Eye and Pen

A software for recording and analyzing handwriting

Writing is a particularly complex human activity.
The writer has to construct a coherent idea and formulate it in accordance with linguistic rules (grammar, spelling), all the while ensuring that it is clear and readable (graphomotricity) for the reader.
The ability to carry out and coordinate these various mental processes within a limited timeframe is often a sign of expertise in text composition. For researchers, as well as for people interested in these questions, identifying the rules governing the implementation and coordination of thes processes is the key to understanding the act and dynamics of writing. The "Eye and Pen" software was designed to address these issues.

For whom?

The Eye and Pen software can record and analyze anytthing that is produced with a pen on a sheet of paper or a screen, be it writing, drawing, annotating, correcting, pointing, underlining, circling, writing music. We start using a pen at an early age and continue doing so throughout our lives. Accordingly, Eye and Pen has been designed for use with all kinds of people, be they old or young, disabled or with a sensory disablility (e.g. deafness).
Eye and Pen can be used by psychologists, speech therapists, teachers, researchers or anyone else interested in these issues.

How?

 Eye and Pen software makes realtime recordings of the writer's pen movements while writing, drawing or pausing for thinking, and then analyzes these data.
When an eyetracker is added, the Eye and Pen software can simultaneously record the writer's eye movements. Precisely identifying the nature of the visual information fixated during writing (drawing) or pausing provides important clues about the dynamics of the writing processes involved, for example, in text production.
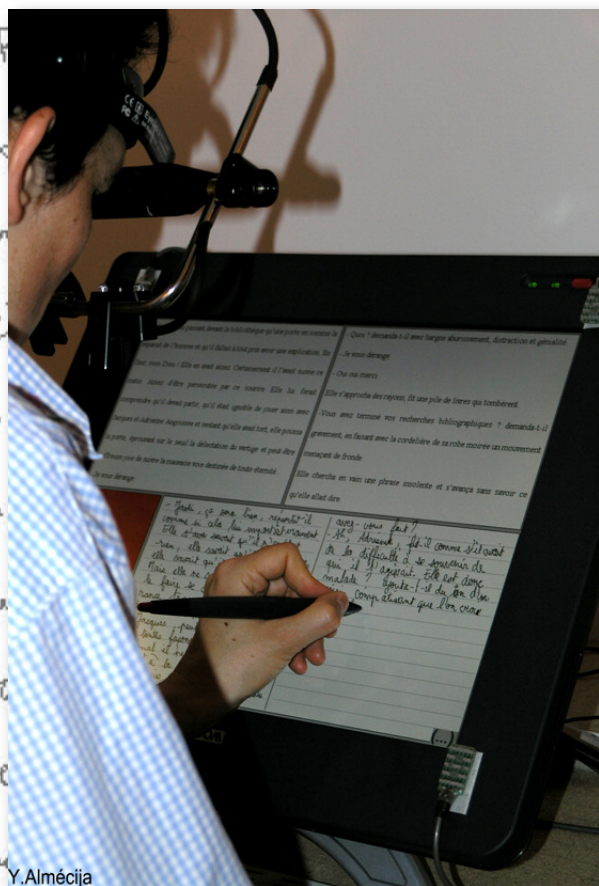
■ Eye and Pen can support **graphics tablets** of any size, be it a common model of with a build-in LCD (writing/drawing onto the screen).

