



Biometric Standards, Performance, and Assurance Laboratory



DEPARTMENT
OF
INDUSTRIAL TECHNOLOGY
PURDUE UNIVERSITY

Animal Identification By Retinal Imaging and Applications For Biosecurity

C.R. Blomeke¹, C.P. Rusk Ph.D²., M.A. Balschweid Ph. D²., & S.J. Elliott, Ph. D³

¹Department of Curriculum and Instruction, School of Education Purdue University, West Lafayette, IN 47907

² Department of Youth Development and Agricultural Education, School of Agriculture Purdue University, West Lafayette, IN 47907

³Department of Industrial Technology, Schools of Technology, Purdue University, West Lafayette, IN 47907

Problem

Current livestock identification methods for beef cattle and sheep are tattoos, ear tags, branding, and in some cases taking a nose print. Each of these techniques have problems because of not being a permanent identification method or can be altered.

Retinal imaging is a non-invasive method in which a digital camera takes a photo of the retinal vascular pattern. The vascular pattern is shown to be unique between animals, twins, clones and even between eyes.

Current research is being conducted with the 4-H organization to determine if retinal imaging is a system that will speed up the enrollment process of beef cattle and sheep and could replace current nose printing procedures. Animals must be enrolled at the County ID Day to verify animals are in possession of the 4-H member by the May 15th deadline. The nose prints are at the County and State levels to verify that the animal exhibited is the animal enrolled by the deadline

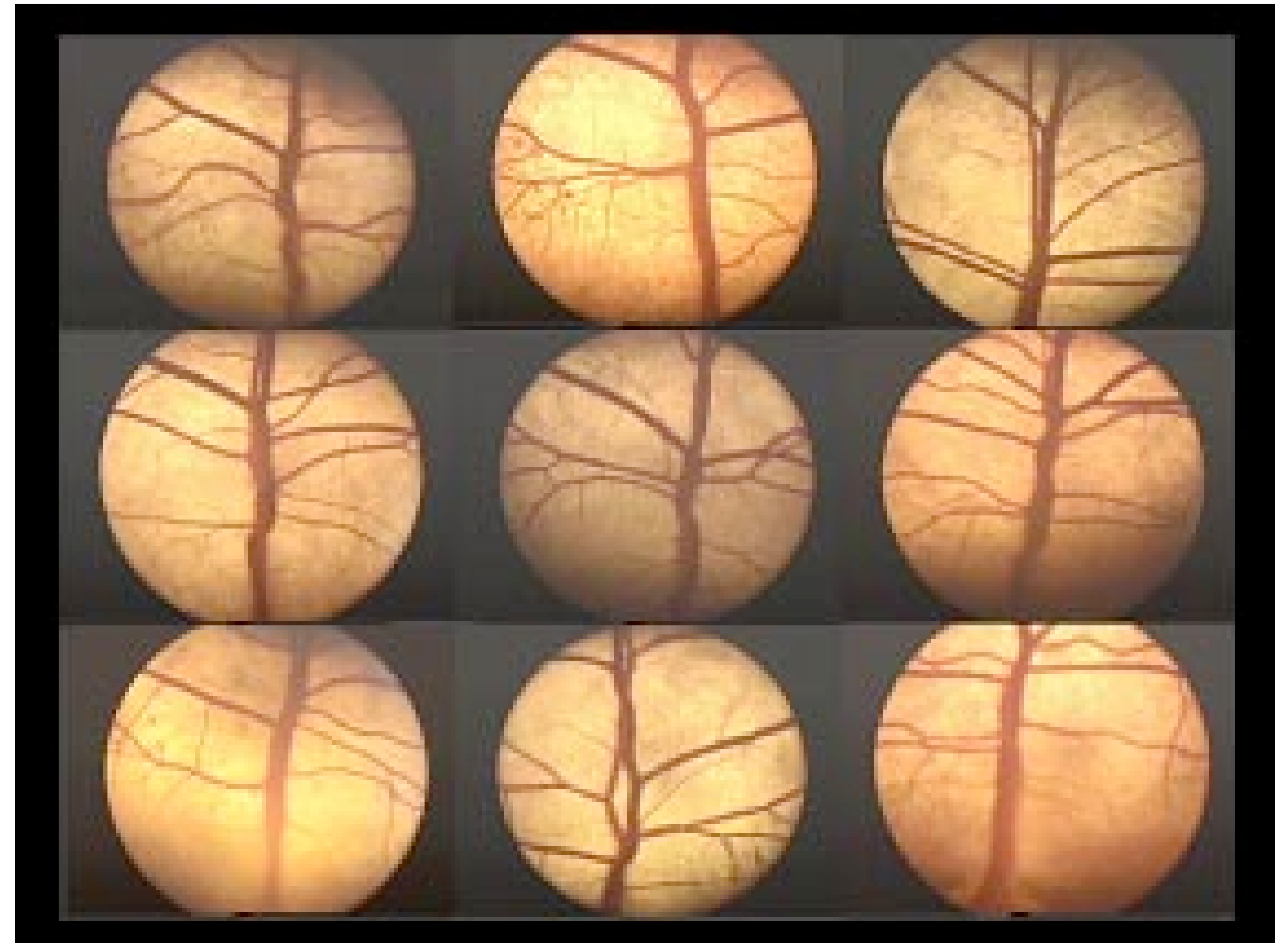


Figure 1 – Retinal images of 9 individual cows, showing the unique retinal vascular patterns. AP Photo

Applications of Retinal Imaging

- Permanent livestock identification
- Livestock traceability from farm to fork
- Tracking disease outbreaks
- Source verification for food safety



Figure 3 – A retinal image being taken of a steer in Valparaiso, Indiana. The digital pictures are stored in a database that contain animal specific information such as breed, weight, and breeding records. Photo contributed by Indiana State 4-H.



Figure 2 – Examples of beef cattle nose prints. Five consecutive points must be found between prints to determine a positive match.