

# FILTWAM - A Framework for Online Affective Computing in Serious Games

## Citation for published version (APA):

Bahreini, K., Westera, W., & Nadolski, R. (2012). *FILTWAM - A Framework for Online Affective Computing in Serious Games*.

## Document status and date:

Published: 21/11/2012

## Document Version:

Peer reviewed version

## Document license:

CC BY-NC

## Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

## General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

<https://www.ou.nl/taverne-agreement>

## Take down policy

If you believe that this document breaches copyright please contact us at:

[pure-support@ou.nl](mailto:pure-support@ou.nl)

providing details and we will investigate your claim.

Downloaded from <https://research.ou.nl/> on date: 17 Mar. 2021

Open Universiteit  
[www.ou.nl](http://www.ou.nl)



# FILTWAM

## A Framework for Online Affective Computing in Serious Games

Kiavash Bahreini

Wim Westera

Rob Nadolski

4th International Conference on Games and Virtual Worlds for Serious Applications,

VS-GAMES'12, 29-30-31 October, 2012

Genoa, Italy

Centre for Learning Sciences and Technologies

Open Universiteit

[celstec.org](http://celstec.org)



# Agenda

1. What is this research about?
2. What is the target group?
3. Why are we doing this research?
4. How to do this research?
5. Framework, experiment
6. Participants, tasks, and results
7. Conclusion
8. Future research

Centre for Learning Sciences and Technologies

Open Universiteit  
celstec.org



# What is this research about?

- Emotion Detection (happy, sad, fear, disgust, surprise, angry, neutral)
- Learner support in serious games:
  - Enhancing online soft-skills training for lifelong learning
  - Soft-skills training: emotional intelligence: self-awareness of own behaviour
  - Interpret learners' emotional behaviour into emotional states
  - Provide timely and adequate feedback upon learner's facial expressions and verbalizations in a game-based environment
  - Offer a smooth setting for learners to improve their communication skills at their own pace, place, and time



# What is the target group?

- Life-long learners who would like to enhance soft-skills e-learning approaches with emerging technologies



# Why are we doing this research?

1. Communication skills are more important in knowledge society nowadays
2. Market demands: More jobs require more skilled people with respect to communication skills
  1. For example:
    1. Doctor/patient
    2. Manager/employee
    3. Teacher/student
3. Soft-skills are high priority at EU level<sup>1, 2, 3, 4</sup>
4. Provide a flexible, effective, efficient, and attractive environment with regard to game-based learning
  1. <http://www.euca.eu/eu-project-erasmus-modes>
  2. [http://www.epc.eu/documents/uploads/pub\\_1160\\_skills\\_and\\_education.pdf](http://www.epc.eu/documents/uploads/pub_1160_skills_and_education.pdf)
  3. <http://softskillsproject.com/>
  4. <http://www.fas.ie/en/pubdocs/SoftSkillsDevelopment.pdf>

**Centre for Learning Sciences and Technologies**

**Open Universiteit**  
**celstec.org**



# How to do this research?

1. Using devices and modern equipment rather than traditional devices, such as keyboard and mouse
  - Webcams
  - Microphones
2. Developing the overarching framework and software
3. Gather facial and vocal emotion data
4. Integrate the software with EMERGO (a game-based toolkit for delivery of multimedia cases )



