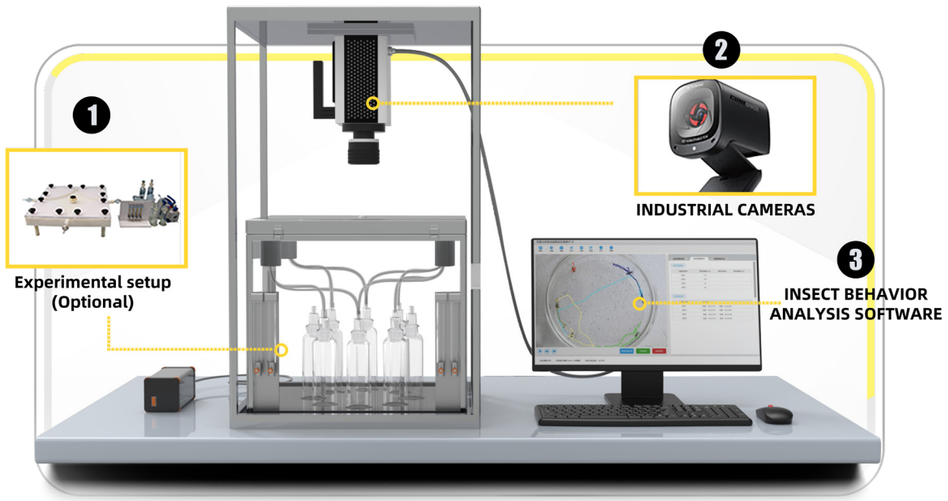


TP-KCXW

INSECT BEHAVIOR TRACKING AND ANALYZING SYSTEM

Introduction

The Insect Behavior Tracking nd Analyzing System analyzes and records insect activity videos through software, automatically detects and identifies insects in the videos, tracks their movement trajectories, records relevant movement parameters during movement, displays and saves data in real-time during the tracking process, presents it in the form of charts, supports exporting movement parameters, movement trajectories, and tracking videos in commonly used formats, and also supports custom settings for tracking targets and experimental areas. The output results can be directly applied to research papers, improving experimental research efficiency, and visualizing, intelligentizing, and digitizing experimental insect behavior research.

What do insects tell us ? (Insect Language Translator)

Visualize Behavior → Shoot → Insect Videos → Translate → Quantitative Data

01 Behavior

Motion behavior (**M**)
Touchline behavior (**T**)
Inactive behavior (**I**)

02 Translate

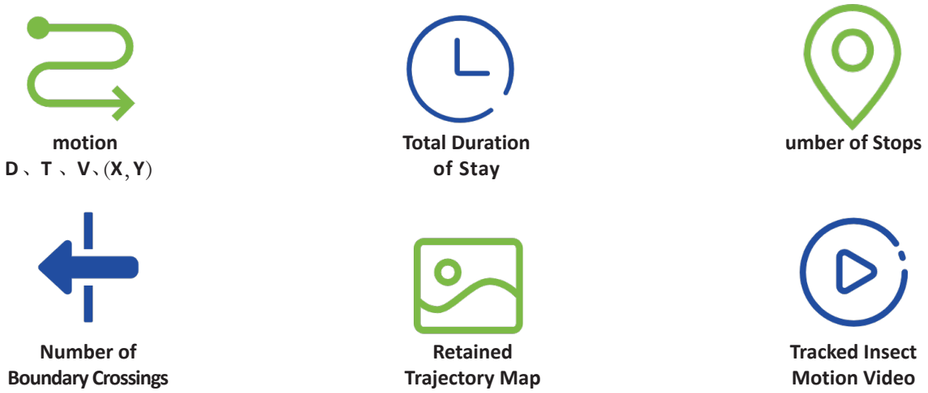
(**M**) Distance of motion
(**M**) Duration of motion
(**M**) Speed of motion
(**I**) Total duration of stay
(**I**) Number of stops
(**T**) Number of boundary crossings
(**PNG**)Retained trajectory map
(**MP4**)Tracked insect motion video

03 Data

Motion parameter data (**EXCEL**)
Motion trajectory chart (**PNG**)
Tracking video (**MP4**)

Software Features (Insect Behavior Analysis)

Multi Parameter Acquisition and Analysis



Insect Recognition Model

- **Insect Gallery**: There are already tens of thousands of insect galleries. Train insect recognition models through deep learning methods.
- **Remote update**: Users can transmit insect movement videos to the server based on their own research insects, update dedicated models, and install remotely.

High Throughput Analysis

- **Multi video processing analysis**:simultaneously tracking videos of 96 parallel projects.
- **Multi target tracking analysis**: supports simultaneous tracking of multiple target insects, and can adjust information such as the size of the target insects to be tracked.

