

Object Recognition + 3D Roaming System

A next-generation interactive platform that combines physical marker recognition with real-time 3D navigation — delivering a multi-user, immersive spatial experience without head-mounted displays.

SPATIAL COMPUTING

REAL-TIME 3D



KLEADER MULTIMEDIA CO.,LTD

What Is Object Recognition + 3D Roaming?

Object Recognition + 3D Roaming refers to a system that combines an object recognition screen, markers, and a display device (such as a TV or CAVE projection system) to achieve an optimal 3D model viewing experience.

By manipulating different markers, users can perform actions such as walking, rotating, and navigating within a 3D scene. Key points can also be added to trigger pop-up images or text descriptions.

Touch

Place markers on the recognition surface

Navigate

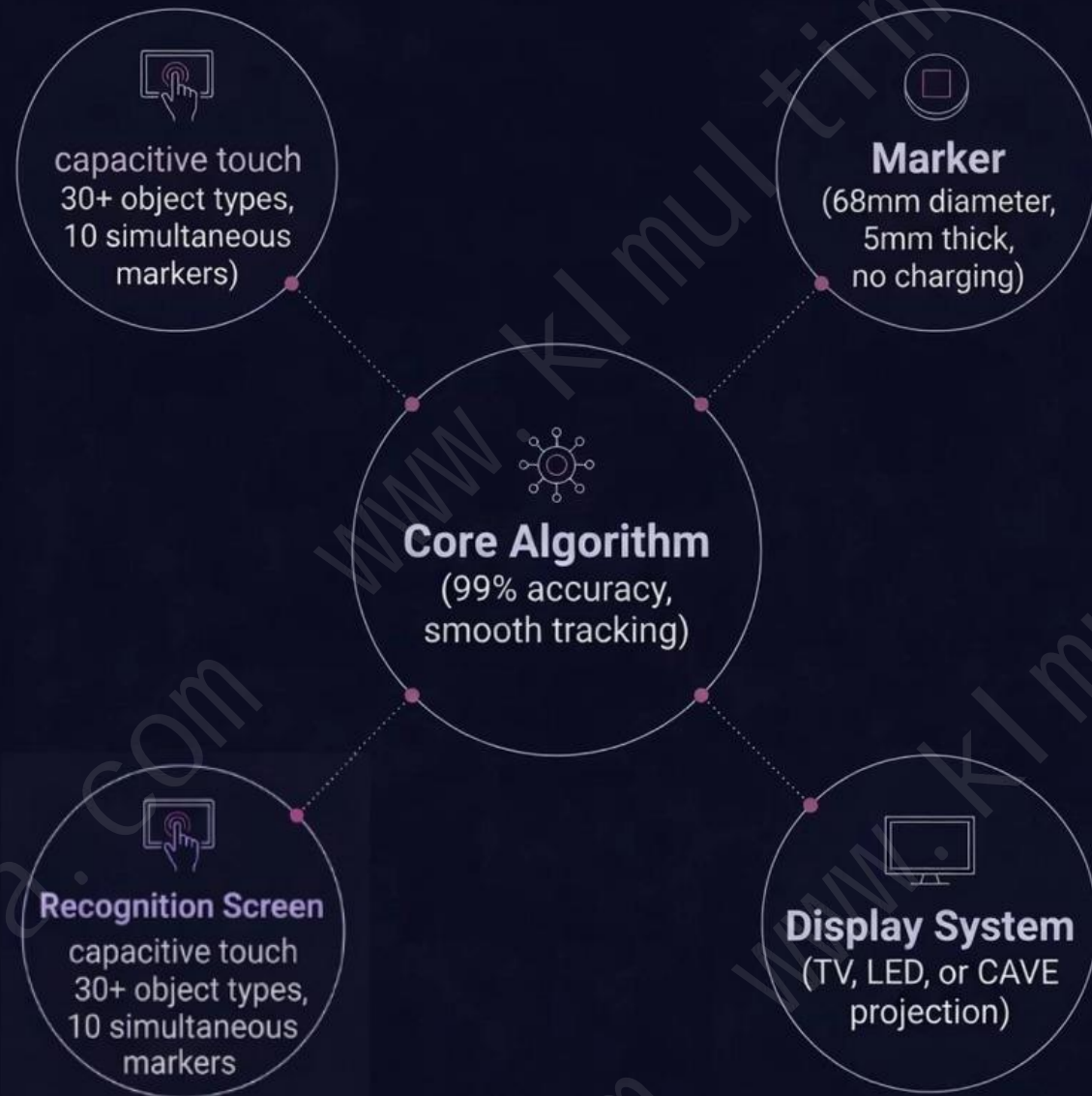
Move and rotate to control the 3D scene

Explore

Trigger annotations and immersive views



System Architecture



Four Pillars

The system is built on four tightly integrated layers, each engineered for low latency and high fidelity. The recognition screen and markers form the input layer, the core algorithm processes ID and rotation data, and the display system renders the real-time 3D output.

