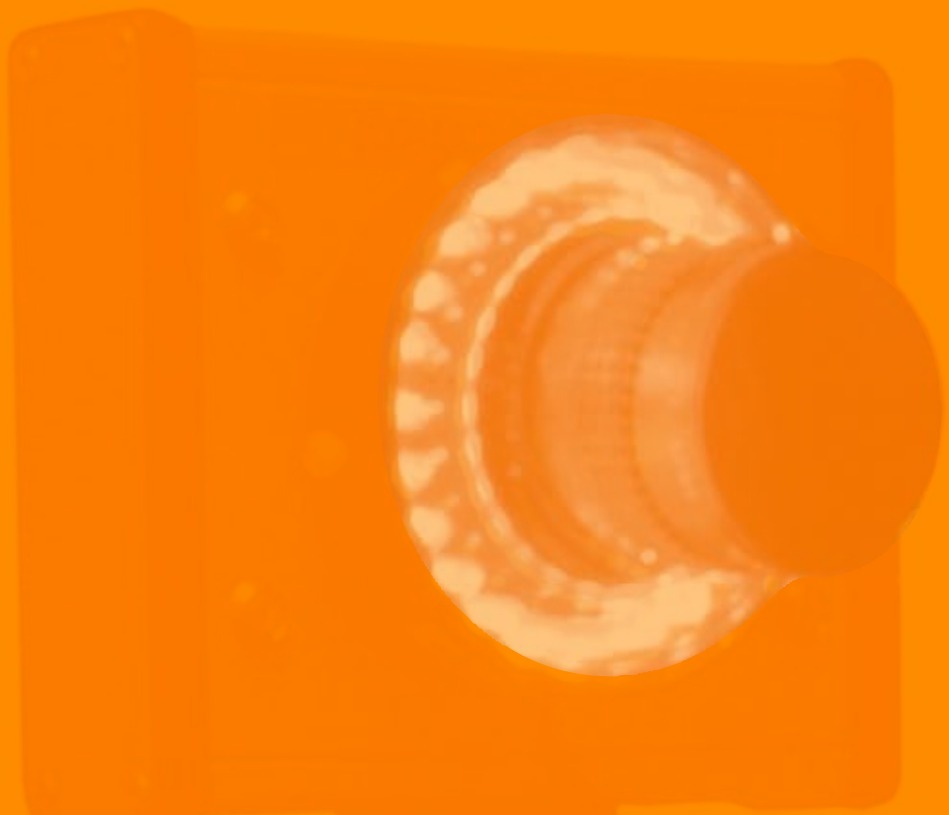
EyeNetics, A new Eye for Motion Analysis



EyeNetics

A New Eye for Motion Analysis !

The EyeNetics Company

The **Eye**Netics goal is to simplify the use of motion analysis system. In this way, we have designed an ergonomic and smart device : The **Eye**CAM system.

This device is accessible for all the aspects of motion capture in the medical and sport domain due to its low cost and close assistance with the end-user.

The **Eye**Netics company was laureate of the French national OSEO Innovation contest in 2006, regional in 2007 and also of Bourgogne Entreprendre in 2007. It receives the support of the regional incubator PREMICE as well as The Regional Council of Burgundy.

The **Eye**Netics products are designed with the help of an academic laboratory specialized in real-time image processing namely :

The Le2i
Mixed research unit of Burgundy University / CNRS

So we continuously benefit from the most up-to-date research results in the image processing and motion analysis.

The company is based in Dijon on the university campus.