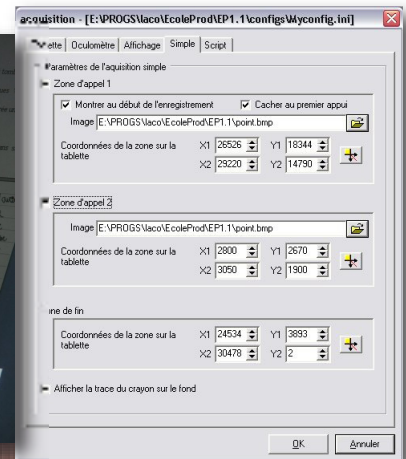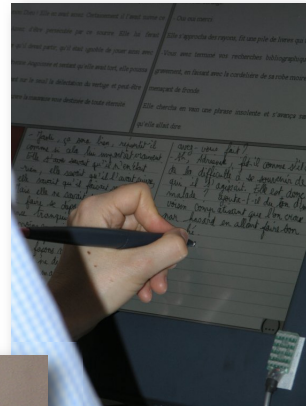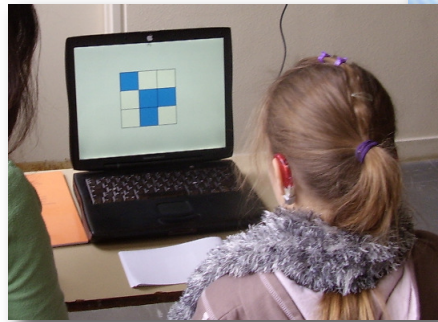■ Eye and Pen can support EyePuter, ASL504, Eyelink and i-ViewX **eyetrackers**.
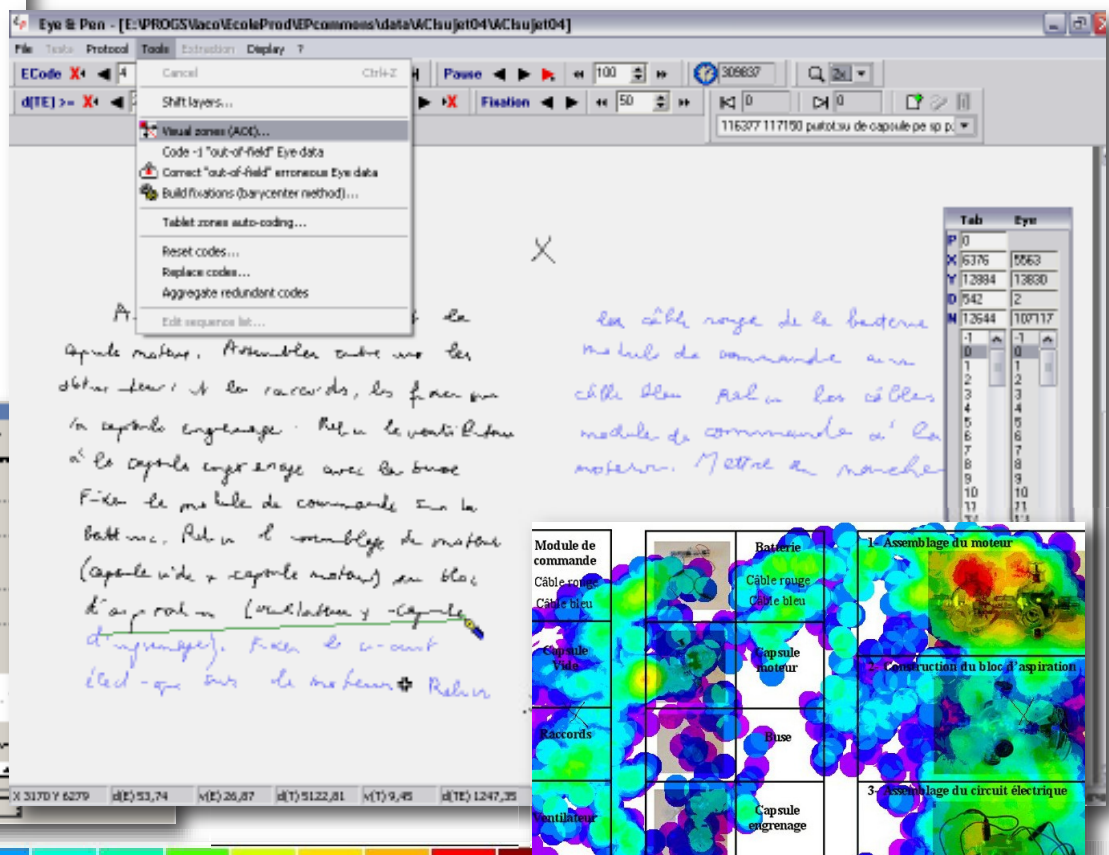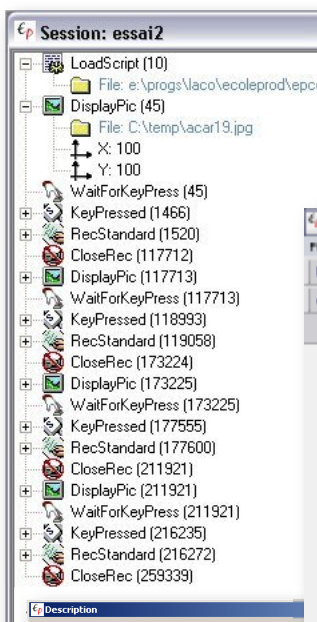
Y.Almécija

Acquisition

Eye and Pen allows users to manipulate audio and video stimuli, images and texts, both before and during the recording.

Alongside a basic acquistion (parameterized via a graphic interface), Eye and Pen incorporatesa mini-language for creating more sophisticated designs (priming, dictation, working memory loading, etc.) and undertaking recording sequence management. Areas of the tablet can be designated as event triggers (interaction).

Analyse

Eye and Pen includes tools for data visualzation ("heatmap", etc.), tools for handwriting and eye movement data segmentation based on time or space (AOI, etc.), filtering (pause and fixation thresholds), data coding and extracting/exporting. Some tools make it possible to "navigate" through the production, according to citeria such as pause duration, distance between gaze and pen position, etc. or simply replay it, as one would with a video recorder.

Domains of application

Eye and Pen is mainly (but not exclusively) designed for research on handwriting, whatever shape it takes, from text to drawing.

