



Revolutionizing Behavior Research



TopScan

Features:

- Complete Top-View based Behavior Recognition software
- Includes *LocoScan*, *ObjectScan*, *MazeScan*, and *WaterMazeScan*
- High-Throughput capability up to 32 simultaneously
- Real-time or offline
- Continuous lengthy recordings and analysis possible
- Easy plug-n-play functionality
- No user intervention required during experiment
- Detailed statistics about events that occurred during the experiment
- Automated Binned Data Output
- Automatic Graphing and Charting included!
- Validated to be more than 90% accurate with respect to human scoring
- Full color-analysis
- Automatic adaptation to changing environment, non-uniform lighting, etc.
- Result review, Visualization of Acquired Experiments
- Extensive Experiment Database Management included!
- Batch-mode allows user to run multiple videos successively without human intervention

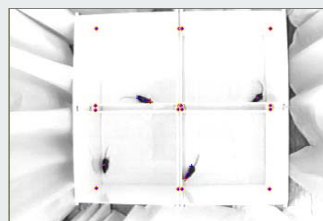
Events TopScan can detect:

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Zone Visits • Crossovers(CO) • Partial COs • Speed • Motion • Dist to Points • Dist to Zones • Orient to Points • Disappear | <ul style="list-style-type: none"> • Sniffing • In-place Motion • Shape • Stretch Attend • Head Dip • Immobility • Elongation • Turn • % Body In | <p>Additional functionalities:</p> <ul style="list-style-type: none"> • Circling • Flat-back Approach • Grooming • Thigmotactic Behaviors |
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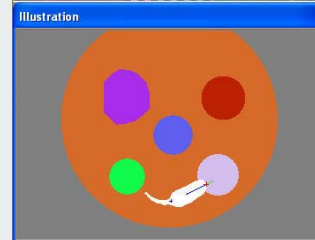
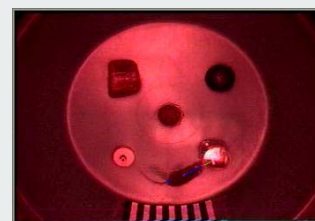
TopScan is a general purpose Top-view based behavior analysis system and was the first to use animal body parts (since 2002) to provide the most accurate behavior analysis results possible. It is applicable to a wide ranging set of experiments, from the most basic animal tracking task to more complicated tasks such as Novel Object Recognition requiring precise detection of the nose of the animal exploring an object. *TopScan* is an extendable framework that comprises 4 separate products – *LocoScan*, *ObjectScan*, *MazeScan* and *WaterMazeScan*. Any or all of those 4 product combinations may be purchased. Additional functionalities for integration into *TopScan* include Circling, Flat-back approach, Grooming and Thigmotactic behaviors. Moreover, *TopScan* can be directly integrated with other Clever Sys products such as *AnnoStar*, *SocialScanTop*, *DrugEffectScan*, *DSRScan*, etc.

LocoScan allows automated analysis of locomotor activity. The system has the flexibility that the animal can be placed in an arena with or without bedding. *LocoScan* outputs detailed statistics about locomotor behavior such as total distance traveled, average speed, average turning angle, etc. It also allows the user to divide the cage or arena into zones of any shape as they want and *LocoScan* will output zone-specific statistics including zone entry and exit statistics, average speed and turning angle within each zone, length of stay in each zone, etc.

ObjectScan automatically detects and records sniffing behavior information including object sniffed, duration of sniff, numbers of sniffs at each object, etc. The system uses video taken from the top with objects placed in a pre-defined region. *ObjectScan* ensures that sniffing is counted only when the animal's nose is in contact (or in a specified distance) with an object, without coloring animal's head, as it can automatically identify important body parts of the animal such as nose, tail, forelimbs and hind limbs all the time.



LocoScan



ObjectScan



TopScan

(Continued from front)

Applications:

- Open Field, Locomotor Activity
- Novel Object Recognition
- Maze Analysis (Elevated Plus Maze, Zero-, Y-, T-, Radial Arm Maze)
- Morris Water Maze
- Place Preference
- Light/Dark Box
- And many more!

