MOMMA

Museum MOtion & Mood MApping

Project proposal for the eNTERFACE 2015 International Workshop
August 10th – September 4th, 2015

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Context

Better understanding the public, their motivation, expectations, and experience of a museum visit, recognising the role of affects in the construction of meaning (emotions, mood, feelings, etc.), optimising the conception of exhibitions, evaluating the quality of exhibitions, and assessing cultural policies are all good reasons for museums to use new tools for assessment, analysis, and decision making. Although the technologies available today (i.e., miniature video cameras, wireless mobile terminals) allow the experience of the visit to be documented precisely within an ecological framework of research (Schmitt, 2013), museum curators and, more broadly, any individuals involved in the domain are still in want of simple technical devices and easy-to-implement investigation methods in order to obtain precise, reliable, and easily interpretable results.

In practice, the M4Museum project is based on the intimate experience of visitors during their visit in a natural and autonomous setting, as it synchronically records a video tracing their visual perception (visual field + position of the gaze), their emotional state, and the circuit travelled. Each visitor surveyed is equipped with a localised touch tablet as well as a mini video camera and microphone. During the visit and at their own discretion, the actors indicate their emotional state on this touch tablet in an application that uses a W3C-Compliant navigator. In real time, the generated data are compiled and treated in order to obtain a situated emotional cartography of the circuit followed by the visitor, which may then be corroborated in an *ad hoc* programme so as to gain a more detailed picture of a visit or a group of visits.

For each surveyed visitor, this project allows the following data to be accessible on the same screen: the circuit travelled, the visitor's emotional state, state of awareness, and subjective perception situated within this space, and, in certain cases, the verbalisation of his or her bodily and cognitive activity.

Project objectives

The objective of this project is thus to conceive a device that contains the following information:

- the circuit of each visitor in terms of the path followed;
- the situated mood of the visitor (in relation to the circuit);
- the evaluation of the emotional impact of the visit;
- the subjective video of their circuit.

And for a group of visitors:

- a measure of emotional states situated within the museum space, that is to say, a set of correlated qualitative-quantitative data aiming to report the visitor experience.

This cartography of the situated mood, complemented by re-situ subjective interviews, will serve as an analysis, decision-making, and even remediation tool intended for museum institutions, local authorities, the state, and exhibition curators.

Data available

The set of raw data will be available to every participant of the project. However, the analysis process and its results are susceptible to disclosure contracts. The raw data consists of :

- Localisation of visitors ;
- SYM spots (indications of mood and adjectives given by the user via the SYM-4M interface) ;
- Subjective video and sound recording of the visitors ;
- Gaze trajectories and heat maps ;
- Post-visit verbalizations' retranscription, audio, video and tagging.

Detailed technical description

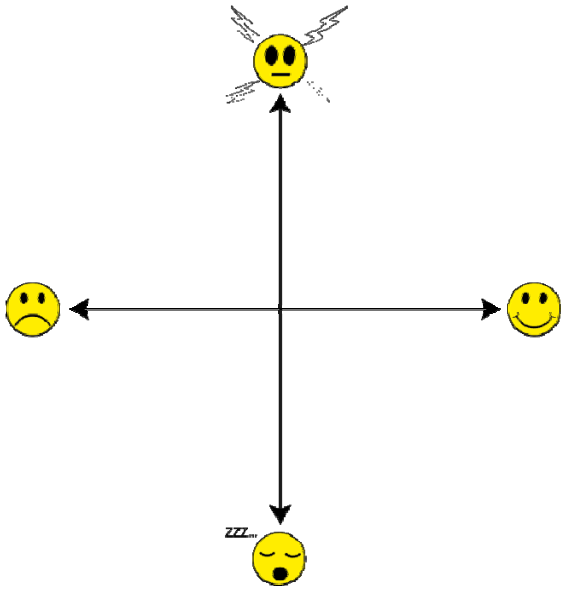
Monitoring protocol of the museum experience using explicitation of emotions and brief verbalisation and data crossing based on the routing in the installations. Employed technologies : SYM-4M, geo-localisation then processing on a supervised server for real time reports generation

SYM (Delestage *et al.*, in development) aims at proposing a protocol of explicitation support of individual mood in *in situ* experiments conditions. WIth its dedicated version SYM-4M, the software solution consists in the deployment of an *ad hoc* local server "mother" (disconnected from the web) providing and collecting data to and from "daughter" terminals (tablet type).