The EyeNetics Team

Laurent HAAS
Manager
☎ 03 80 79 22 39
06 80 27 12 67
03 51 12 23 86
Laurent.HAAS@**Eye**Netics.fr

Gérald BARDINI
Hardware engineer
☎ 03 80 39 52 38
06 74 66 24 04
03 51 12 23 86
Gerald.BARDINI@**Eye**Netics.fr

Michel PAINDAVOINE
Scientific consultant
☎ 03 80 39 60 43
03 51 12 23 86
Michel.PAINDAVOINE@**Eye**Netics.fr

Pierre CHATELIER
Software engineer
☎ 03 80 39 52 38
03 51 12 23 86
Pierre.CHATELIER@**Eye**Netics.fr

EyeNetics S.A.R.L.
Université de Bourgogne - Faculté des Sciences Mirande
Aile des sciences de l'ingénieur
21000 DIJON - FRANCE
www.**Eye**Netics.fr - Contact@**Eye**Netics.fr
Limited Liability Company - Capital of 40 000 €
Headquarters 13 rue de la Croix – 21910 Corcelles les Cîteaux - FRANCE
N° Siret 497919027 00019
N° TVA FR 64497919027
RCS DIJON 497 919 027

EyeNetics
Un nouvel œil pour l'analyse de mouvement !

The EyeCAM System

With the use of a 10 bits gray level sensor, the **Eye**CAM system can generate movies captured at up to 240 fps full frame VGA. It alows to play recorded movies of human or animal movements with a very slow motion. Due to our specific algorithms, the **Eye**Cam system can detect markers placed on the body and calculate their position with high accuracy. A bayer filter can also be used on the sensor of the **Eye**CAM to obtain fast colour movies.

A Compact Embedded System for Motion Analysis

A Smart Camera whith High rate capture
Picture rate capture : 60 / 120 / 240 / 480 / 960 fps

Pictures Sizes VGA (640x480) ,1/2 VGA or 1/4 VGA
Real time picture compression

Integrated light, red and near-infrared
To improve markers detection accuracy

FPGA component
For embedded processing

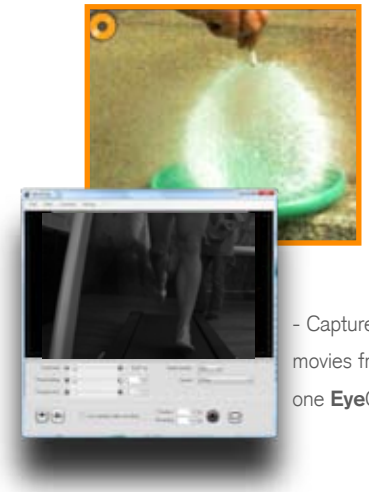
Using with a common laptop
Due to embedded processing

Fast USB 2.0 streaming
Up to 6 **Eye**CAMs connected to a common laptop

Standard C Mount Lens

EyeNetics Software

MiniCAM



- Capture movies from one **Eye**CAM

MultiCAM

- Capture synchronised **Eye**CAMs

EyeMotion2D

- Markers Tracking
- Speed / angles
- Augmented reality
- Video Edition

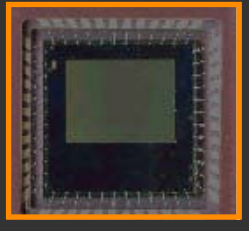
The range of **Eye**Netics Software began with MiniCAM (provided with all **Eye**CAM) which allows basic movie capture and very slow replay. MultiCAM is the software for synchronised capture with up to 6 **Eye**CAMs.

EyeMotion2D is the **Eye**Netics solution to record and analyze generated movies. This software provides an automated markers tracking and skeleton reconstruction. The movies can be enriched with graphical information.

Technical features of the acquisition system

The **Eye**CAM device uses a fast CMOS sensor. It allows to do acquisitions up to 240 fps with a 640x480 picture size and 480 or 960 fps in smaller size. Further characteristics of the sensor are summed up as follows :

