Non-destructive Measurements of Vegetable and Poultry Products for Quality Assessments: Opportunities of Thermal Imageries Using Deep Learning Algorithms

Abstract

Thermal imageries play an import role in non-destructive measurements of quality assessment for fruits, vegetables and poultry products. However, this sector faces issues of disease detection and quality assessment. Specially in poultry, there is a lack of robust techniques and affordable equipment for avian embryo detection and sexual segregation at early stages, which still drives farmers to low-precision hatching and the culling of undesirable one-day-old male chicks on breeding farms. To bring a significant solution using machine vision domain, thermal imageries are explained how to address the above-mentioned challenges for fruits, vegetables and poultry in this short talk.

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RESEARCH AREAS AND EXPERTISE
- General area: Agricultural Automation
- Specific area: Agricultural Robotics and Precision Agriculture

AWARDS AND RECOGNITION
- Associate Editor, Computer and Electronics in Agriculture, 2022~
- BEST FACULTY MEMBER, University of Tsukuba, 2016 and 2022
- Shin-Nourin Shinbun International Award, Japanese Society of Agricultural Information (2021)
- University Gold Medal Award, Outstanding Academic Results for Undergraduate (1996) and Graduate (2001) Programs, Bangladesh Agricultural University

Short Biography:

Tofael Ahamed is an Associate Professor, Institute of Life and Environmental Sciences, University of Tsukuba, a leading research university in Japan relocated at the Tsukuba Science City during 1973 from Tokyo University of Education. Tofael has also teaching and research experiences as a Lecturer, Assistant, and Associate Professor in the Department of Farm Power and Machinery, Bangladesh Agricultural University, established with academic support from the Texas A&M University during 1961. He received PhD from the University of Tsukuba and conducted postdoctoral research at the University of Illinois at Urbana-Champaign, USA. Tofael performs research in the field of precision agriculture technology, agricultural robotics and decision support systems. He focuses on enabling smart application using Internet of Things (IoT) and Artificial Intelligence (AI) in agriculture, where crop, orchard and livestock production varies spatially and temporally within the field boundaries depending on the soil, nutrient and environmental conditions. Tofael is also serving as one of the Associate Editors for Computer and Electronics in Agriculture (Elsevier), Agricultural Information Research (JSAI), Editorial Member for Asia-Pacific Journal of Regional Science (Springer-Nature). He is also serving as a Guest Editor of Special Issues for Remote Sensing and Regional Application of Remote Sensing. Tofael has published in journals such as '*Computers and Electronics in Agriculture*', '*Biosystems Engineering*', '*Transactions of ASABE*', *Sensors, Remote Sensing* and *Japanese Society of Agricultural Machinery and Food Engineering* (JSAM). By far, he has published more than 100 journal articles and Lead Author and Editor of 6 Books.

Tofael is actively collaborating with International Research Institutes and Universities from Japan and abroad. Tofael has supervised more than 20 PhD students, 30 Masters and 20 undergrad students and received more than 10 funded projects in the past 10 years. Currently he is supervising 11 PhD students, and 10 Masters students at the University of Tsukuba, Japan.

Tofael also recognized as one of the best faculty members for 2016 and 2022 at the University of Tsukuba, Japan