Intelligent Design

- **Manual recording**: Manually record event information, such as excretion, egg laying, enemy defense, etc., while also recording the time, duration, and frequency of the event.
- **Target merging**: For tracking lost targets, the data of new and old targets can be merged by merging the sequential numbers of the same target.

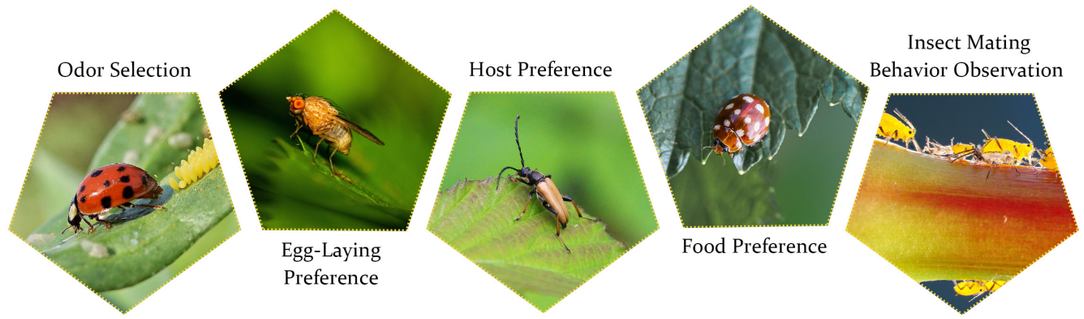
Custom Module

- **Insect attributes**: such as gender, serial number, dosage, etc.
- **Experimental area**: Cut, divide, calibrate, and independently record experimental data.

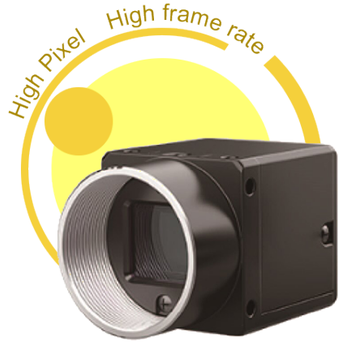
Data Import and Export

- **Import**:real-time video input and recorded video import.
- **Export**: Preview and filter, confirm accuracy before exporting. Data (EXCEL), tracking trajectory chart (PNG), tracking video (MP4).

Experimental Application Scenarios



OPERATION STEPS OF INSECT BEHAVIOR ANALYSIS

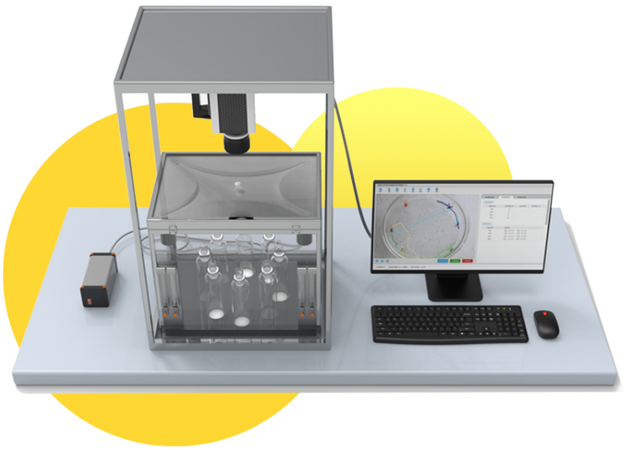


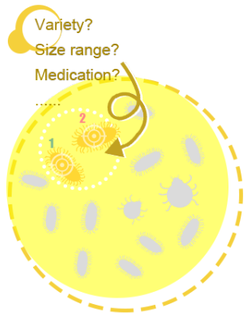
Import Video
Collecting Insect Crawling Videos

real-time video input
and recorded video import

Experimental Area
Divide And Calibrate The Experimental Area

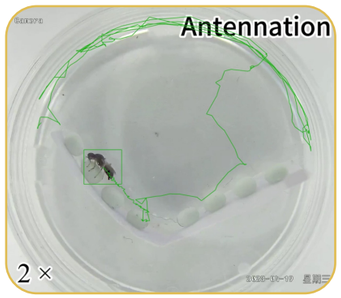
Customize experimental area
Divide and calibrate the experimental area
Independently record experimental area data

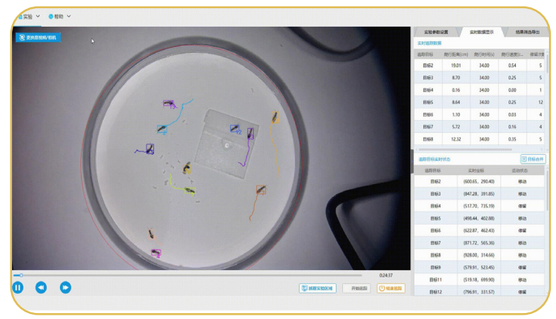




Target Insects
Set Target Insect Attributes

Professional insect recognition model
Customize insect attributes



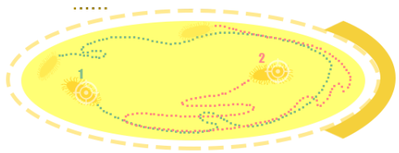


Visualize Data
Export Visualization Data

Delete selected data
preview data
Export data (EXCEL PNG MP4)

Zoning Target

Serial number
Lay eggs
.....