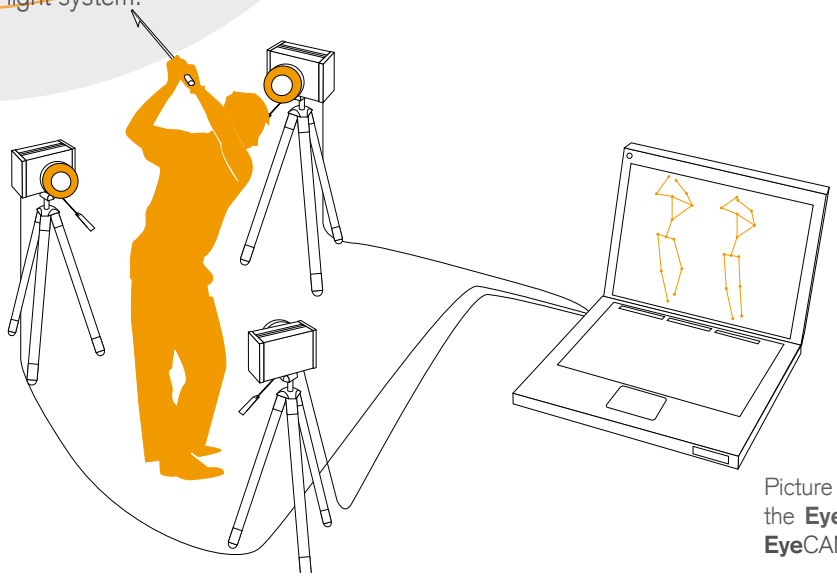
Parameters	Values
Optical Format	1⁄2 inch
Active Pixels	640 (H) x 480 (V)
Pixel Size	9.9 µm x 9.9 µm
Shutter Type	Electronic Snapshot Shutter
Maximum Data Rate/Master Clock	80 MPS/80 MHz
Frame Rate	250 fps (640 x 480)
ADC Resolution	10-bit, on-chip
Responsivity	3200 V.m2/W.s 17 V/lux.s
Dynamic Range	61 dB
Supply Voltage	Analog: 2.5V-3.3V Digital: 2.5V I/O: 2.5V
Power Consumption	190 mWatt
Operating Temperature	–40 °C to 70 °C
Color Filter Array	Mono RGB Bayer Pattern
Packaging	48-pins LCC



Using this sensor at its maximum capcities, allows EyeNetics to propose efficient devices for concurrential prices.

Muti-EyeCAM System for 3D-reconstruction of the movement

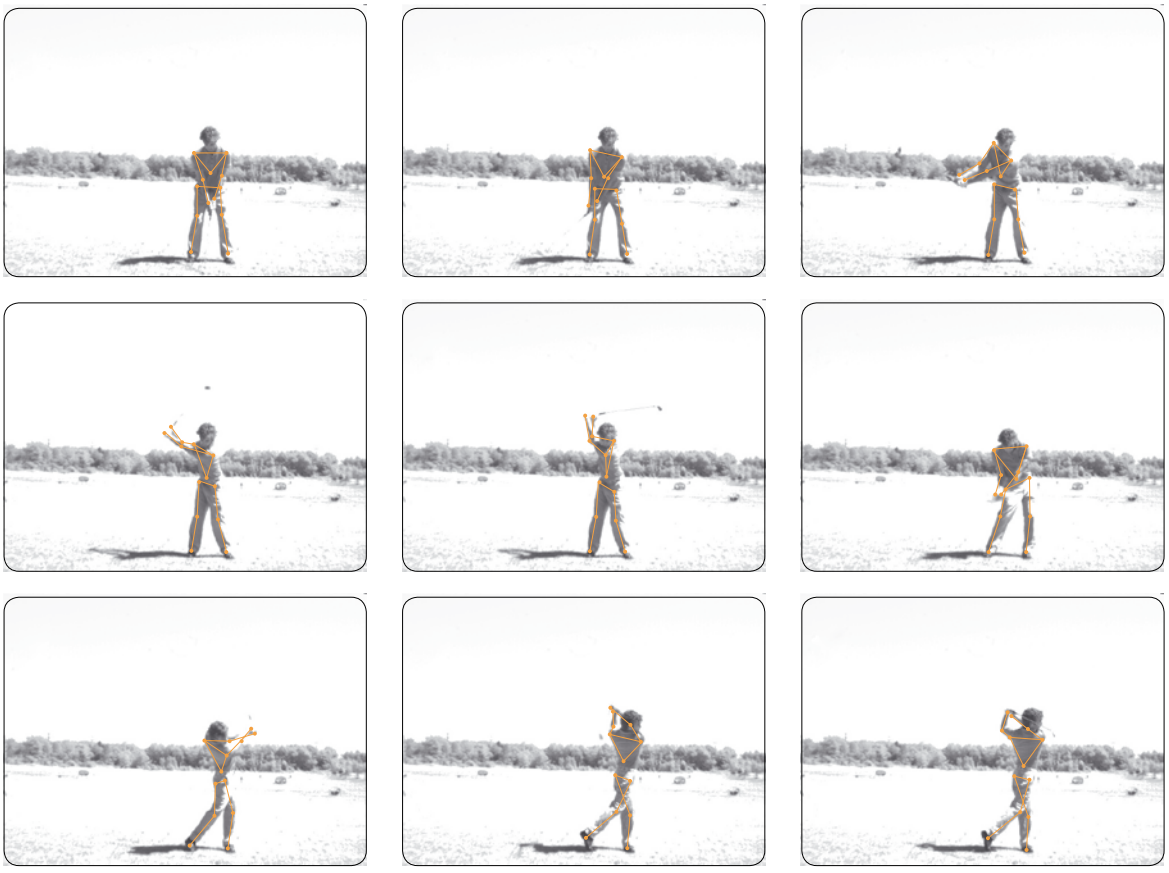
Several **Eye**CAM systems can be plugged together on a same computer (possibly a laptop) in order to get from 2 to 6 different views of the same movement. 3D-reconstruction is possible with this very light system.



