

Democratizing Biomechanics with Markerless Vision

Accessible Canine Gait Analysis Technology Ecosystem

Mission: In Memory of Elli

Making clinical-quality gait analysis affordable, transparent, and deployable for real-world puppy development monitoring. Early detection can prevent musculoskeletal disorders and reduce suffering through accessible, evidence-based intervention.

The Democratization Process

1

Capture

Smartphone/camera records movement

2

Process

AI models extract pose data

3

Analyze

Biomechanical interpretation

4

Act

Early intervention & prevention

1 Computer Vision Foundation

OpenCV

Real-time processing, camera calibration, stereo depth

PyTorch/TensorFlow

Deep learning frameworks for custom canine models

MediaPipe

Google's pose detection (adaptable to quadrupeds)

2 Pose Estimation Models

DeepLabCut

High accuracy with 50-200 training frames

SLEAP

Multi-animal tracking and social behavior

SuperAnimal

Cross-species models without per-species labeling

YOLOv8 Pose

Real-time detection and pose estimation

3 Gait Recognition & Fusion

OpenGait

Flexible framework for canine locomotion analysis

Gaitmap

IMU-based analysis with 20+ algorithms

Anipose

3D reconstruction from 2D keypoints

4 Data Annotation Tools

CVAT

Industry-standard video labeling platform

Labelbox

Medical-grade annotation with quality assurance

GAVD Dataset

Publicly accessible clinical gait videos

5 Data Science & Visualization

NumPy/SciPy

Kinematic computations and analysis

Pandas

Time-series gait metrics and monitoring

Matplotlib/Plotly

Clinical dashboards and visualizations

Scikit-learn

Pattern recognition and risk modeling

6 Biomechanical Modeling

3D Slicer

Motion capture with anatomical imaging

OpenSim

Musculoskeletal simulation with canine models

Key Benefits



Speed of Impact

Development from years to months



Clinical Credibility

Peer-reviewed validation



Community Resilience

Amplified capabilities



Affordability

No license fees



Standardization

Cross-clinic comparisons



Customization

Breed-specific adaptation

In Elli's Memory

"The tools, data, and algorithms are no longer the limiting factor. What remains is access, coordination, and the will to deploy them where they can change outcomes. By building in the open—with vets, engineers, breeders, and loving owners—we can begin to catch the early tremors of dysfunction before they become lifelong pain."