Prefiguration of the SYM logotype

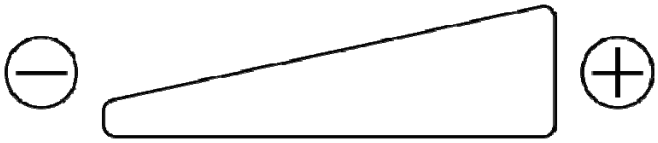
The "mother" terminal is at the researcher disposal during the experiment, allowing him (her) to follow in real time the visitors, while the "daughter" terminals are distributed to the co-participants so that they carry it during the visit. At any moment and at any place of this visit, the co-participants can, without any supervision, indicate their mood, their psycho-physiological state.

The indication of this state is done by the user on a diagram of Valence / Arousal as defined by (Thayer, 1989) ; they have an orthonormal referential where the X axis represents the hedonic valence (pleasure / displeasure) and the Y axis represents the psychophysiological activation, the arousal (drowsy / excited). The extremum of the vectors show smileys representing in the most explicit possible nonverbal manner pleasure (right), drowsiness (bottom), displeasure (left), excitement (top).



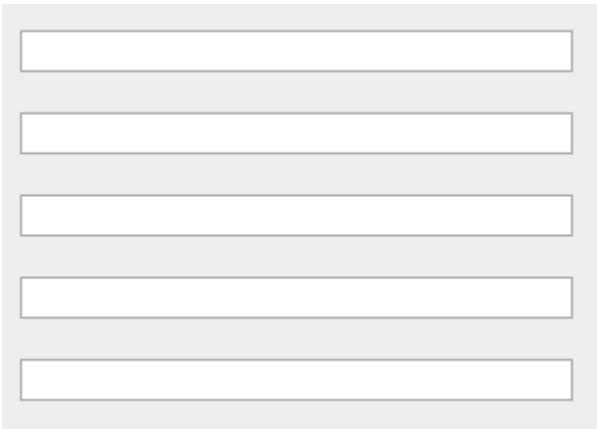
Valence/Arousal space of SYM

In addition to that, a visual-analog-scale (VAS) is present to characterize the intensity of the felt state. This representation is similar to the audio scales found in some software in order to translate this notion of force and intensity. Its inner space is colored in grey to the point designated by the user so as to give a feedback on the relative intensity of the perceived mood. By default, without any previous indication, the scale is set to the middle point.



Visual-Analog-Scale for the measure of intensity of SYM

In parallel of this nonverbal expression of the mood, the visitors are invited to put words on their indications by the possibility to add up to five lexemes (preferably adjectives). The conjunction of these two explicitations allows *a posteriori* various analysis strategies as much based on the evaluation of the spatial proximity of the different indications as the semantical analysis of the lexemes as proposed in (Yvart et al., 2014).



Qualification field by lexemes of SYM

The technologies employed by this solution are sorted from the latest evolutions of the web technologies regarding HTLM5 and its support languages :

- SYM-"daughter" uses basic web pages in HTML5 / jQuery / CSS3 for a light page layout and a increased usability on modern mobile terminals ;
- SYM-"mother" uses a Node.js server, allowing non-blocking transactions with the "daughter" terminals and a fast and parallelised data processing, linked with a MariaDB database allowing a fast request execution and an easy interfacing for a more consequent back-office.

Also, the real time visualisation of the data will be using a WebGL interface, for a flexible and efficient display of the data processing results.

By now, the indoor localisation solution is to be developed. Thus, the localisation method is to be developed before and during the workshop. A lesser infrastructure needing solution is using Wi-Fi and tablet's sensors.

Staff needed

- 1 or more computer science specialised in indoor localisation, to develop and implement on site the indoor localisation in the solution ;
- 1 or more specialists in ergonomy, data presentation and interfaces ;
- 1 or more specialists in statistics ;
- 1 or more in mobile technologies.