Picture compression embedded inside the **Eye**CAM allows the connection of 6 **Eye**CAMs on one laptop.

Sport Applications

Swing analysis and postural golfer analysis : Portable device on outdoor. The analysis software of golfers's movements is developed in partnership with OsteoGolf.



Small animal motion applications

The movie acquisition is done with a pair of **Eye**CAM devices connected to a laptop. It enables a 2 x 240 frames per second frequency in half VGA mode.

The data analysis given by the multi-**Eye**CAM system allows to quantify the animals movement and diferentiate a regular walk compared to a pathological one.

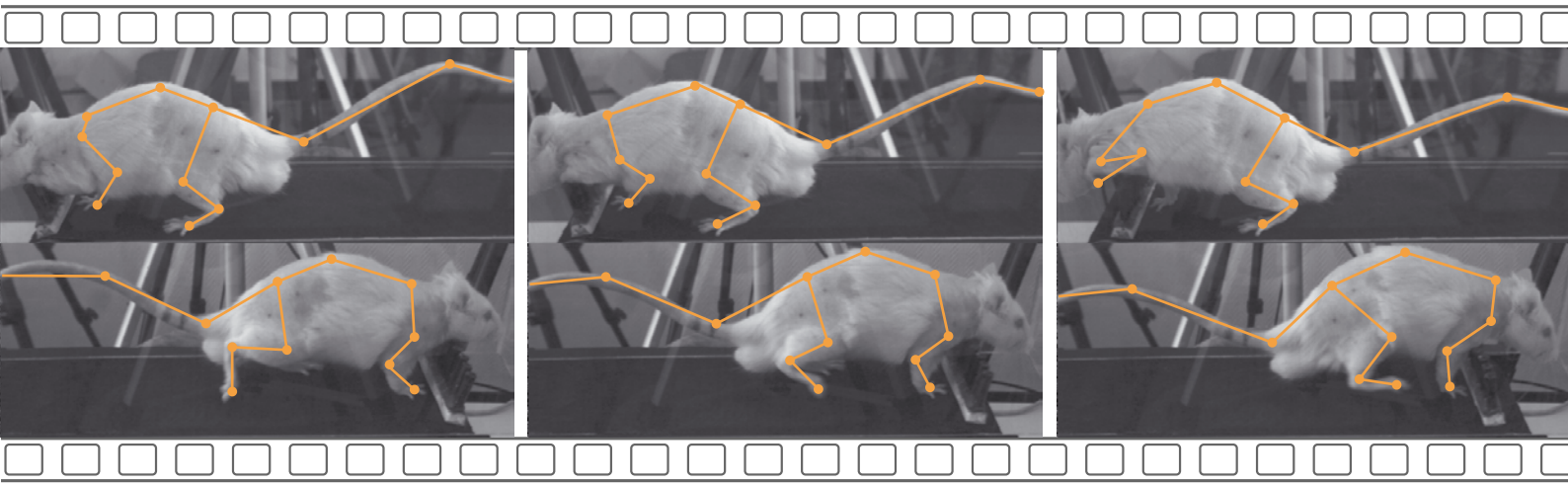
Infra-red reflective markers allow tracking of points of interest for mouse locomotion.

