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INTERFACES MULTIMODALES

I FACE

INTERACTIVE FACE ANIMATION

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1 Introduction

During the last 20 years, the communication systems never stopped being improved by multimedia interfaces. Today, visual communication systems become more and more significant, from video phones to virtual agents in games and web services. With iFACE, we have the possibility to create real time animations of virtual faces from sounds with a lot of parameters. Those parameters can generate natural human behaviors.

2 Installation

2.1 Get sources

To install iFACE, you need to download some files. You can find this files at the url :

http://ivizlab.sfu.ca/research/iface/#7.

Firstly, you have to download the "iFACE executable" file. If something is missing, you can also get it at the same address.

2.2 Installation of iFACE

You must uncompress the file "iFACE executable" and place all files and directories in *c:\iFACE*, as shown in figure 2.6 It is possible to place these files in another place. You have to modify some files, but we haven't any indication which one.

2.3 Tests of needed softwares and libraries

To run iFACE, you need to have .NET Framework and DirectX installed.

2.3.1 .NET Framework

iFACE (Framework and Studio Application) need .NET Framework. To check if it is already installed, run **TestDotNet.exe** in *c:\iFACE*. If you see a window as shown in figure 2.6, you can continue. If not, please download the .NET Framework.

2.3.2 DirectX

DirectX 9.0c is needed. if you run **TestD3D.exe** and it failes, download the DirectX from the Microsoft website. To check if everything is ok, you can type *dxdiag* in a command prompt. The test failed the first time we tested, even if we got the right version of DirectX. After intalling it again, we saw the famous teapot like in figure 3.1

2.4 Register DLLs

The last step is to register DLLs. To register ETCodeX.dll and SpeedX.dll, run **RegisterDLLs.bat**.

2.5 Running iFACE

Now, you're ready to use iFACE Framework or iFaceStudio Application.

2.5.1 iFACE Framework

To develop applications with iFACE Framework, you need to add **Wrappers.dll** to a C# projetc or add **Face3DControl** to the Toolbox and insert an instance of the control to a form. Otherwise, you can add **Helpers.dll**, **Geometry.dll**, **Behaviour.dll**, and **Speech.dll** to the project References, and derive the form from Face3DForm.

The necessary iFace namespaces must be added to the source code :

```
using iFace.Geometry;  
using iFace.Behaviour;  
using FaceHelpers;  
using D3DHelpers;
```



using GeneralHelpers;
using SoundHelpers;

2.5.2 iFaceStudio

To run iFaceStudio, run `c:\iFACE\iFaceStudio.exe`. You ought to see something like in figure 2.6.