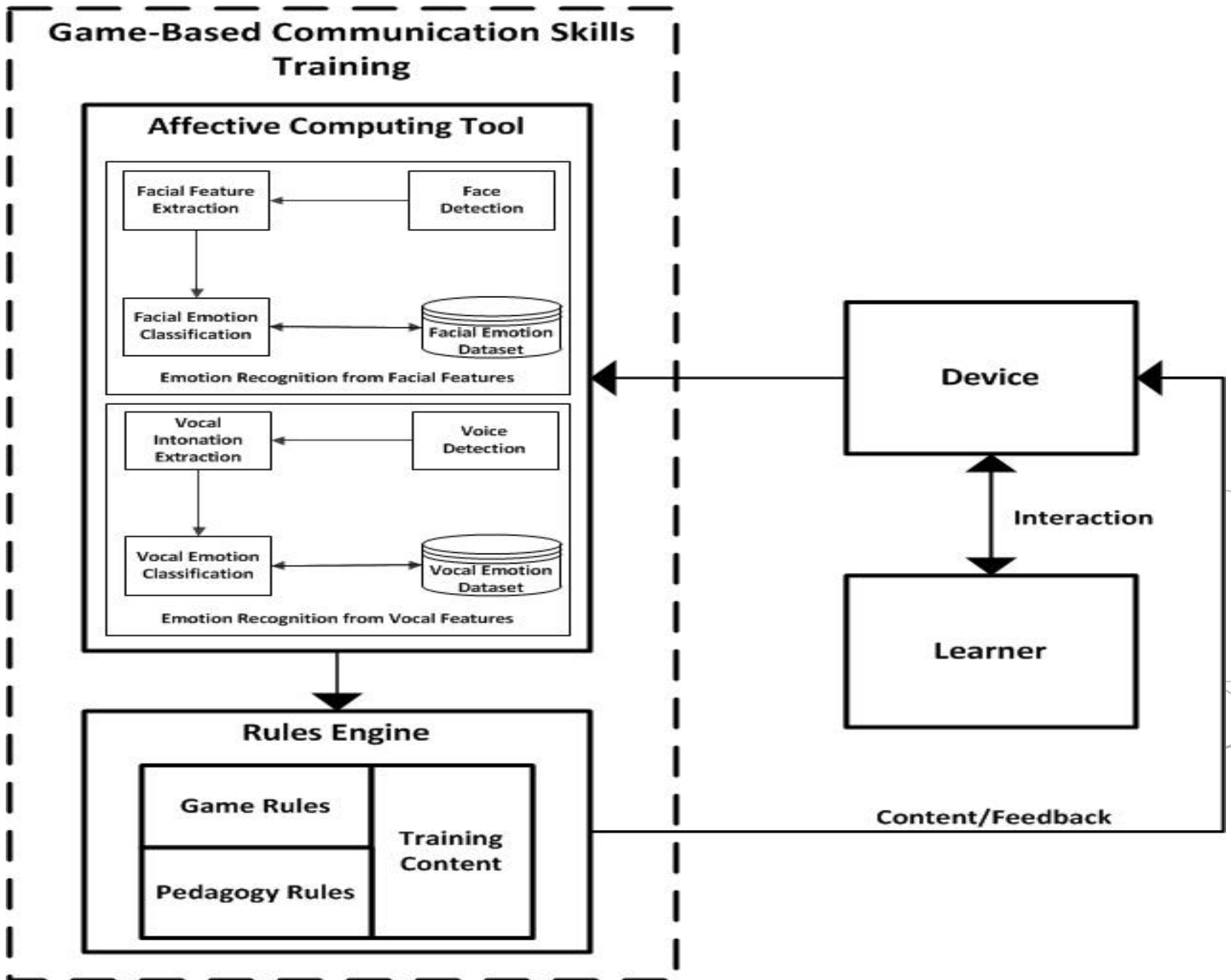
# Framework, experiment, and results

- Development of brief conceptual framework
- Design and development of a technical framework
- Software and Experiment
- Validating of facial and vocal data