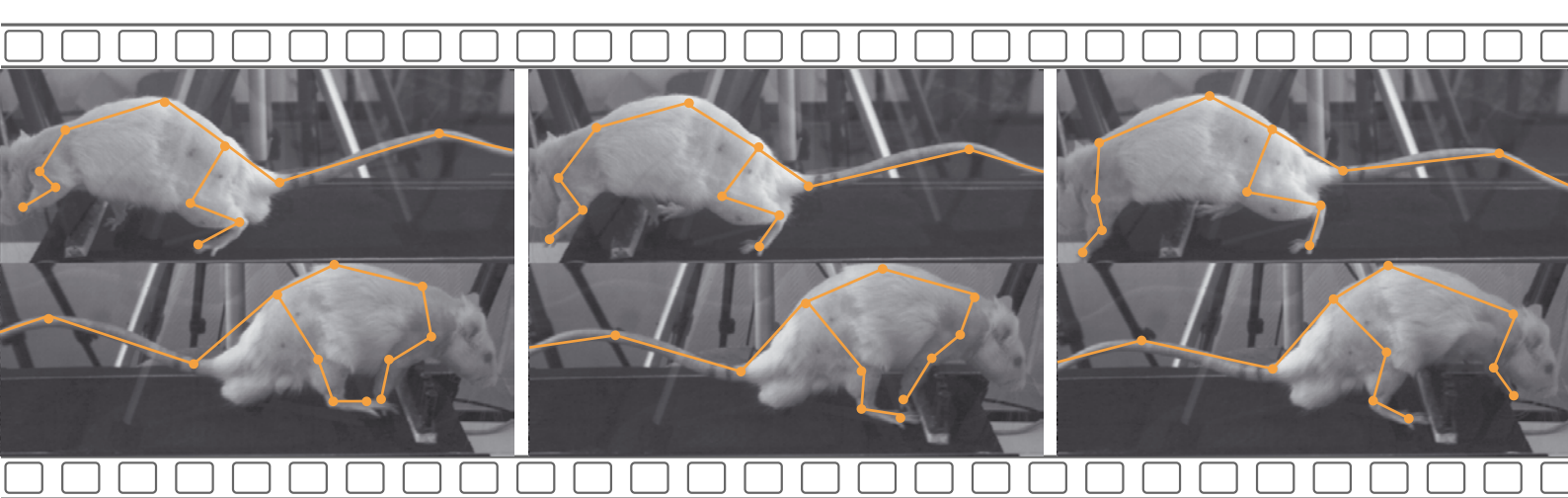
A locomotion analysis software has been developed together with Neureva company based in Montpellier.

neuréva

Movement breakdown of a white rat :

Stereo view at 240 frames per second crossing an obstacle by a white rat.

