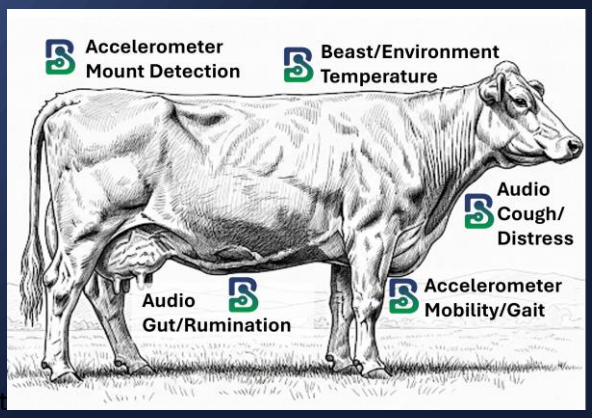
# BLUMIND

AI for Everyone, Everywhere

# Application Brief

## All-analog always on AI for Agriculture




Always-on sensors with Blumind's ultra-low power all analog AI inferencing can monitor and diagnose remote livestock for efficient and timely reporting of health and wellbeing.

## Always-on AI for Smart Agriculture

Advanced farm management can now include remote, always-on AI monitoring, inferencing, and event classification of livestock. Audio and time-series accelerometer or temperature data be analyzed in-situ by Blumind's ultra-low-power, all-analog AI inferencing, with alerts being communicated via long-distance wireless networks (like LoRa). Audio analysis can be used to determine the frequency and amplitude of rumen contractions, which are associated with the flow and fermentation patterns of feed particles in the ruminoreticulum compartment. Likewise, abnormal coughing due to lungworm or pneumonia can be classified and reported.

Accelerometer sensors with Blumind's AI technology can detect the gait, movement, and sexual activity of the herd. Temperature measurements from rumen-reticular thermometer technologies can be monitored for sub-acute ruminal acidosis (SARA), mastitis, ovulation, and other possible infections.

Timely and accurate event notification allows for efficient herd management with positive economic outcomes.

## Lowest Power with Programmability

Blumind's all-analog approach to smart livestock management achieves the highest total system value for clients. System-level power, size, and cost are minimized to achieve the most efficient and easy-to-deploy solutions, resulting in months of battery life even with always-on monitoring. Further, our unique architecture enables in-field updates to neural network parameters for new or targeted algorithm deployment.

### Blumind AMPL™ Technology

Blumind's AMPL technology is unique. The Blumind all-analog approach delivers the lowest power solution while the inherently parallel architecture delivers ultra-low latency for real time applications, all in a tiny footprint.

No high-speed clocks, ADCs, DACs, or specialty memory are used. AMPL technology is built in standard CMOS with a roadmap to advanced process node.

By exploiting advanced CMOS device physics Blumind creates single transistor neurons that are small and power efficient.

The AMPL architecture was built from the ground up to address the analog compute challenges of variations in process, temperature, voltage, and long-term drift and our results are impressive.

Standard PyTorch and TensorFlow software tools are used to create the parameters for the powerful AMPL neural network.