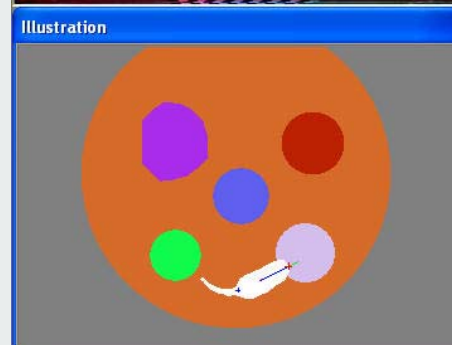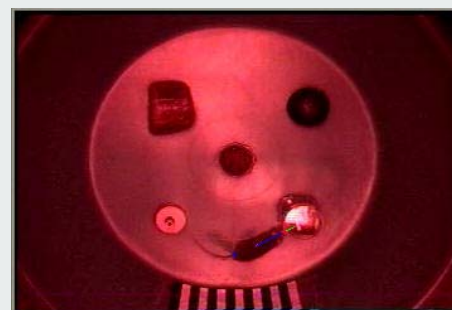# ObjectScan

Features:

- Top-View based Object Recognition Behavior Analysis software
- Integratable with any of *LocoScan*, *MazeScan*, and *WaterMazeScan* into *TopScan* framework
- High-Throughput capability with 4 or more arenas 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 ObjectScan can detect:

- Sniffing

A standard behavioral assay in the learning and memory field of neuroscience research involves testing the novel object recognition capabilities of a mouse. This experiment paradigm is also referred to as Object Recognition or Sniffing Behavior Assay. This assay is important in order to analyze the learning, memory, and recognition abilities of rodents. Hence, it is an important topic of research in genomics and drug development.

ObjectScan can automatically detect and record rodent sniffing behavior information that includes the object sniffed, duration of sniff, number of sniffs at objects, relative sniffing duration with respect to other objects, etc. The system uses video taken from the top view with objects placed in a pre-defined region. The camera remains stationary and is continuously focused on this region. ObjectScan allows the experimenter to remove, move or replace objects in the analysis region and re-analyze. The objects are labeled by the user. ObjectScan ensures that sniffing is counted only when the animal's nose is in contact with (or within a specified distance of) an object, without the need to color the animal's head, due to the fact that ObjectScan can reliably detect the nose of the animal at all times, except when the animal is curled up so much that the nose would not be discernable. ObjectScan can automatically identify important body parts of the animal such as nose, tail, forelimbs, hind limbs at all times.

ObjectScan

ObjectScan
(Continued from front)

Applications:

- Novel Object Recognition
- Odor preferences studies
- Hidden (buried) pellet/object studies
- Social Preference studies
- And many more!

Results:

- Objective Novel Object 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

ObjectScan outputs the detailed sequential listing of behaviors with recorded sniffs on various objects. After completion, ObjectScan also outputs detailed summary statistics about the sniffing behavior on each object such as the number of sniffing behaviors on each object, the fraction of sniffs on each object, the average duration of sniffs, etc. Multiple cages or arenas numbering up to 20 (depending on size of arena and objects) can be analyzed simultaneously. Advanced features such as automatic stopping of recording for each cage, automatic enlargement/shrinking of objects are supported.

All detected sniffing events are output as a list. Double-clicking each item on the list will playback the video segment corresponding to that occurrence, facilitating validation and detailed study. ObjectScan also includes a sophisticated and easy to use experiment data management mode that organizes results of all animals/trials in an experiment in a database. From this database, the advanced feature-based group export function allows exporting of all or multiple results from a given experiment into a comprehensive Excel file.

The powerful Visualization Mode allows full review of the analysis, ability to load alternative parameter settings, and export of various statistical measures and graph data.

Other applications for ObjectScan include choice-test paradigms where the user needs to determine where the animal visits/sniffs amongst a multitude of options (odor tests). A similar paradigm where the animal needs to find hidden or buried pellets or objects in receptacles is also applicable for ObjectScan. The objects may also be other animals confined to a specific area, such as an animal placed inside a opaque/transparent cylinder (example shown in figure below). The cylinder is used as the object to determine if the test animal approaches and sniffs the cylinder or not.

As mentioned earlier, ObjectScan can be applied to achieve high throughput screening as well. System architecture for high throughput screening has been designed that provides analysis of up to 20 arenas on a system, depending on how large the arenas are. More realistically, 4 to 8 arenas can easily be analyzed simultaneously. Such high levels of throughput are possible as we can integrate multiple cameras together into the TopScan framework that ObjectScan is a component of. 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.
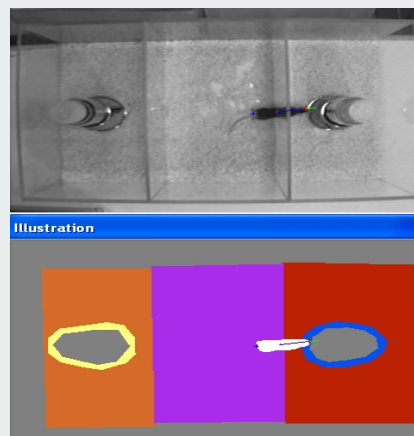
Unique Capabilities:

- Complete Hardware and Software Solution
- Analyzes 640x480 at 30 frames per sec
- Detects nose at all times
- Uses accurate nose position to determine "True" Sniffs and minimizes false positives.
- 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

Clever Sys Inc.
The Behavior Recognition Company

11425 Isaac Newton Sq, Suite 202, Reston, VA 20190
Web: http://www.cleversysinc.com
Email: sales@cleversysinc.com
Phone: (703) 787-6946