

ANIMAL TYPE SENSE

ZENITH 

“AI-Powered Animal Type
Classification”

Team Name: @Zenith | **Team ID:** 92648

Problem Title: Image-based Animal Type Classification
Cattle and Buffaloes

Theme: Agriculture, Food Tech & Rural Development

Owner: Ministry of Fisheries, Animal Husbandry & Dairying

“97% Accuracy | Offline Model”

Smart India Hackathon 2025 • Problem ID: SIH25005



The Problem We're Solving



In dairy farming, *Animal Type Classification (ATC)* = evaluating body structure (length, chest width, rump angle, etc.) to identify **elite dams** for breeding.

Currently done manually by trained field workers using visual inspection and tape/ruler measurements.

This data is recorded in the Bharat Pashudhan App (BPA) to support the **Rashtriya Gokul Mission** (improving indigenous breeds & milk productivity).

Gaps in the Current ATC System

Error-Prone & Subjective

Scoring depends on human judgment → different workers give different results

Inconsistent & Unreliable

Fatigue, bias, and manual measurement mistakes reduce accuracy

Data Integrity Compromised

Wrong scores affect elite dam selection → weakens breeding programs and BPA data quality.

OUR AI-DRIVEN SOLUTION

WHAT WE DID

We built a system that can analyze animal images and automatically measure body traits (length, height, chest width, rump angle, udder shape).

We used image segmentation to remove the background and focus only on the animal.

We applied landmark detection models to find key body points like withers, chest, and legs.

We used advanced AI (Vision Transformers, CLIP) to calculate a standardized ATC score (1–9).

EXTRA FEATURES WE ADDED

Detects if the animal is pure or crossbreed (with % estimate).

Shows explainable AI heatmaps → highlights body parts used in scoring.

Can create a 3D digital twin for long-term monitoring.

Works offline on a smartphone and syncs with BPA automatically.

Includes an AI chatbot so farmers/field workers can ask:
“What is this animal’s score?” or “Is this cow eligible as an elite dam?” in local languages.

Technical Architecture



Image Input

1. Field worker takes side/front/top photo using smartphone camera.
2. App checks image quality (blurry, dark → asks for retake).

Preprocessing

1. Background removal (Mask R-CNN / Segment Anything).
2. Pose normalization → auto-align animal.

Landmark Detection

1. AI model detects key body points (withers, chest, rump, udder, legs).
2. Converts them into digital measurements (length, height, angles).

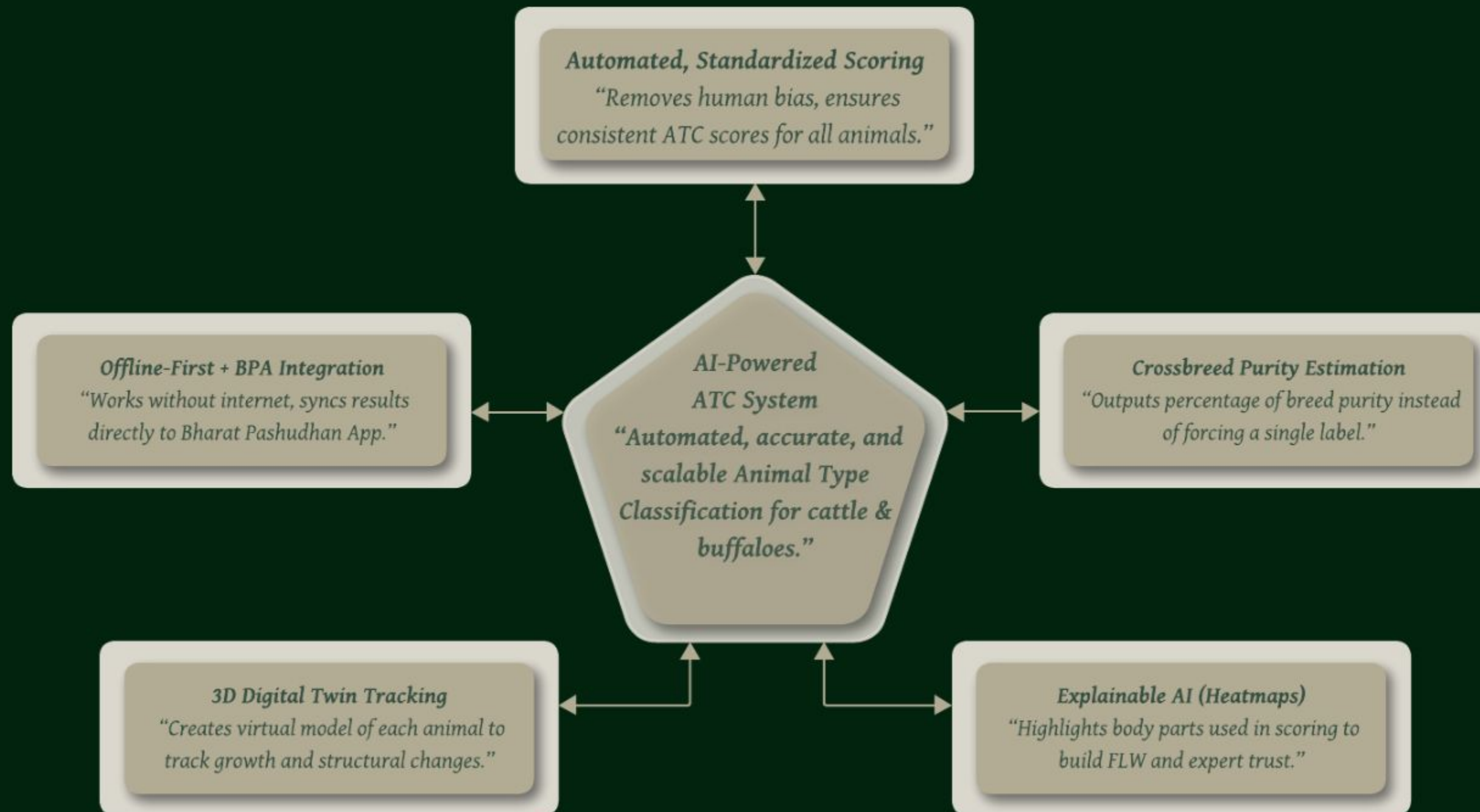
Feature Extraction & Scoring

1. Vision Transformer (ViT) + CLIP backbone → analyzes body shape.
2. Generates ATC scores (1–9 scale) based on ICAR standards.
3. Confidence score shown (low confidence → flagged for manual check).

Output & Integration

1. Results saved in Bharat Pashudhan App (BPA) automatically.
2. Farmer/FLW can ask AI Chatbot for explanation or scheme suggestions.
3. Supports offline-first mode with later sync.

Key Innovations



""Our solution combines advanced AI, usability, and explainability to revolutionize Animal Type Classification.""

Thank You!

"For your time and consideration"

"We are happy to answer your questions"