SMART Video-Tracking System for Automated Recording of Animal Behavior

Key Features
- Flexible and precise analysis of animal behavior
- Automated detection of head, center mass and base-tail (Triwise technology option)
- Highly user-friendly
- Digital video files analysis capabilities
- Entirely configurable data report
- Zone-dependent camera settings
- Optimized tracking in low contrast conditions
- Day/night cycle control system
- Immobility detection for forced-swimming test and freezing
- User defined criteria for zone entry with Triwise technology option

Parameters Measured
- Animal trajectory (distance, speed, permanence time in zone etc.)
- Specific parameters for Morris Water Maze (latency to target, time near walls, Wishaw’s error, permanence time in quadrants, directionality etc.)
- Social interaction (contacts, relative movements etc.)
- Immobility periods
- Global activity
- Rearing (input/output or Triwise option)
- Events visualized by the experimenter (using event recorder)
- Clockwise and counter clockwise rotations with Triwise option

SMART is a complete and user-friendly video-tracking system for evaluating behavior in experimental animals. It allows the recording of activity, trajectories, events, social behavior interactions and performs the calculations of a wide range of analysis parameters. The system offers a flexible and easy to learn interface for setting up a wide variety of behavioral tests: Water Maze, Open Field, Plus/Radial Arm Mazes, and Place Preference tests in addition to other user-designed applications.

SMART works with animals located in up to 16 separate enclosures providing both quantitative and qualitative analysis of each animal’s path. Each animal enclosure can be divided into different zone of interest using the specific tools provided by SMART. Up to 31 different zones (and one Exclusion Zone) can be easily drawn with different name and characteristics (Standard, Target, Arm or Hidden). A special tool for Water Maze is included.

Animal trajectories are acquired from real time TV images or videotaped records and stored, enabling you to analyze and reanalyze experiments with different zone configurations and parameters.

TRACKING allows not only data acquisition of the spatial position of the animal but also the automatic detection of a range of specific behaviors. Manually scored behaviors (e.g. grooming) can be calculated for any zone or independent variable. The parameters evaluated are presented in reports entirely configurable by the user. The report coverage can be the full track or it can be split into different intervals of time. Results can be directly and automatically exported to Excel®.

SMART can elaborate a graphic representation/image of the tracks studied. This option is of great interest to illustrate data in publications and conferences.

An adapted version of SMART, SMART-DT, is provided for free to check data, generate statistics, print out results and obtain graphics. SMART-DT can be installed in as many computers as may be required.

The SMART system can be expanded for using the Triwise technology for the automated detection of the head, center-mass and base-tail allowing then a more detailed evaluation of some specific behavioral items — rearing, rotations, object exploration, entries into zones, contacts and more.
SMART Video-Tracking System for Automated Recording of Animal Behavior (continued)

Components Included
- CD and USB protection key
- Cables and connectors
- Instruction manual
- Free software updates of the acquired system
- 2 year warranty on hardware

Options
- A wide range of cameras and accessories are available, please contact our technical support staff for details
- Material for camera fixation (upon request)
- DVD reader/writer
- Telemetric switch (remote start/stop switch)
- Frame grabber board (PC interface board)
- PC station
- Multiplexers, digital switches, digital recorder are available upon request

related hardware
> Open Field Box, see page G55
> Circular Pool, see pages G40 to G41
> Radial Maze, see page G44 to G45
> Elevated Plus Maze, see page G53 to G59
> Black & White Box, see page G57
> Spatial Place Preference Box, see page G61
> Many other possibilities!

Specifications
- Computer Requirements
  2 GHz processor or higher (Celeron processor not supported), 2 Gb of RAM with PCI 32-bit bus master expansion slot available and 1 free USB port. VIA chipset not recommended.
- Graphic Card Requirements
  256 colors palette graphics card for 1024x768 pixels, 32-bit true color RGB display.
- System Requirements
  Windows® 98, 2000, XP (SP2 or Higher), Vista 32
- Sources
  Video camera, video tape, DVD player or digital video files

Order # | Model | Product
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PY2 76-0272 | SMART TV | Triwise Module for Detection of Head, Center Mass, and Base-Tail
PY2 76-0267 | SMART I/O 8 C | Smart System Extension, Control Box for 8 Inputs and 8 Outputs
PY2 76-0268 | SMART I/O 32 C | Smart System Extension, Control Box for 32 Inputs and 32 Outputs
PY2 76-0269 | SMART UPG2.5 | Upgrade from previous versions to V 2.5
PY2 76-0270 | SMART TS | Telemetric Switch (Remote Start/Stop Switch)

Citations
- Singer IS et al. (2009) Prenatal exposure to antibodies from mothers of children with autism produces neurobehavioral alterations: A pregnant dam mouse model. (elevated-plus maze, mouse, USA)
Smart JUNIOR: Straight to the Point Video-Tracking

Key Features
• Simplest video-tracking
• Nine steps and you’re done!
• Provides concrete meaningful data
• Ready-to-use configurations

DESIGNED FOR:
Water Maze Experiment
• Latency to reach the platform and times platform is crossed
• Permanence time, distance traveled, speed and number of entries (and %) into zones (platform, pool, quadrants, border and total)
• Movement pattern and manually scored events