Results:

- Objective Behavior Recognition Results
- Automatic Export to Excel
- Complete Experiment Database Management
- Summary of All Occurred Events, Times of occurrence, Durations, Latency to occurrence, various measures during occurrence
- Binned data at user-defined bin intervals

Product Options:

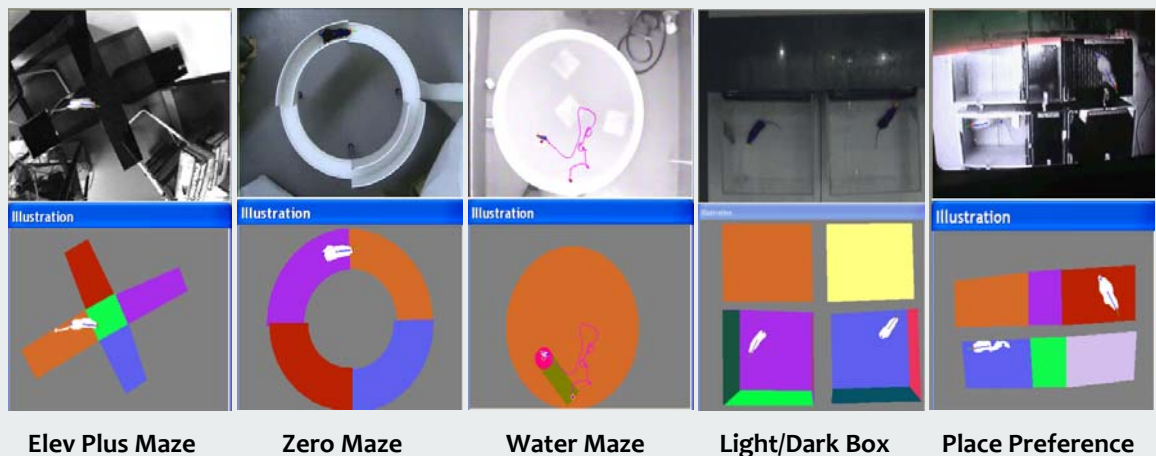
- High-Throughput Option (H Option)
- Realtime Option (R Option)
- High-Throughput Realtime Option (HR Option)

Requirements:

- Windows-based PC
- Intel High-speed Processor
- Special Videocard for realtime analysis
- Large HDD space for storage
- Good lighting conditions
- IR-switchable camera or red-light for night
- Video-multiplexer for multi-camera feed

MazeScan automates the analysis of experiments conducted on all types of mazes including Elevated Plus Maze, Zero Maze, Radial Arm Maze, Y- or T- Maze, etc. In addition to detecting traditional parameters like entries into each arm/area and time spent in each arm/area as events, we provide the capability to detect novel parameters such as Stretch-Attend behavior (SAP), Protected SAP (p-SAP) and Unprotected SAP (u-SAP), Head-Dipping behavior, Body-across-two-zones (partial incursions into a zone).

WaterMazeScan automates the analysis of the popular Morris Water Maze experiment. The video is taken of the water maze experiment from the top, and WaterMazeScan will analyze this video to give a variety of significant results. In addition to traditional parameters such as latency to platform and distance traveled, we provide advanced measures such as Heading Error (orientation difference from platform direction), Turning Ratio (number of turns per body length traveled), etc. The Turn behavior is special to the WaterMazeScan product and can count the number of turns the animal performs in the water.



All components of TopScan can be applied to achieve high throughput screening as well. System architecture for high throughput screening has been designed that involves analysis of up to 32 arenas on a system, depending on how large the arenas are. Such high levels of throughput are possible as we can integrate multiple cameras together into the TopScan system. The High-Throughput product option is necessary to analyze more than a single arena simultaneously. The Realtime Option is necessary to perform realtime analysis where the live video feed into the computer is compressed, encoded, saved to the hard drive while simultaneously full analysis of the video is performed.

Many advanced features are incorporated, including supporting full color analysis, automatic adaptation to non-uniform or changing environment, automated handling of light/dark areas, variable speed playback of specific video segment for specific detected behavior, etc.

Complete Turn-key systems including all necessary Hardware and Software are available. Custom design of your environment to facilitate analysis, including lighting condition setup, IR/red light setup, cage enclosures, video integration, and video-feed to computer is also available.

Unique Capabilities:

- Complete Hardware and Software Solution
- Analyzes 640x480 at 30 frames per sec
- Detects animals in low contrast also!
- Works with rodents of all colors/sizes
- Integrates with 3rd party devices/bio-signals
- Controls other hardware devices via I/O ports
- Records video into storage during analysis