BLACK PLASTIC CLASSIFIER DEVELOPMENT FOR PLASTIC INSPECTION AND DETECTION SYSTEM ON GIN STAND FEEDER

Mathew G. Pelletier
Gregory A. Holt
John D. Wanjura
USDA-ARS Cotton Production and Processing Research Unit
Lubbock, TX

Abstract

The most cost-effective machine-vision systems are based on low-cost color cameras. The traditional machine-learning classifiers in use rely predominantly on color differences for detection of plastic. While this works for the vast majority of plastics brought into the cotton gins; it still leaves about 10-20% of the plastic contamination undetected as the colors are too close to normal cotton colors to allow for detection without significant risk of false-positives. For in-field plastics, the number of hard to detect plastics colors is greater due to wider range of colors presented by the background, as modified by the variation in natural lighting, where color temperature of the sky-light can vary from 3000k to over 10,000k, Hence a primary research interest, for removal of plastic contamination from field and in cotton gins, is the identification of colored plastics where the plastic color is very similar to the normal background colors. This research development effort seeks to develop alternative classification methods, such as the use of cascaded traditional machine-learning algorithms, and as pre-processing sections for advanced deep-learning methods. The presentation covers latest developments in this effort.