Open Field Experiment
• Permanence time, distance traveled, speed and number of entries (and %) into zones (center, periphery and border)
• Movement pattern and manually scored events

Plus Maze Experiment
• Permanence time, distance traveled, speed and number of entries (and %) into zones (center, open arms and closed arms)
• Movement pattern and manually scored events

T-Y Maze
• Alternations (number, %, max), first arm choice, latency first choice
• Permanence time, distance traveled, speed and number of entries (and %) into correct/incorrect arms, left/right arms or A/B/C arms
• Movement pattern and manually scored events

Place Preference
• Permanence time (absolute and relative), distance traveled, speed and number of entries (and %) into compartment associated to drug/placebo and corridor
• Movement pattern and manually scored events

Components Included
• Instruction manual
• Free software updates of the acquired system

Options
• Telemetric switch (remote start/stop switch)
• WebCam or other cameras
• PC station or laptop (upon request)

NEW Smart JUNIOR MA Extension!
With the NEW MA (Multiple Arenas) extension to Smart JUNIOR, users are able to work with an amazing number of subjects (over a 100!) for maximum efficiency. Create arenas and related zones in less than 10 clicks! Allows independent or synchronized (all arenas or only selected arenas) start/stop of tracking process. The ONLY system available that features different lighting/contrast and timing control settings for each arena!
Smart JUNIOR: Straight to the Point Video-Tracking (continued)

Smart JUNIOR

Smart JUNIOR is a economical video-tracking system specially indicated for laboratories with very precise interests and needing concise meaningful reports.

With a more competitive price, the Smart JUNIOR software fulfills all the basic functions of a classical video-tracking system. Ready-to-use configurations, Run panel and Data reports are directly targeted to specific standard experiments. An innovative Scheduler tool allows managing the subjects and trials in different phases and sessions for an easy retrieval and organization of the final data. Succinct graphs provide a direct visualization of the results obtained in the different experimental groups.

Smart JUNIOR takes advantage of the latest technologies in terms of image processing for providing accurate data in the context of behavioral research on animal. The software platform is expandable: new ready-to-use protocol configurations can be easily plugged-in for widening the scope of the system.

Smart JUNIOR represents the finest solution for completing molecular and cellular studies by standard behavioral analysis. It is also a perfect alternative for emergent markets.

related hardware

> Circular Pool, see pages G40 to G41
> Elevated Plus Maze, see page G53 to G54
> Open Field Box, see page G55
> Place Preference, see page G60
> Y or T Maze, by request

Specifications

Computer Requirements
2 GHz processor or higher (Celeron processor not supported), 2 Gb of RAM

Graphic Card Requirements
256 colors palette graphics card for 1024x768 pixels, 32-bit true color RGB display

System Requirements
Windows® XP (SP2 or Higher), Vista 32

Images Sources
Webcam, digital video, firewire/USB digital camera; in general, any device compatible with Windows® Image Acquisition (WIA)

Order #  Model  Product

PY 76-0029  SMART JUNIOR  Smart Junior Platform
(Needs Experiment Modules)
PY 76-0255  SJWM  Water Maze Experiment Module
PY 76-0256  SJPM  Plus-Maze Experiment Module
PY 76-0257  SJOF  Open-Field Experiment Module
PY 76-0416  SJTY  T-Y Maze Experiment Module
PY 76-0415  SJPP  Place Preference Experiment Module
PY 76-0508  SJMA  Multiple Arenas Module

Options

PY 76-0270  Smart Remote  Telemetric Switch
PY 76-0260  CAMWEB  Logitech Quickcam Express 5000 640x480 30FPS w/Cable USB 1.8 m
PY 76-0261  CAMWEB  High Resolution WebCam Creative WebCam NX Ultra 640 x 480 w/Cable USB 1.8 m
PY 76-0262  CONVANAUSB  Video Converter (Analog/Digital)

FAQ’s

1. How many animals will I be able to monitor with Smart JUNIOR System?

At this initial stage Smart JUNIOR is designed and restricted to one animal because our main goal is the maximum and extreme simplification of the system. However, Panlab/Harvard Apparatus is open to customer’s requests and welcome you to put us to the test!

2. When my trial version expires, what should I do to acquire a license?

Just follow the instructions indicated by the Activation Assistant of the Smart JUNIOR and you will get your registered copy within minutes!

3. Once I buy the system, will I have to pay anything else such as annual license or technical/scientific support?

Panlab/Harvard Apparatus includes all related expenses in its price. You will pay one time and will get product’s version life assistance.

4. Now there are only 5 Experimental Modules but, do you plan to add new ones? If so, which ones?

As long as there are standard experiments with highly standardized parameters to look at, we will not stop widening JUNIOR’S scope.

5. If at a later stage I become interested in a highly sophisticated video Tracking system such as your renowned Smart, will I have to pay for a brand new system?

At Panlab/Harvard Apparatus we make this transition simple for our customers! What is more, we offer a highly affordable Transfer Fee for customers wishing to move from Smart JUNIOR to SMART! Contact our technical support staff for more information.

Citation

Camara J et al. (2008) Memantine prevents the cognitive impairment induced by 3,4-methylenedioxymethamphetamine in rats. Eur. J. Pharmacol. 5891-3; 132-9 (open-field, water maze, rats, Spain)