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# Roha-Precision introduces AGILOSCOPE, an intelligent and scalable diagnostic instrument for automatic scanning and image analysis

**Market Need and Industry Context** India's dairy market was valued at INR 2.35 lakh crores in 2024 and is projected to reach INR 3.22 lakh crores by 2029, growing at a CAGR of 6.5%. Despite this growth, the sector remains inefficient, largely because veterinary healthcare is inadequate for the country's 125 million milking cows and buffaloes, 80% of which is located in rural areas. Private providers have struggled to serve rural areas, where farmers need affordable services and customer acquisition is expensive. As a result, government veterinary services are often the only option, but they are not always flexible enough to meet local needs.

**Why This Is Now Feasible** Recent advances in AI, 5G connectivity, and digital communication have made rural veterinary businesses more viable. Roha Precision uses AI and automation to build autonomous diagnostic tools that increase speed, accuracy, reliability and ease of use, while reducing testing costs. Thus, large-scale diagnostic screening is more practical, even in a rural setting.

**Agiloscope: System Overview** Agiloscope is built by motorizing a standard trinocular microscope with stepper motors, belt drives, and limit switches. This enables high-precision X and Y scanning with 1 um resolution and 10 um precision. The system is powered by a Raspberry Pi 5 running the latest 64-bit Raspberry Pi OS 13 and can be operated through a 7-inch touchscreen or through an external monitor, keyboard, and mouse.

- Imaging capture options: 4X, 10X, 20X, and 100X with a 12.1 MP camera
- Eyepiece viewing magnification: 40X, 100X, 200X, and 1000X
- AI inference support: machine-learning-based ONNX models for image recognition on images up to 1 megapixel
- Detection capability: recognition of features as small as approximately 2 microns

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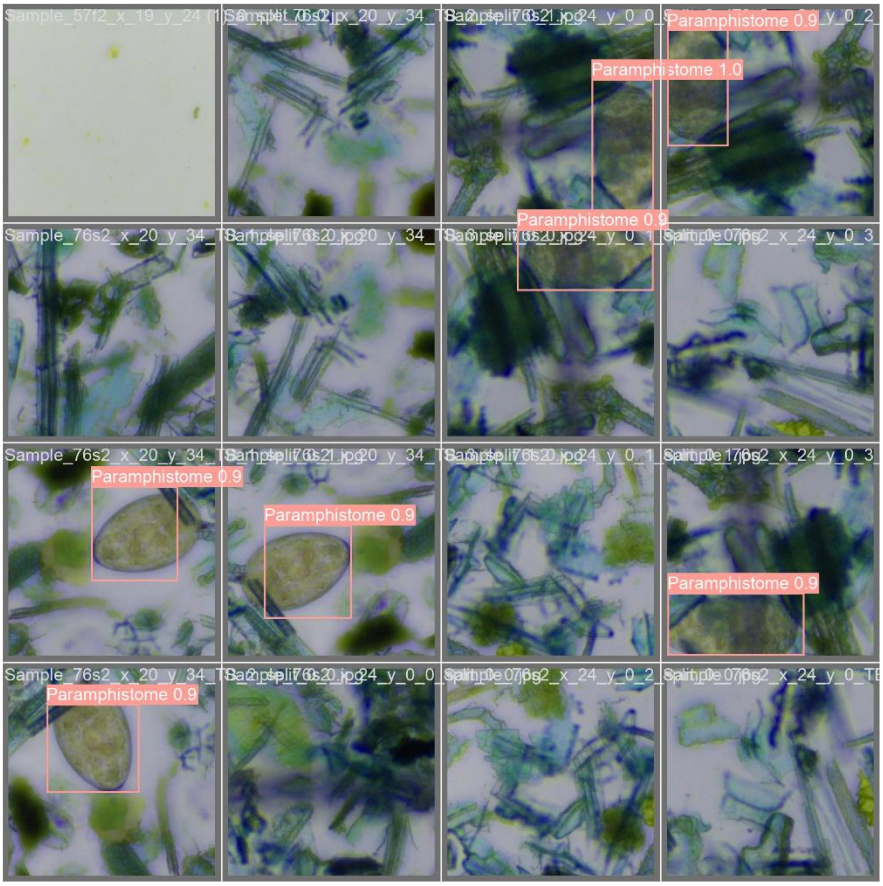
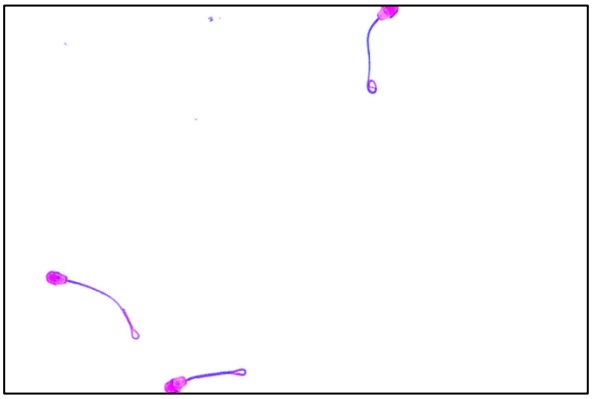
**AI-Enabled Scanning and Detection** Agiloscope can scan entire coverslips and detect target objects automatically. To do this, the system is first trained to recognize object features using YOLO through an AI development workflow. Once trained, the instrument can detect and count those objects using the deployed model. Its autofocus algorithm keeps images sharp during scanning and can also work with the trained model to focus specifically on objects of interest instead of the entire slide. This improves image quality and helps automate repetitive microscopy tasks in the life sciences, allowing researchers to spend more time on higher-value work.




## Applications in Dairy Diagnostics

Agiloscope has several promising applications in the dairy sector, particularly in animal health and breeding diagnostics.

- Helminthology: identification of gastrointestinal parasite ova in stool samples, including organisms such as Paramphistomum
- Blood diagnostics: detection of hemoprotozoa in red blood cells
- Cell counting: AI models for RBC and WBC counting to support screening for anemia, iron deficiency, and infection patterns through changes in neutrophil, eosinophil, and lymphocyte counts



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**Applications in Animal Breeding** Agiloscope can also be used for acrosome counting, an important test for predicting fertilization success. Using stained samples such as those prepared with Giemsa stain, the machine-learning model can estimate the percentage of intact acrosomes and identify broken acrosomes. This makes the system especially useful in breeding programs, particularly for bovines.

**Additional Use Cases** Beyond dairy and breeding applications, Agiloscope can support water-quality inspection workflows that require identification of protozoa, metazoa, bacteria, and fungi. Water quality is often a concern in Third World countries and needs to be regularly monitored to prevent diseases. With the library of identified pathogens, Agiloscope can help monitor most of the common ones.