Recognition Hardware



Recognition Screen

Customized high-sensitivity capacitive touch screen

Supports recognition of 30+ object types

Can simultaneously recognize up to 10 different markers

Common sizes: 43", 55", 65"



Marker Modules

Custom-molded physical tokens. 68 mm diameter, 5 mm thick. Passive design, no batteries, no charging required. Each carries a unique ID and rotation angle.



Core Algorithm

Optimized low-level recognition algorithm

Recognition accuracy up to 99%

Smooth tracking for rotation and movement

Ensures fluid roaming experience

Wall Display Options



Choose Your Immersion Level

The display system can be:

TV

LED screen

CAVE system (4-sided projection)

TV Display

Optional sizes: 60"–86"

LED Display

Pixel pitch: P2 or finer

Higher cost

Suitable for bright environments

Can form a 4-sided immersive CAVE system

Projection System

4 projectors (≥ 5000 lumens, 1920×1200 resolution, laser)

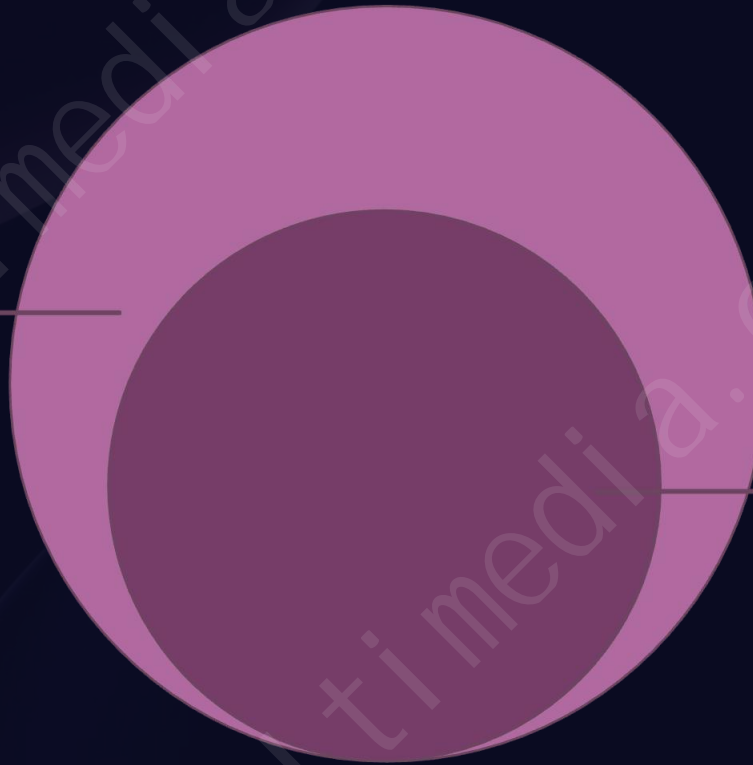
Projects onto left, center, right walls and floor

Creates immersive CAVE environment

Not suitable for high ambient light conditions

Software Stack

UE5 3D Interaction
Real-time navigation, model import, ray tracing



C++ Recognition SDK
Marker communication, ID and angle data

The software architecture separates low-level hardware communication from high-level 3D rendering, enabling clean integration and independent updates.

C++ Recognition SDK

Handles all communication with the marker recognition screen. Parses marker IDs and rotation angles in real time with minimal latency.

UE5 Interaction System

Built on Unreal Engine 5. Supports forward/backward navigation, rotation, and imports 3D models from 3ds Max, Kujiale, and other standard formats. Includes real-time ray tracing.

Why It Stands Out

Software System

Object Recognition SDK

Developed in C++

Handles communication with marker recognition screen

3D Interaction System (UE5)

Developed using Unreal Engine 5

Supports navigation (forward, backward, rotation)

Supports importing 3D models from 3ds Max, Kujiale, etc. Creates immersive CAVE environment

Not suitable for high ambient light conditions



Application Advantages

1. The only roaming system on the market that supports one-handed control for movement and rotation
2. Designed based on ergonomic principles for intuitive operation
3. Large display provides strong immersive experience
4. Compared with VR (head-mounted displays):
 - Supports multi-user interaction and viewing
 - No motion sickness
 - Stronger interactivity




Pricing & Package Structure

Hardware Package

- Recognition screen + marker modules
- Display system (TV / LED / projector)
- High-performance PC (RTX 5080 GPU)
- Custom interaction table

Software Package

- C++ low-level SDK (marker communication)
- UE5 real-time ray tracing application
- 3D model import pipeline (3ds Max, Kujiale)
- Navigation and annotation system

 Hardware and software are quoted separately, allowing flexible configuration based on display choice and deployment scale.

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