Development of an Immersive Virtual Environment for the study of Phobias

Engineering Internship (start date effective March-April 2010)

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This internship is within the context of the INRIA collaborative research initiative, NIEVE (web site available end of Feb. 2010: http://www-sop.inria.fr/reves/NIEVE)

The goal of the this internship is to advance the development of an interactive immersive application in the context of the INRIA Sophia-Antipolis immersive space (see Fig. 1), which is a display device offering a 3.2m x 2.4m working area. It is made of 3 vertical screens (left, front, right) and an horizontal one (floor). Thanks to the head tracking, it allows a single user to be completely immersed in a virtual environment.

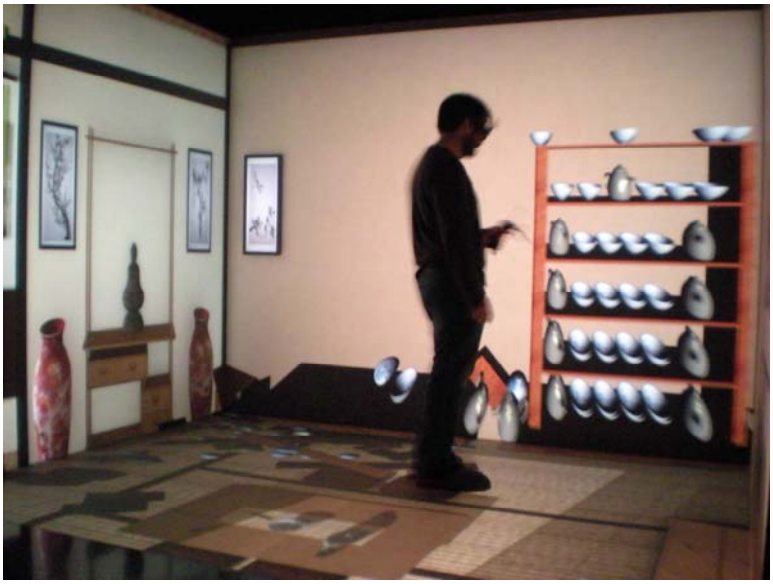

Figure 1: The immersive space at INRIA Sophia-Antipolis

The application in question is a set of three Virtual Environments (see Fig. 2, second row), for the study of phobias, and in particular the fear or dogs. In the context of a previous project (the FET Open EU project CROSSMOD http://www.crossmod.org) we have developed a first prototype application for an outdoors garden environment. This development was performed as an Ogre3D application, with a limited level of scripting interface.

The successful candidate will participate in the development of the new applications, including the city environment and the interior factory environment. The current application handles only the garden scene, with a limited number of interactive animations as a specific “hard coded” application. An appropriate scripting interface needs to be developed to allow the experimenter to be able to modify simple aspects of the interaction easily, and handle different scenes in a generic manner. This will require the development of a set of toolboxes for the design of such interactive environments, both for audio and visual processing. In addition, the current level of rendering quality is not sufficiently realistic for the experimental conditions:

new algorithms need to be integrated into the VEs to handle dynamic lighting conditions and shadows, and better texturing. This development will be shared by INRIA engineers (both permanent staff and specific engineers hired for the project), and the intern.

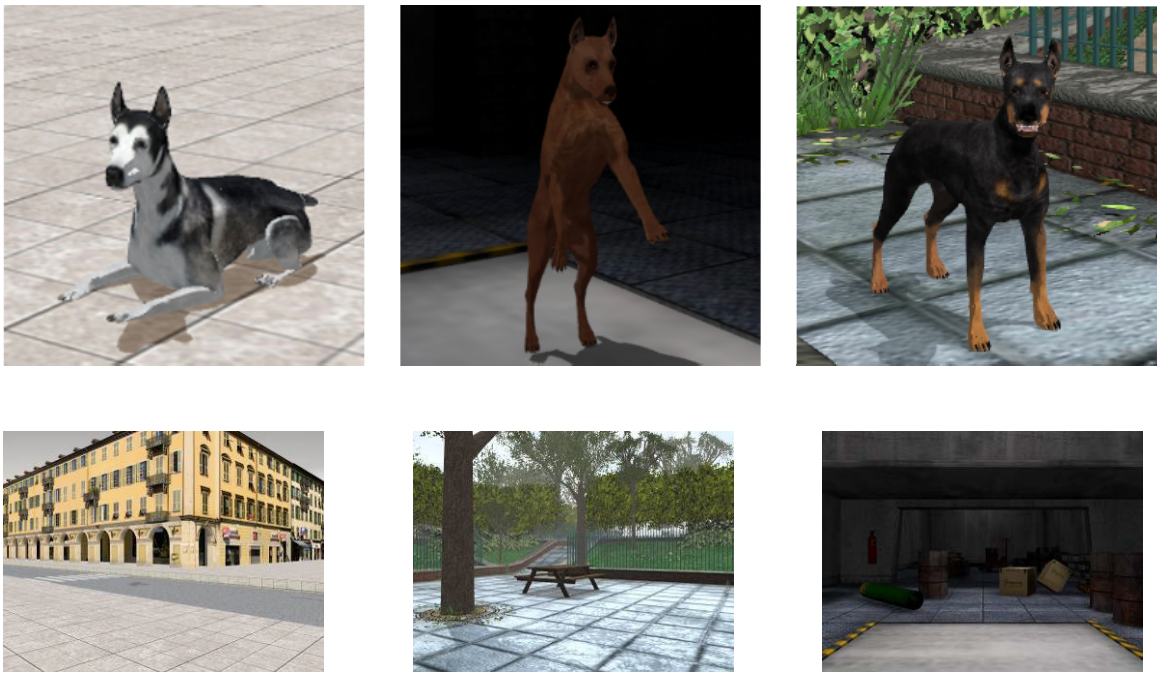

Figure 1: Above: the three dogs used in the DogPhobia application. Below the three environments to be developed for use in the iSpace.

Requirements

The successful candidate should have be a 4th or 5th year student in Computer Science. The candidate should be a good C++ programmer, with experience in building complex programs. The candidate should be have taken courses in computer graphics and in computer graphics programming, with knowledge of OpenGL or DirectX, and some experience with shading languages such as GLSL/HLSL/Cg. Knowledge of Ogre3D and/or OpenScenegraph will be considered an important plus.