COGO DATA

PROJECT PORFOLIO

Cattle Breeding Value Modelling

Services: Predictive Modeling

Context

A South African animal registration organisation needed a more advanced way to estimate breeding value outcomes than the traditional method of averaging bull and cow values. The goal was to support more informed breeding pair selection using richer genetic information across generations.

Solution

Developed ensemble machine learning models using three generations of genetic data to predict key breeding value outcomes such as calving ease, weaner calf value, fertility value, cow value, growth value, carcass value, and related production indicators. The modelling approach combined architectures such as Bayesian neural networks, graph neural networks, multilayer perceptrons, and Monte Carlo-based methods to better capture complex genetic relationships.

Impact

Improved prediction accuracy across several breeding variables, with the strongest result delivering up to 55% improvement over the traditional parental averaging approach for one target value. The work enabled a more data-driven approach to breeding pair optimisation, while also highlighting where further gains would depend on deeper and broader genetic data.