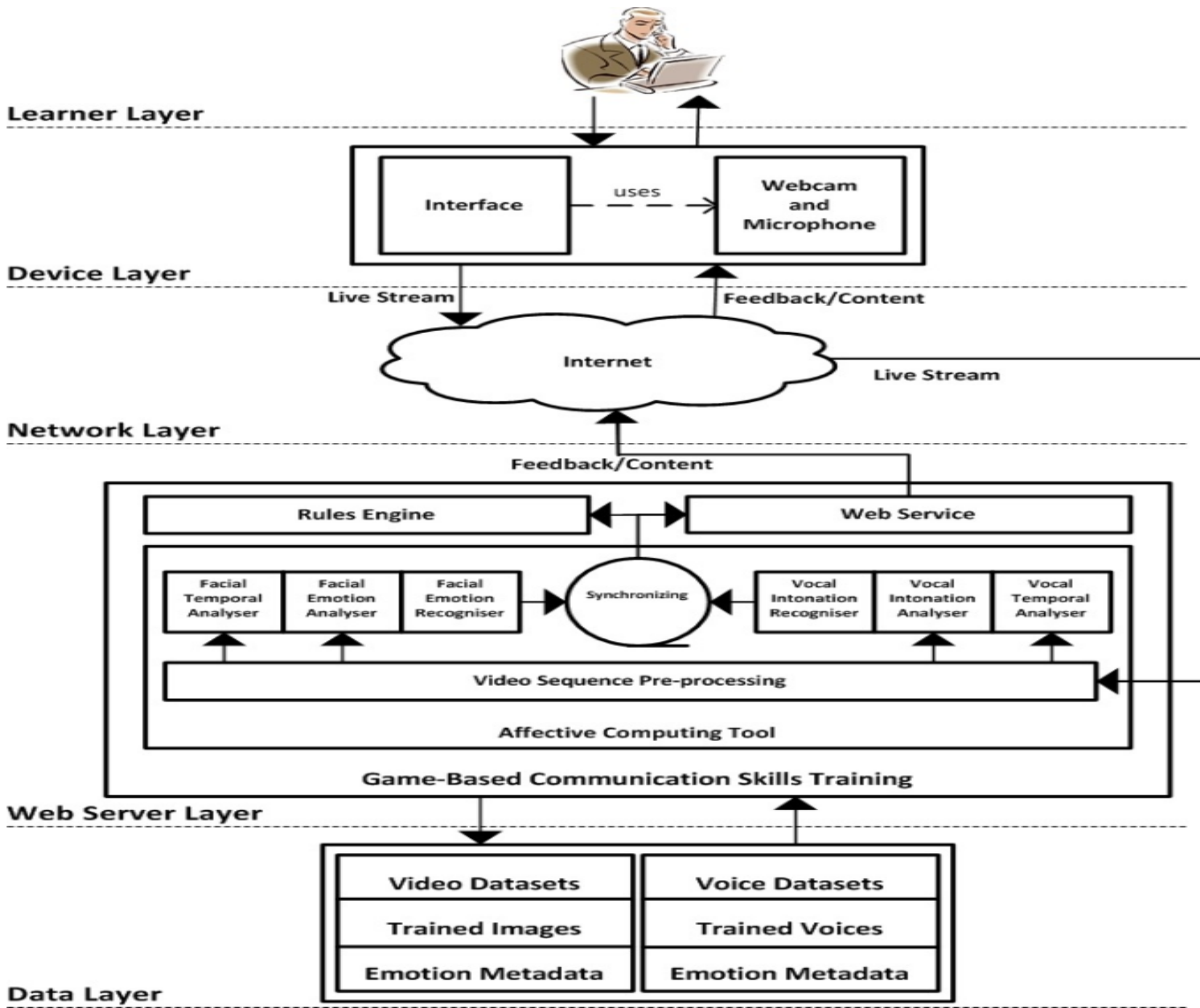




# Conceptual framework



# Technical architecture

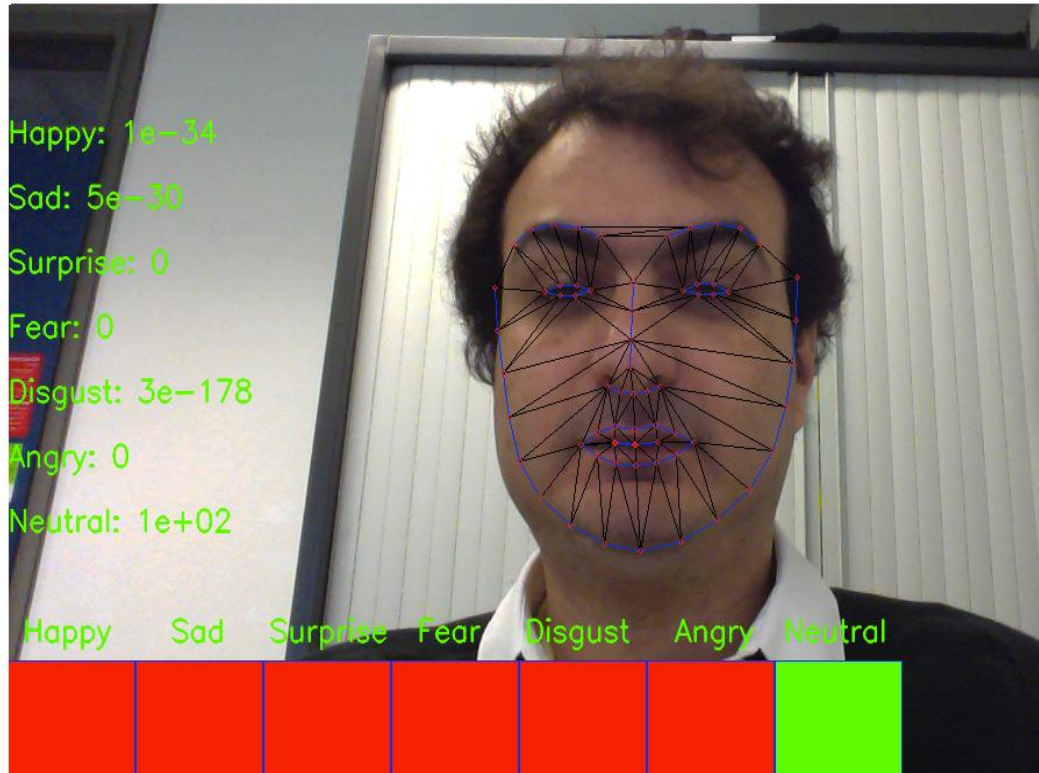


# Participants and tasks

- Sixteen participants (12 male, 4 female; age  $M=42.5$ ,  $SD=10.9$ )
- Five consecutive tasks were given to the participants:
  - Train the database of the affective computing software,
  - Mimic the emotion that was presented through PowerPoint slides,
  - Mimic the seven face expressions two times,
  - Slides presented a text transcript (both sender and receiver) taken from a good-news conversation, participants were requested to read and speak aloud the sender 'slides' of transcript,
  - as in task 4, but in this case the text transcript was taken from a bad-news conversation



## Affective Computing Tool



## PowerPoint Slides

### Sender Emotion: Neutral

No, that's not really the point. We already agreed that your work in general is good. This is beyond discussion. Do you mind if I explain to you what we have considered for this decision?



## Validation results

(Task 2: Mimic seven emotions two times)

		Recognized Emotion							
Requested Emotion		Happy	Sad	Surprise	Fear	Disgust	Angry	Neutral	Total
	Happy	71.875	3.125	----	----	18.75	----	6.25	100
	Sad	----	31.25	3.125	12.5	25	6.25	21.875	100
	Surprise	----	3.125	71.875	9.375	9.375	----	6.25	100
