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FORPXL—A Fortran interface to *PXL*, the Psychological Experiments Library

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Abstract—*FORPXL* is a software interface that provides programs written in Fortran with a convenient and easily expandable access to the versatility of *PXL*, the C-based Psychological Experiments Library (Irtel, 1992).

1. DESCRIPTION

Many laboratories devoted to psychophysical and psychological research still have a collection of potentially valuable Fortran programs that are obsolete for the following reasons:

- their code is too long and complex to be easily ported to a more modern programming language;
- they rely on graphics hardware which either no longer exists or does not meet modern requirements.

To re-activate such programs in today's PC-controlled experimental environments, we have developed *FORPXL*, a Fortran interface to the Psychological Experiments' Library *PXL*.

PXL (Irtel, 1992; see also Irtel, 1997) is a C-based programming environment and is now widely used for application programming in psychological research. It implements a standardized and convenient scheme for the procedural control of experiments and for managing experimental parameters. From the programmer's perspective, writing a *PXL* application primarily requires the generation of code for predefined *PXL* functions which form the body of a script-like protocol specified in a separate parameter file. The syntax of these parameter files is similar to a command language and the file is processed by a parser during run time.

An important asset of *PXL* is that it includes a comprehensive set of libraries which support a wide range of hardware and software typically required in psychophysical

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and psychological experiments, including interfaces to various graphics devices, response devices and timing routines, and procedures for adaptive parameter estimation (see Irtel, 1996, for a more complete list). However, due to the complex structure of *PXL* the direct use of these resources as plain libraries and under circumvention of the parameter-file system requires some precaution, in particular concerning the correct initialization of the system.

FORPXL was developed with the intention to make *PXL*'s versatility available to programs written in Fortran. *FORPXL* makes extended use of the mixed language facilities offered by MicroSoft™ Fortran (Version 5.0 or later) and MicroSoft™ C (Version 7.0 or later), which allow convenient embedding of *PXL* into the MicroSoft™ Fortran environment. From a practical viewpoint, *FORPXL* appears as an additional Fortran library that contains the subroutines for communicating with the *PXL* system. *FORPXL* comprises routines for graphics initialization, loading color palettes, presenting grey-level images of PCX format, performing input and output of text in graphics mode, control of timing, and for sound generation. Additional *PXL* functions can be easily added by using the source code of existing routines as prototypes.

Currently there are two application programs that use the *FORPXL* interface, *C_Learn* and *R_Contrast*. For a detailed description of *R_Contrast* see Strasburger (1997). *C_Learn* implements a supervised learning paradigm as a series of learning units, where each consists of a training phase and a test phase. During training, subjects are repeatedly presented with a series of images in random order, each followed by a corresponding (predefined) class number. During testing, each image is shown once and has to be classified by the observer. The sequence of learning units is continued until the subject has learned the classification of the images up to a pre-specified criterion (e.g. 100% correct classification). The program has been used so far in a number of studies in the field of visual learning (see Rentschler *et al.*, 1993, 1994; Jüttner and Rentschler, 1996).

2. AVAILABILITY

FORPXL is available free of charge through the authors, whose email address is given on p. 1.

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