorming activities both in collocated and in distributed teams. The distributed system allows users to perform brainstorming effectively either in a collocated group or as remote participants joining the collocated group. To support this, DigiMetaplan consists of two components: DigiMetaplan Board – an application primarily running on an interactive whiteboard and serving as the main shared brainstorming canvas and DigiMetaplan Pad – an application running on personal devices (smartphone, tablet) aiming to support both collocated and remote group members to jointly participate in a brainstorming session (Fig. 2).

Using the DigiMetaplan framework, participants in a brainstorming session write their ideas on digital notes, using their devices and DigiMetaplan Pad. Next, they discuss and refine the generated ideas on DigiMetaplan Board. By providing a clear separation between the roles of the facilitator and other participants, DigiMetaplan is an innovative and groundbreaking soft-

Fig. 1: The 3-1 setup of user study with DigiMetaplan system consisting of one remote participant and three collocated participants, from which two are collocated members and one is facilitator (b) Brainstorming facilitator working with DigiMetaplan Board accompanied with a Skype video stream of remote user in user study (c) Remote user pointing with a stylus pen in overview mode of DigiMetaplan Pad in user study.

ware system. The system offers tangible benefits to the MERCO industrial partners, both in terms of novel products and improved processes.

Impact

The technical outcome of this project is exemplified by two key potentials with the MERCO partners' value chain. Firstly, the project

come from DigiMetaplan. As for number of products that have been improved using the result of the project, there is 1 for 2017, 1 for 2020, and 1 for 2022. Cross domain corporations are expected
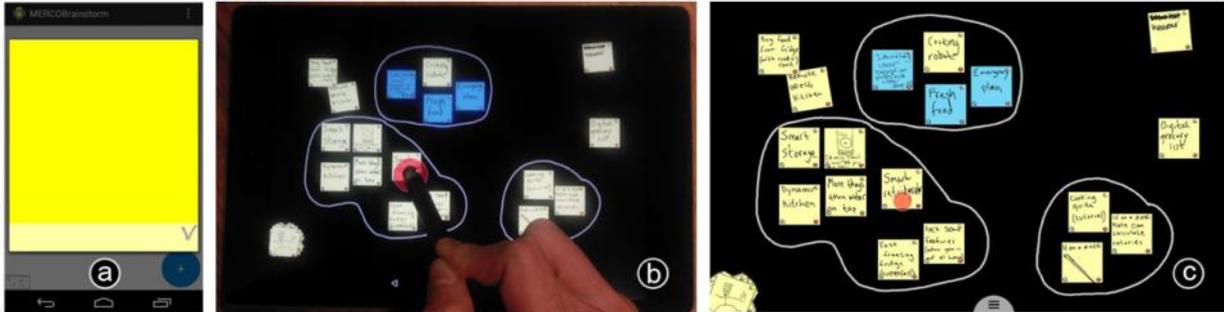
Fig. 2: DigiMetaplan Pad (a) note editing view, (b) "overview" view with fading highlighter (red circle) triggered by user touch pointing, and (c) pointing highlighter (red spot) shown at the corresponding position on DigiMetaplan Board.

Achieved results

During the project, seven reports were published or are currently in review for highly competitive ACM conferences. Six master theses and three bachelor theses were based on this project. Two of the key researchers of this project are also PhD-students at the respective academic institutions; ETH Zurich and Chalmers Gothenburg. Both engineers successfully pursue their doctoral studies in computer science and human-computer interaction. Finally, the companies expect to protect and license software and product results direction resulting from this project (kindly see MERCO final report document).

outcome catalyzes Touchtech's core competence in digital products and Ericsson's & AVS's growing engagement in digital products. Secondly, the project's outcome catalyzes Semcon's and Intelliconcept's core competence in consulting and Ericsson growing engagement in consulting.

More specifically, **AVS AG** expects this product to supplement other collaboration software they expect to integrate in their product portfolio (Fig 3). **Ericsson AB** expects the number of new products that have been developed based on the project results are expected to be 1 in 2020 and 1 more in 2022. Actually, Ericsson is working on similar platforms for collaborations and parts/ideas may

in Telecom-Banking and internal cross-domain functions in relation to cooperation. For **Touchtech AB**, a B2B connection was established during the project. As the company states: "Touchtech established a partnership with AVS to promote and resell the Touchtech Lima software as a collaboration and presentation software in the Swiss and German market. Supporting Touchtech to reach a global market." Finally, based on the outcome of the MERCO pro-

Fig. 3: DigiMetaplan exposed with AVS customers in a live demo at the AVS showroom (2016).

ject, **Semcon AB** expects a new software license in 2020. Already this year (2017) SEMCON has 3 new employees directly related to this project. By 2020 Semcon estimates to have hired 3 additional software developers for the commercialization of MERCO software. Already running one cross domain collaboration (telecom-automotive), Semcon expects to grow this threefold by 2020 and steeply to a tenfold by 2022. The background for this growth is that software licensing will fuel an extended collaboration with customer domains such as *Medtech*, *Industry*, and *Energy*. Finally, Semcon expect one trademark by 2020.

About Celtic–Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World" paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the intergovernmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies

or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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