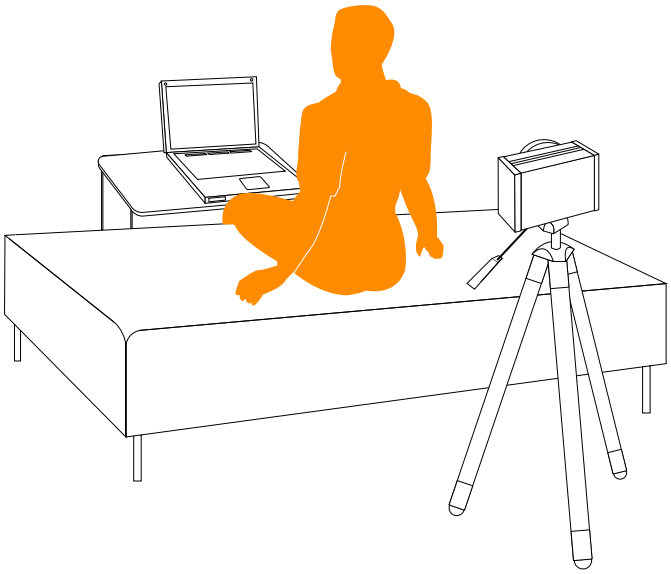




Applications in functional rehabilitation and Medical applications

The **Eye**CAM system in association with a dedicated software becomes a simple, transportable, measurements device for verticality postural perception : VertiCAM.

With its real time postural measurements, the device allows to rehabilitate patients due to a game function. It also allows to follow the evolution of the pathology with dated patient files.



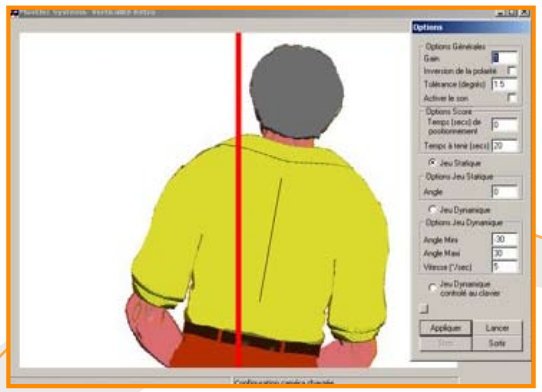
The doctor can measure vertical position of patients sitting in his room, with half-degree precision.

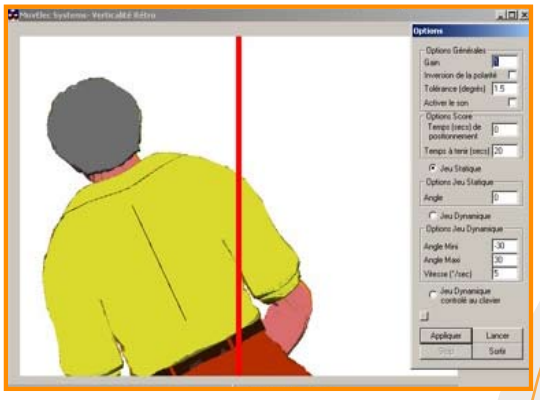
The patient can play dynamic games designed to rehabilitate its vertical sense under the doctor's control.

This device has been developed in partnership with the Dijon CHU rehabilitation area.

Biofeedback real time game :

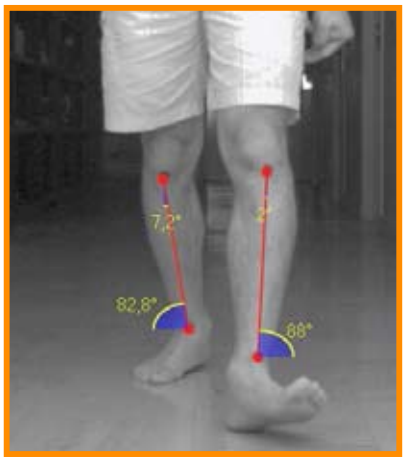
The avatar, guided by the patient's posture, follows the red line orientation, as long and precisely as possible.





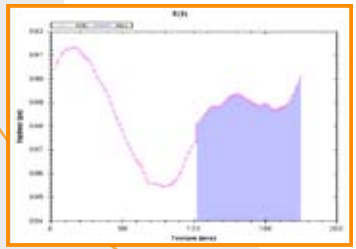
The red line can be animated with a constant movement giving a dynamic and entertaining rehabilitation.

Gait analysis with EyeCAM system



The walking speed, step time and length can be measured with only some markers on the legs or feet of the patient.

A report can be published automatically by **Eye**Motion2D sofware.



EyeNetics
A New Eye for Motion Analysis !