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Development of optical tomography at 840 nm wavelength for sex classification of newborn Korat chickens.

The classification of sex of a newborn chicken is crucial for optimizing the cost of chicken meet production. The current classification technique relies on visual inspection by human naked eyes, which required years of training to expertise. There is no commercially available gender-classification tool for newborn chicks. Recently, a new optical imaging technology for cross-sectional imaging of biological tissues at high speed, high resolution, and high sensitivity has been developed, called Optical Coherence Tomography (OCT). OCT uses near-infrared light for imaging, which is non-destructive and non-invasive for biological tissues. Here, we presents the development of an OCT prototype that has an operating wavelength of around 840 nm for subcutaneous cross-sectional imaging of the bottom of newborn chicks. The depth penetration of the developed OCT prototype was up to 2 mm from the sample's surface. An imaging speed of the developed prototype was about 20 frames per second. The depth resolution was measured to be about 15 microns in air. The capability of the prototype for deep tissue imaging of newborn chickens was verified. The analysis and identification of the sex of newborn chickens by using OCT cross-section images together with machine learning algorithm has been investigated. Some preliminary experimental results will be presented and discussed. The results show that OCT imaging system equip with machine learning technique has potential for determination of newborn chicks at high accuracy. Furthermore, a design and implementation of the field prototype to be installed in the hatchery area of Korat chick to verify the capability of the developed technology for on-site sex determination of the newborn Korat chickens will be presented.

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