FILTWAM - A Framework for Online Affective Computing in Serious Games

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A Framework for Online Affective Computing in Serious Games

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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

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[1, 2, 3, 4]
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
3. http://softskillsproject.com/
4. http://www.fas.ie/en/pubdocs/SoftSkillsDevelopment.pdf

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)

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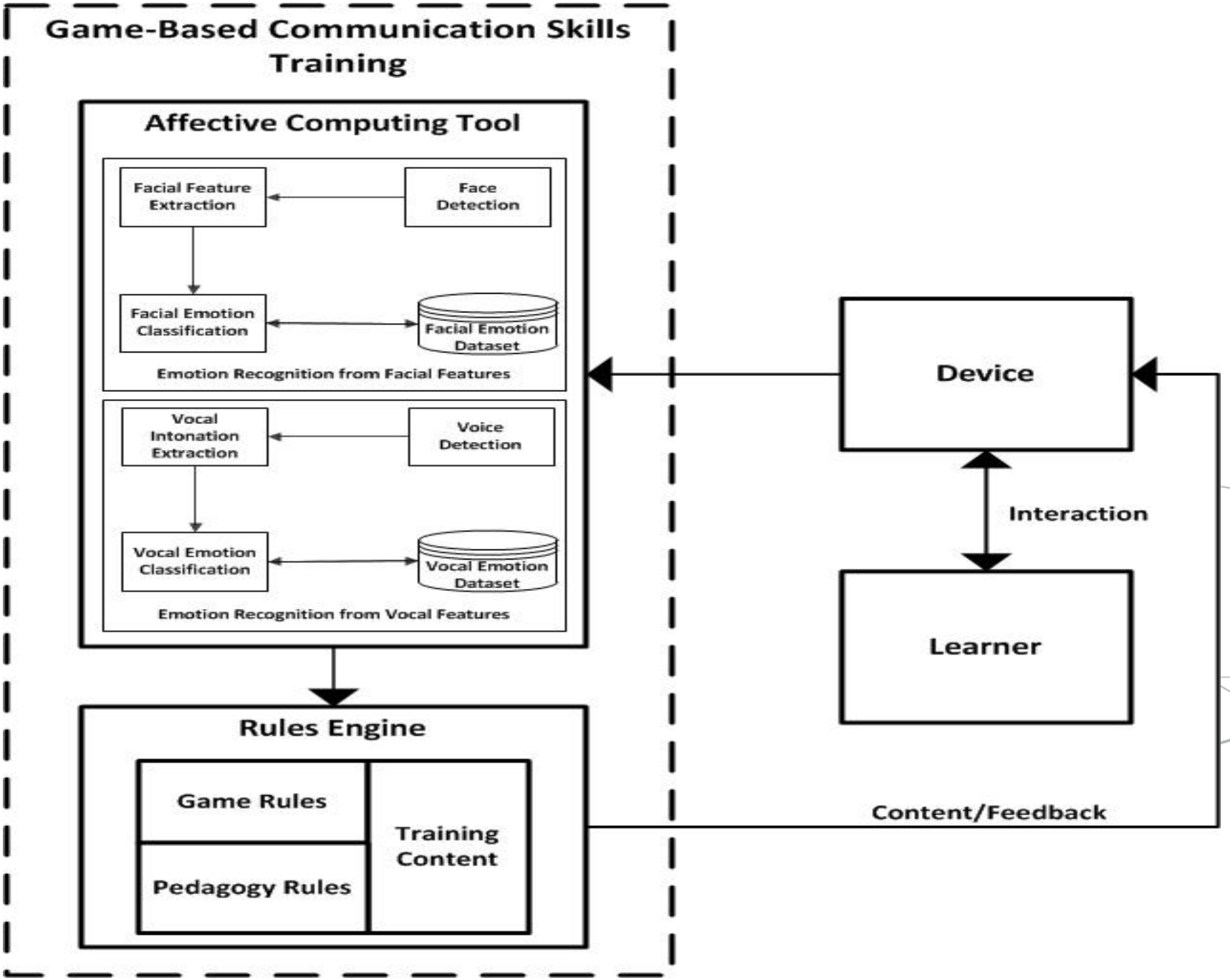
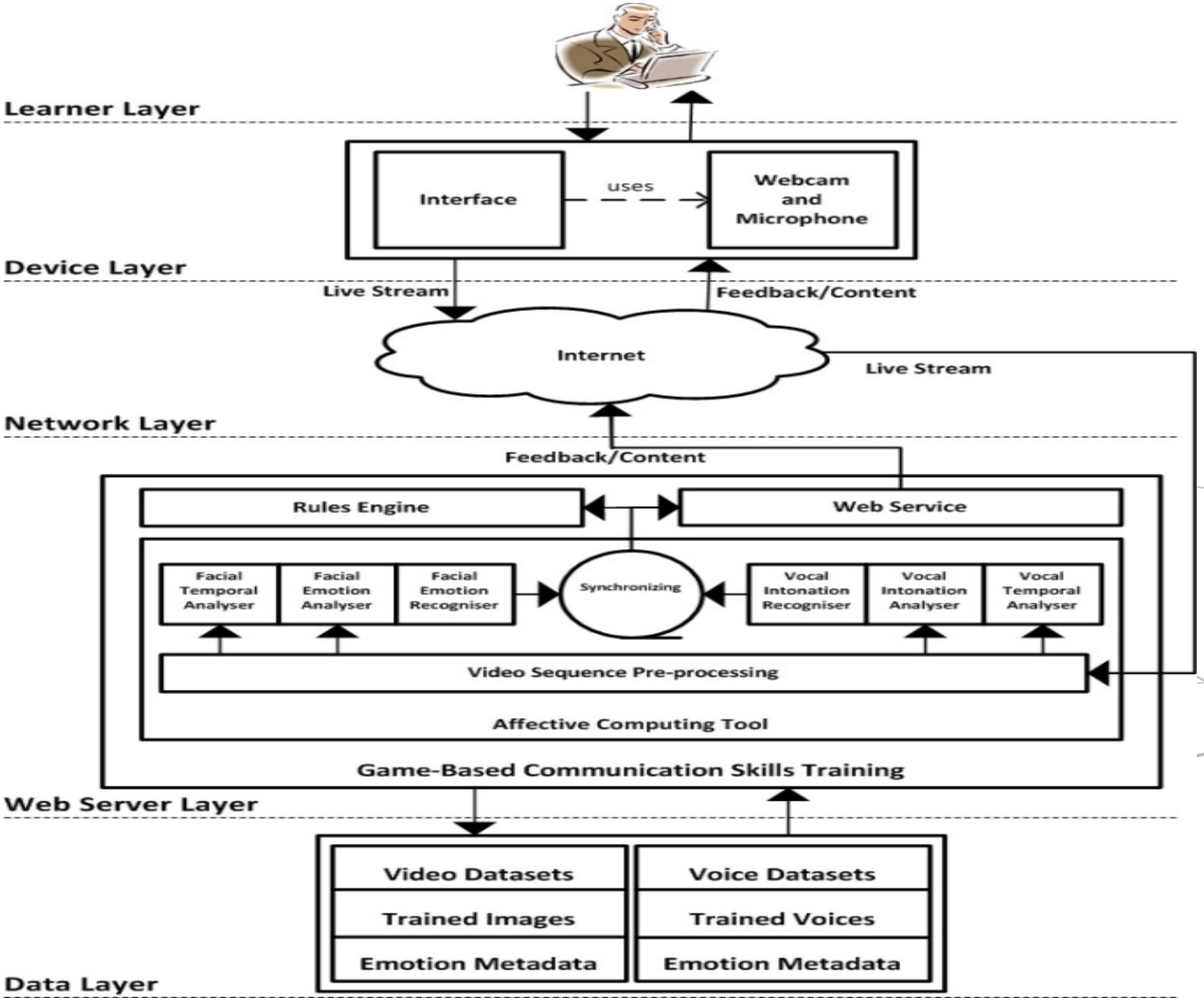
Framework, experiment, and results