2.6 Figures

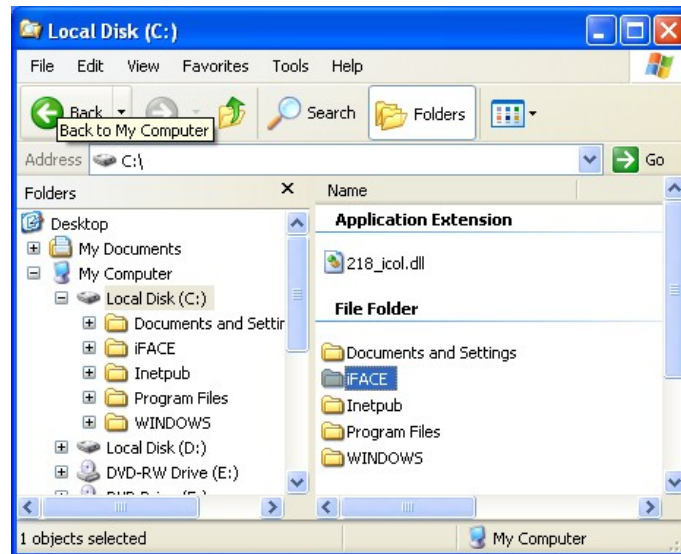


FIG. 1 – Installation directory

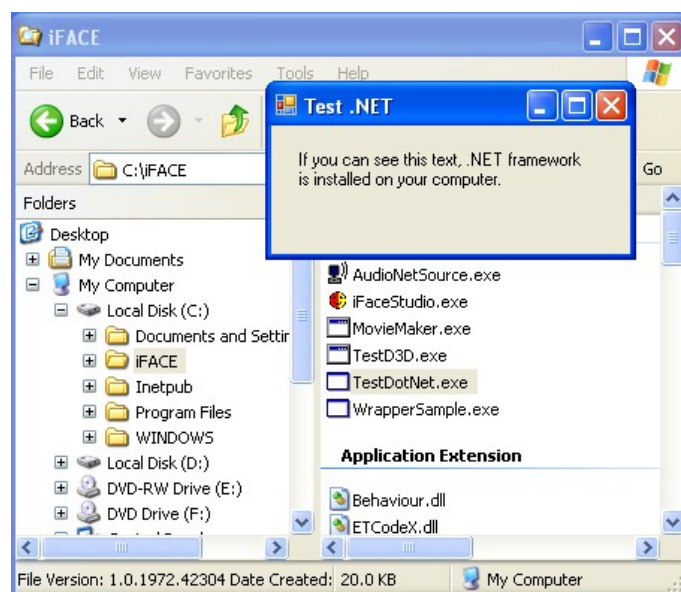


FIG. 2 – .NET Framework test



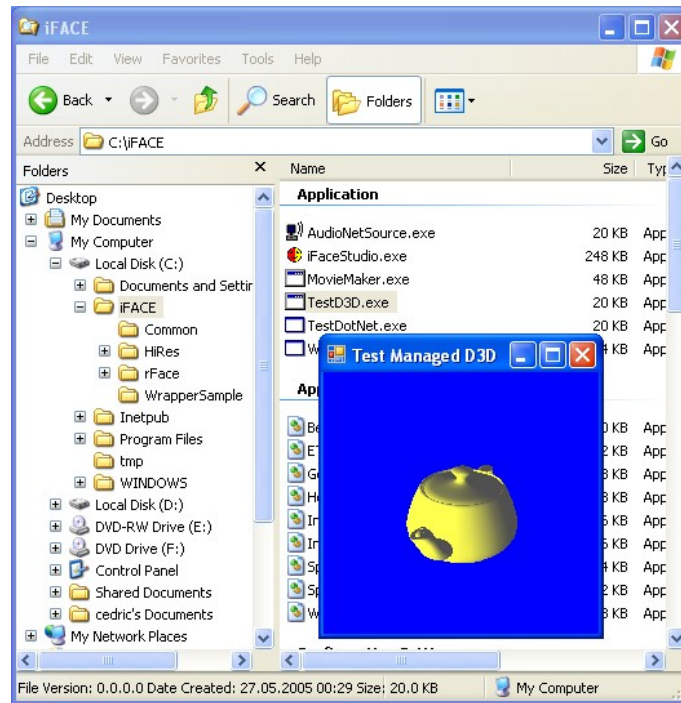


FIG. 3 – DirectX 9.0c test

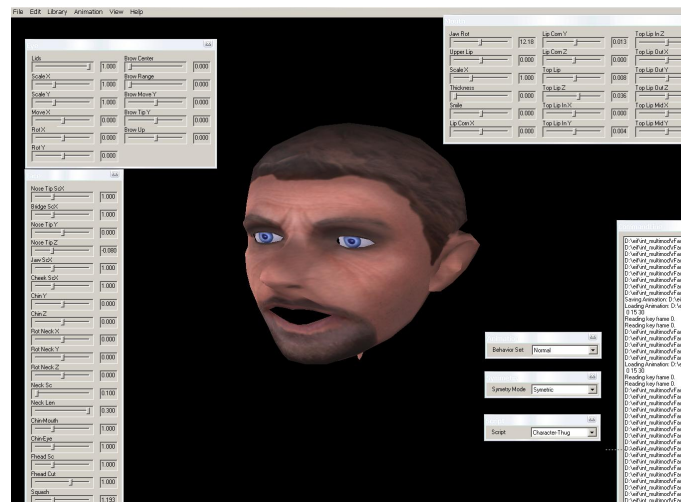


FIG. 4 – iFaceStudio

3 iFace presentation

3.1 What it is ?

Modern multimedia presentations are aggregations of objects with different types such as video and audio. Due to the importance of facial actions and expressions in verbal and non-verbal communication, the authors have proposed a "face multimedia object" (FMO) as a new higher-level media type that encapsulates all the requirements of facial animation for a face-based multimedia presentations within one single object.