It can be used to study production of both children and adults, as well as those of elderly or deaf people, for example. Some studies has already been conducted with professional authors and writers.
It is also possible to study the phases of text correction and revision, wether of one own's production or someone else's.
Ergonomics and teaching applications are numerous (enhancement of writing, instructional programs etc...).
Eye and Pen has already been used for studying linguistics, psychology, teaching, neurology and sports.
Eye and Pen can be used for any research which involves recording the movement of a pen across a surface.

Some users

University of Staffordshire, United Kingdom
University of Essex, United Kingdom
University of Clermond-Ferrand II, France
University of Lyon 2, France
University of Nantes, France
University of Nice, France
University of Toulouse 2, France
University of Stavanger, Norway
University of Nanyang, Singapour
University of Lund, Sweden

More information

Documentation, forums, newsletter...
http://www.eyeandpen.net

Octarès Edition (Eye and Pen sales)
http://www.octares.com

Contact
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Who we are

David Chesnet is a software developer at the Maison des Sciences de l'Homme et de la Société, University of Poitiers, France (UMS 842 CNRS).

Denis Alamargot is a senior lecturer at the CeRCA Laboratory of the University of Poitiers (UMR 6234 CNRS). He is head of the "Approche Pluridisciplinaire de la Production Verbale Ecrite" (GDR 2657 CNRS) research group and of the "The european research network on learning to write effectively" (ERN-LWE; IS0703) european COST action involving researchers from 18 countries.

Eye and Pen is the fruit of this research and collaboration, and is frequently enhanced to meet our new requirements as well as requests from our users.

Eye and Pen has been registered with the Agence pour la Protection des Programmes (n°IDDN.FR.001.470020.000.S.C.2004.000.31235)
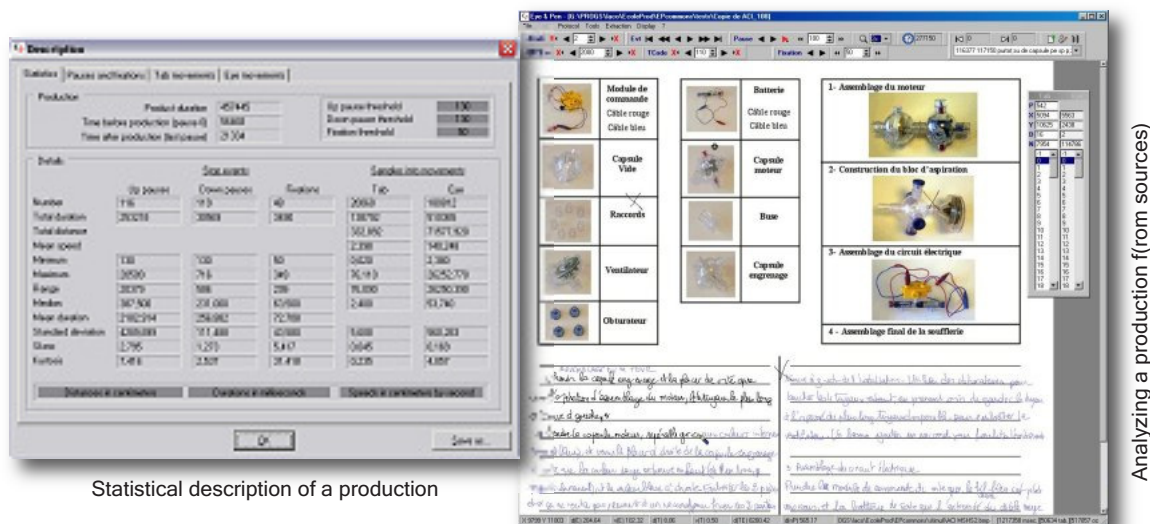
Some publications

Alamargot, D., Dansac, C., Chesnet, D. & Fayol, M. (2007). Parallel processing before and after pauses: A combined analysis of graphomotor and eye movements during procedural text production. In M. Torrance, D. Galbraith & L. v. Waes (Eds), *Cognitive Factors in Writing*. Dordrecht-Boston-London: Elsevier Sciences Publishers.

Alamargot, D., Chesnet, D., Dansac, C. & Ros, C. (2006). Eye and Pen: A new device to study reading during writing. *Behaviour Research Methods, Instruments and Computers*, **38**(2), 287-299.

Chesnet, D., & Alamargot, D. (2005). Analyses en temps réel des activités oculaires et graphomotrices du scripteur: Intérêt du dispositif 'Eye and Pen'. *L'Année Psychologique*, **105**(3), 477-520.

Caporossi, G., Alamargot, D. & Chesnet, D. (2004). Using the computer to study the dynamics of handwriting processes. *Lecture Notes in Computer Science*, 3245, 242-253.

Statistical description of a production

Analyzing a production f(rom sources)