	Fear	----	6.25	18.75	46.875	3.125	3.125	21.875	100
	Disgust	6.25	3.125	----	----	62.5	15.625	12.5	100
	Angry	----	9.375	----	9.375	28.125	40.625	12.5	100
	Neutral	----	3.125	6.25	6.25	9.375	6.25	68.75	100



## Validation results (Task 4: Delivering good news)

	Recognized Emotion								
Requested Emotion		Happy	Sad	Surprise	Fear	Disgust	Angry	Neutral	Total
	Happy	73.34	----	20	3.33	3.33	----	----	100
	Neutral	----	10.39	10.39	6.5	----	----	72.72	100



# Conclusion

1. Majority of the participants were able to accurately use the software
2. They were not fully aware of their emotions to mimic
3. They could easily fix the wrong emotions when looked at the reflections of their emotions in the software screen
4. Almost all participants forgot how they trained the software in initial stage



# Future research

1. Extend version of the framework for voice emotion detection
2. Extend version of the software to be able to detect voice emotion
3. Apply the game-based learning and the components in the study
4. Extend, improve, and development of training materials





# Future research

5. Integration of face emotion recognition and voice emotion detection in one system
6. Develop a web service to provide feedback
7. Improve the setup for future experiments in order to address the problems and improve accuracy
8. Improve the feedback mechanism