Interactive Face Animation - Comprehensive Environment (iFACE) is a general-purpose software framework that implements the FMO and provides the related functionality and tools for a variety of interactive applications such as games and online services. iFACE exposes programming interfaces and provides authoring and scripting tools



to design a face object, define its behaviours, and animate it through static or interactive situations. The framework is based on four parameterized spaces of *Geometry*, *Mood*, *Personality* and *Knowledge* that together form the appearance and behaviour of the face. iFACE can function as a common *face engine* for design and run-time environments to simplify the work of content and software developers.

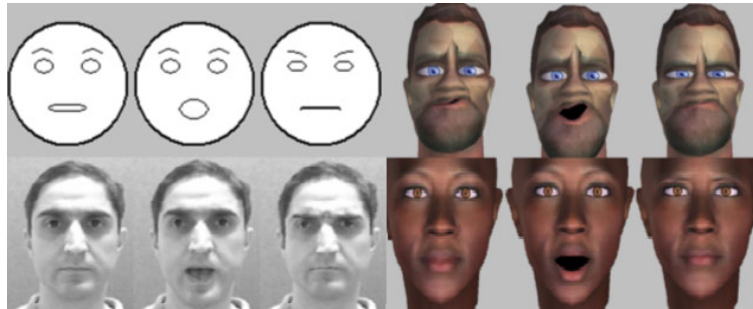


FIG. 5 – Face animation with different heads

3.2 How it works ?

FMO operates as a *face engine* for design-time and run-time applications. Using FMO, animators and authors can design proper geometry and facial actions and pass them to runtime modules only as commands, instead of keyframes with information on all moving parameters. At run-time, the application or game only detects the required action and asks the engine to replicate the same result. This has the advantages such as :

- Less information saved by design tool and passed to run-time
 - Ease of run-time development due to black-box use of FMO
 - Possibility of dynamic applications and usercontrolled event-driven scenarios without the need of a pre-design
- iFACE uses a hierarchical head model that hides the modelling details and allows group functions to be performed more efficiently. Multiple layers of abstraction on top of actual head data make the client objects and users independent of data type (3D or 2D) and provide the similar behaviour regardless of that type. Behavioural extensions in form of Knowledge, Personality, and Mood control scenario-based and individual-based temporal appearance of the animated character. On the other hand, streaming and wrapper objects make the use of iFACE components easier in a variety of applications, such as character-based online services, games, and any other *face-centric* systems.

iFACE is fully compatible with MPEG-4 standard. Although higher level parameters exist, they are all translated to MPEG-4 FAPs before being performed. The system uses a dedicated XML-based language, FML (Face Modeling Language), which provides all necessary scripting functionality in addition to normal XML Document Object Model (DOM).

4 Hello World type application

iFACE is composed of two parts, the main part is named "Studio" (iFACE Executables on the website - iFaceStudio.exe) and the second is a demo version of the Face technology (rFace Demo Toolkit on the website - face.exe). In this sample application, we will use the demo toolkit because it's easier to use and we can do more usefull stuff than with the iFACE executables alone.

4.1 Real-time sync with the sound

You can select the character, the expression and the lips you like by using the menu "Library". At anytime during the demo it's possible to change them. You can also change the behavior set by using the animation panel. The nose, eye and face can be changed by using the appropriate configuration box.

To start real-time synchronization with the sound of the microphone, use the "Animation" menu, click "Send Visemes during During Record" and then, in the same menu, click "Record Lip-sync sample".

You will see the face of the selected character moving (lips, head, ...) with the sound.



5 Conclusion

The goals of this small study was to have an overview of the iFACE library. We think that we have now a global vision of what we can do with it. We think it might be usable. However it requires some improvements because at this time it's not well finished. In the videogames industry, the same kind of software is already used for many years.

In the future, we will see more and more applications of this technology, for example in the Instant Messaging when the user has no webcam, maybe also on websites to discuss with a seller, in the distributors and everywhere we would like to have a more human interface without having a real human in front of us.

6 Sources

Official website <http://ivizlab.sfu.ca/research/iface/>