- 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

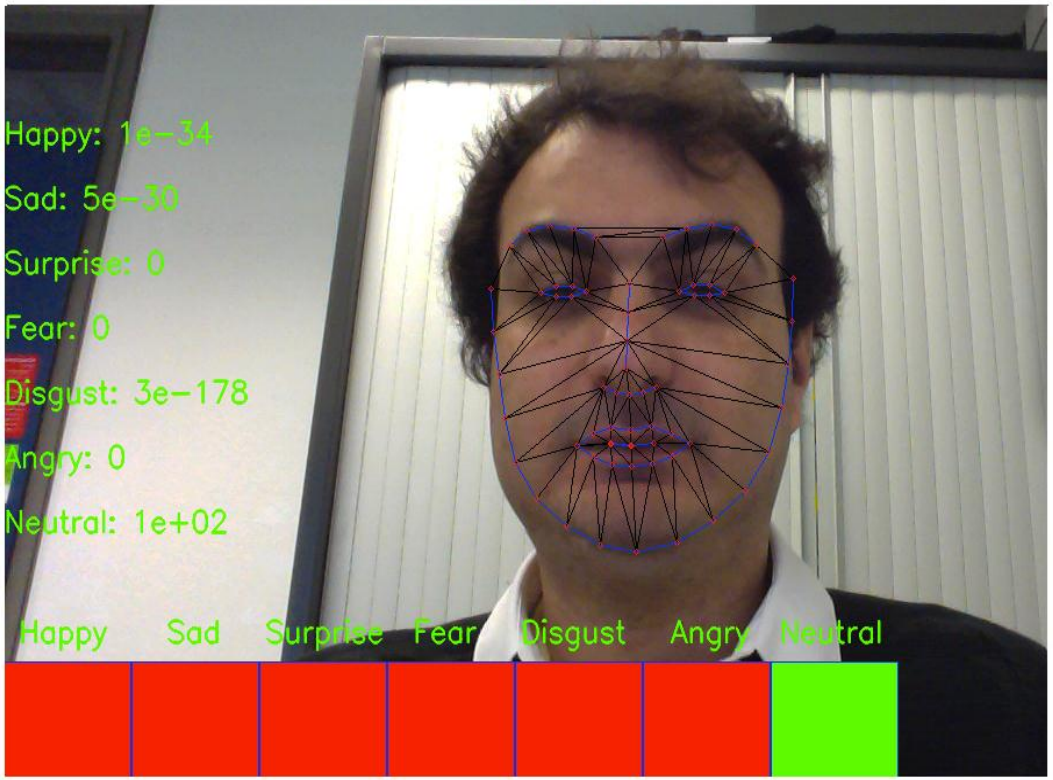


Participants and tasks

- 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

Software and experiment

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

Thank you

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