Intelligence in Elearning for Differently abled learner

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Abstract
In order to support a more self-motivated and stretchy communication between the learner and the system or and the tutor, two category of agents are integrated. In this paper, the type of physically challenged learner has taken for consideration is a sightless learner. Since emotions play an important role in cognitive processes and specially in learning tasks adaptive agent is integrated with emotional framework for a learner. For this type of learner screen reader software like JAWS is more helpful to convert text to sound, but there is no such useful software to convert picture to sound. In this situation, sound agent will be more useful to convert picture to sound. Emotional agent can recognize six basic emotions (happiness, sadness, surprise, fear, anger and disgust) of a tutor. Digital audio watermarking techniques are practically useful to guard the rights of digital audio media.

Keywords-component; E-Learning, emotion agent, sound agent, audio e-leaning contents, common attacks, Digital audio watermarking

I. INTRODUCTION
E-learning is the acquisition and use of knowledge, distributed and facilitated primarily by electronic means. E-learning can take the form of courses as well as modules and smaller learning objects. This form of learning currently depends on networks and computers. Collectively it could be called as communication technologies.

A. Emotion Agent
Emotion plays an important role in the learning process. Inserting emotions into machines makes them more human and should improve human-computer interaction. Adding emotions in the learning process especially for visually impaired learner will successfully deliver the contents to the learner. The analysis of the facial expressions by the emotional agents is generally done according to the following stages: detection of the face, the automatic extraction of contours of the permanent features of the face: the eyes, the eyebrows, and the lips. Extracted contours being sufficiently realistic, we then use them in a system of recognition of the six universal emotions on the face.

B. Recognition and interpretation of facial expression
The Classification is based on the analysis of the distances computed on face's skeletons[2][3]. The distances considered make it possible to develop an expert system (for classification) which is compatible with the description MPEG-4 (MPEG-4 is a collection of methods defining compression of audio and visual (AV) digital data) of the six universal emotions. Contours of the eyes, the eyebrows and the mouth are extracted automatically by using the algorithms described in (NEJI et al. 2004, Ben Ammar et al. 2005).

Fig 2.1: Definition of the distances Di

The segmentation leads to obtain what we call skeleton of expression. Six distances were defined:

D1: opening of the eye, D2: outdistance between the interior corner of the eye and the eyebrow, D3: opening of the mouth in width, D4: opening of the mouth in height, D5: outdistance between the eye and eyebrow and D6: outdistance between the corner of the mouth and the external corner of the eye (Refer Fig 1.1) Joy: {D4 increases}, {D3 decreases and D6 decreases}, {the other distances remain constant}Sadness: {D2 increases and D5 decreases}, {D1 decreases}, {the other distances remain constant}

Anger: {D2 decreases}, {D1 increases}, {D4 either decrease D4 increases} Fear: {D2 increases and D5 increases but more that D2} Disgust: {D3 increases AND D4 increases}, {the other distances remain constant} Surprised: {D2 increases}, {D1 increases}, {D4 increase}, {the other distances remain constant}

The table 1.1 gives a scripts of evolution of the distance Di for the six emotions (↑ means increase, ↓ means decrease and "=" translates the absence of evolution). Notice that for the fear, we do not make any hypothesis on the evolution of D1 because we do not know how to translate the condition {eyes are contracted and in state of alert}.

	D1	D2	D3	D4	D5	D6
Joy	=	=	↑	↑	=	↓
Sadness	↓	↑	=	=	↓	=
Anger	↑	↓	=	↑or↓	=	=
Fear	?	↑	=	=	↑	=
Disgust	=	=	↑	↑	=	=
Surprise	↑	↑	=	↑	=	=