Motion Parameters
Insect Movement Analysis and Calculation

Record insect tracking videos
Automatically draw insect trajectory maps
Automatically calculate motion related parameters

Target 1
Target 2

Hardware Parameters (customizable)

Industrial Camera

1200 W
Video pixels

30 fps
Video frame rate

Industrial Lens

25 mm
Focal length

0.15 m
Min shooting distance

Tablet PC

i7-13700
CPU(Intel core)

RTX4060
GPU(Nvidia)

16 GB
RAM

512 GB
SSD

2560x1600
Resolution

Experimental Setup

Optional
Olfactometer
Insect wind tunnel
.....

Technical Parameter

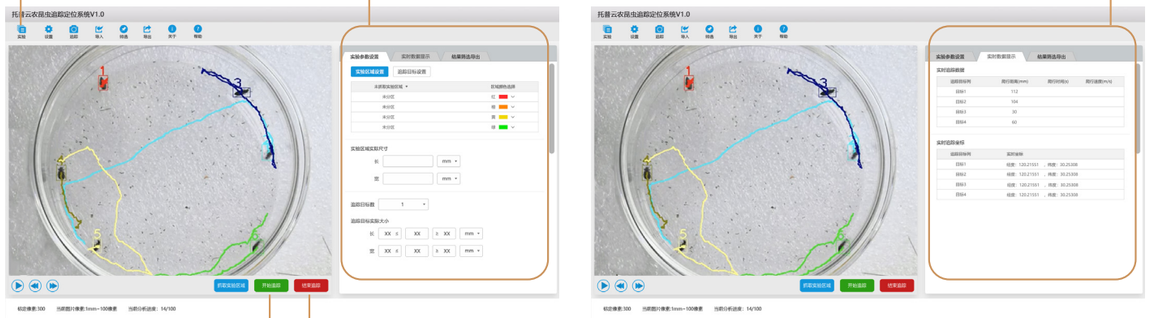
Video resolution	1024x750-4000x3000
Max frame rate for video analysis	30fps
Tracking target size	0.3mm-50mm
Recommend max number of tracking targets	15
Recommend max video tracking recording duration	2 tracking targets： 90min 15 tracking targets： 30min
Accuracy of motion parameters	0.000
Tracking accuracy	⩾ 95%
Accuracy of sports data	⩾ 95%
Optional accessories	Camera bracket, fill light, olfactometer, insect wind tunnel, observation darkroom and other hardware

Interface Introduction

Experiment
Start New project

Experimental Parameter
Experimental area
Experimental objective

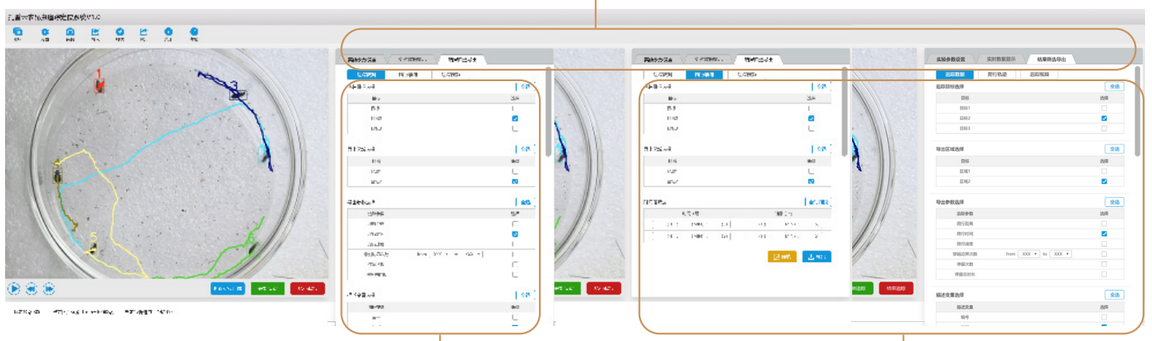
Real Time Data Display
Experimental area
Experimental objective



Start Tracking

End Tracking

Result Filtering and Export
Tracking data(EXCEL)
Trajectory image(PNG)
Tracking videos(MP4)



Filter tracking targets
Filter export area
Filter export parameters
Filter insect attributes
Filter manual records

Tracking Data Export

Filter tracking targets
Filter export area
Filter time period

Motion Trajectory+Video