Equipment needed

- indoor localisation solution

Work plan and implementation schedule

Week 1 (August, 10 to August, 14)

Ending implementation of SYM-4M (if necessary)
Ending implementation of the indoor localisation solution and its integration within SYM-4M
Continue development of the analysis software
Planning the museum setup

Week 2 (August, 17 to August, 21)

Workflow testing in the museum
Workflow adjustments in relation to the museum
Beta-testers recruitments for technical proofing
Technic protocol validation

Week 3 (August, 24 to August, 28)

Running experiments and first re-situ subjective analysis
Ajustements in the analysis software and data presentation

Week 4 (August, 31 to September, 04)

Analysis of results
Results amendment
Redaction of conclusions

Deliverables

Software solution, including :

- SYM-4M-”daughter”, software solution of mood indication and adjectives qualification real time *in situ* ;
- geo-localisation module “in-door” real time ;
- field of view captation module et focalisation point in real time ;
- SYM-4M-”mother”, software solution for real time tracking of collected data ;
- SYM-*, data-analysis software dedicated to C-corpus data.

Data collected during the experimentation :

- a C-corpus of data localised including a continuous subjective video of the user, synchronised with the focalisation points and the focal path and with the discrete measures of mood marked or not by one to five adjectives.

Data generated *a posteriori* :

- Significance clusters regrouping lexemes et nominated by the most pertinent lexeme (Yvart et al. 2014), and attributing them a locus in a Valence / Arousal space and a VAS value, allowing a semantic analysis of the C-corpus ;
- a C’-corpus of data including the c-cluster plus the clusters, creating a coherent set of data localised and commentated.

Benefits of the research

This method allows us to identify and classify visitor expectations in addition to the knowledge activated during their visit. Visitor expectations are then classified according to several thematic categories. The typicalization of these expectations points to the problems of mediation, but also suggests avenues of remediation. Similarly, the typicalization of the knowledge activated by visitors during their visit allows us to describe certain cognitive processes leading to negative visitor experiences. This method proposes a subtle and precise diagnostic tool for museum mediation in a broad sense as well as a potential remediation tool. In one word, benefits of this program are to obtain a powerful device for documenting the visitor’s activity in a museum. This documentation of the visit will lead to a diagnostic tool for hints of remediation of the museal setup.

Team

Team leader : Daniel Schmitt

Daniel Schmitt is Associate Professor at Valenciennes University. He holds a PhD from Strasbourg University and he is graduate from the Ecole Nationale Supérieure Louis-Lumière. The “course of experience” research programme in museums aims to identify, describe, and understand how we construct meaning and knowledge during a museum visit under natural and autonomous conditions (without a guide or teacher). Over a period of more than 20 years he has also managed a large number of museum and exhibition projects while researching interpretative resources for museums in different countries.
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Staff :

Pr. Sylvie Leleu Merviel is leading both the DeVisu Laboratory, since 1997, and the audiovisual and multimedia department, since 1989, in the University of Valenciennes. Her research cover a very large area in the field of information and communication sciences. Main part of her work is dedicated to evaluation of quality and to sense-making from an anthropocentric and constructivist point of view. As she always tried to open and to link research to the industrial world, she enjoys a very good reputation from media industries (France Television, Mediamétrie, Canal +, etc.) to technical industries at the cutting edge of technology (eg. ESA). She is chief editor for the “Ingénierie représentationnelle et construction de sens “collection, Hermés Lavoisier.

Willy Yvart graduated a Master Degree in Multimedia, Audiovisual, Information and Communication Sciences from DREAM departement of the University of Valenciennes (France) in 2011. Since 2013, he is a PhD candidate under the joint supervision of Thierry Dutoit (UMONS, Belgium) and Sylvie Leleu-Merviel (UVHC, France) on the study of semantics metadata in massive music library in order to improve indexing and searching techniques.
http://www.univ-valenciennes.fr/DEVISU/membres/yvart_willy

Charles-Alexandre Delestage obtained a Masters degree in Audiovisual Communication Management in Valenciennes. He started a PhD fall 2014 within DeVisu (UVHC - France). His research is oriented on the automation in the audiovisual processes of production and the impact on the audiences, focusing on the acceptance of such hedonic content. Also, he has programming skills in C, C# (.NET), HTML5 / Javascript / CSS3 / SQL, Node.js and its most famous components.
http://www.univ-valenciennes.fr/DEVISU/membres/delestage_charles_alexandre

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