Table 1.1: Di evolution for every emotion

C. Digital Audio watermarking

Recently the rapid changes from a product-based to a knowledge-based society has resulted in an increased demand for knowledge workers who are capable of higher order thinking and reasoning to solve intricate problems in the work place. This requires organizations to educate and train anyone, anytime, and from anywhere [4]. For this task, asynchronous eLearning, defined as instructional content or learning experience delivered or enabled by electronic technologies including the Internet, intranets, and extranets, breaks the limitations of time and space and also creates many benefits, including reduced cost, regulatory compliance, meeting business needs,. The impact of eLearning is real and it has received fairly extensive attention from practitioners and information system researchers. eLearning is reported to be a means of solving learning and performance problems and has become an increasingly critical issue. As digital multimedia for eLearning (video, audio and images) become available for re-transmission, re-production, and publishing over the Internet, a real need for protection against unauthorized copy and distribution is increased. These concerns motivate researchers to find ways to forbid copyright violation. The most of eLearning contents can be categorized into audio and video (including images) contents. Typically the audio contents play a major role and the video contents, a secondary role to eLearning subjects, i.e., the absence or distortion by malicious attacks of audio contents in eLearning system by the audio and video contents can cause eLearning subjects to misunderstand about eLearning contents. Therefore at the viewpoint of information system researchers, the ownership- proof and the protection of audio eLearning contents must be heavily emphasized. The most promising solution for this challenging problem seems to lie in information hiding techniques. Information hiding is the process of embedding a message into digital media. The embedded message should be imperceptible; in addition to that the fidelity of digital media must be maintained. To protect eLearning audio contents, watermarking is very popular method to hide information about themselves in the audio contents. In general, an effectiveness of audio watermarking scheme must satisfy the following requirements: (i) Imperceptibility: The quality of the audio should be retained after adding the watermark. Imperceptibility can be evaluated using both objective and subjective measures. According to the recommendation of IFPI (International Federation of the Phonographic Industry), a watermarked audio signal should maintain more than 20 dB SNR. (ii) Security: Watermarked signals should not reveal any clues about the watermarks in them. Also, the security of the watermarking procedure must depend on secret keys, but not on the secrecy of the watermarking algorithm. (iii) Robustness: Ability to extract a watermark from a watermarked audio signal after various signal processing attacks. (iv) Payload: The amount of data that can be embedded into the host audio signal without losing imperceptibility. For audio signals, data payload refers to the number of watermark data bits that may be reliably embedded within a host signal per unit of time, usually measured using bits per second (bps). There should be more than 20 bps data payload [2].

II. RESEARCH WORKS

A. Emotion Agent Algorithm

The proposed algorithm for emotion agent and sound agent is based on MADKIT[14] platform and agent[1] concept.

Function emotion-agent (facial-expressions)
returns tutor-sensitivity
Static: face-image, table 1.1
State INTERPRET-INPUT (facial- expressions)
rule RULE-MATCH (state, table 1.1)
action RULE-ACTION (rule)
return action

B. Digital Audoi watermarking model

In his section, the performances of the proposed echo hiding watermarking method by new decoders are evaluated and compared with the performances of [9]. Five random selected audio clips in eLearning contents were used, which consist of music (vocal and instruments) and speeches. All audio clips were sampled at 44.1 kHz with 16bit quantization and the length of segment was 44100 samples for each clips.

We first assumed that the watermarked audio signal was not under any attacks. Table 2.1 shows that the bit error rates (BERs) of our scheme and method [9] versus echo coefficient parameter

BER VERSUS _D_Dd_

	BER (%)	
	Proposed	**Method in [9]**
0.001	12.5	19.6
0.002	10.4	16.5
0.003	9.5	12.7
0.004	8.6	11.9
0.005	7.7	10.6
0.006	6.5	9.3
0.007	5.3	8.2
0.008	3.1	7.2

Table 2.1

As expected, BERs are anti-proportional to value of . However, our scheme has lower BER than the one in [9], regardless of the value of . Then we tested the robustness of these techniques against some common attacks in Table 2.2.

SOME COMMON ATTACKS

Name of attacks	**Description**
Re-sampling	Watermarked signals were re-sampled at 16 kHz
Re-quantization	Watermarked signals were quantized with 8 bits
Time-scaling	15% (speed up)
MP3 attack	Compressing the watermarked signal by Mpeg-3 layer1 (lossy compression)

Table 2.3

It can be seen from Table 2.3 that the proposed watermarking scheme achieves higher BERs under all attacks than the time-spread echo method in [9].

III. CONCLUSION

Learning by itself is an experience. And learning for differently abled persons is not only an experience but also a challenge. When it comes to e-learning the challenge is multi-fold. But there is the aid of technology which comes in handy for such learners. This paper has aimed to identify a couple of agents which could translate the e-learning course materials effectively through their capacity of understanding confining the scope to limited shapes and emotions with the help of MADKIT [5] (MadKit is a modular and scalable multiagent platform written in Java and built upon the AGR (Agent/Group/Role)

organizational model). A new echo hiding audio watermarking scheme based on the modified correlation amount. It is shown that the proposed watermarking method can significantly reduce the BERs, thus enhances the robustness of our watermarking scheme. The experimental results demonstrate that our watermarking scheme can be applied to the ownership- proof and the protection of audio eLearning contents.

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