TOPIC	Innovative Approach for Identification of Cloud Clusters Developing into Tropical Cyclones
ORGANIZERS	Drs. Karimoddini and Homaifar; Gorji, and Lacewell (PhD students)
AREA	Data mining, machine learning, and tropical cyclogenesis
SPEAKER	Chaunté Lacewell, PhD student, ACIT Center, North Carolina A&T State University
DATE	Wednesday, February 18, 2015
TIME	2:00 PM to 3:00 PM
VENUE	ACIT Center, Room 342, Fort IRC Bldg, North Carolina A&T State University, 1601 East Market Street, Greensboro, NC 27411
FEES	No Charge

SYNOPSIS

Forecasters need better techniques to determine whether a cyclone will develop from a loosely organized cluster of clouds. Prior studies have attempted to predict the formation of tropical cyclones (TCs) using numerical weather prediction models and satellite and radar data. However, refined observational data and forecasting techniques are not always available or accurate in areas in which data is sparse such as western North Africa. Consequently, this research investigates predictive features that contribute to a cloud cluster (CC) developing into a TC and it uses only global gridded satellite data that are readily available.

Identifying predictive features for developing CCs is a complex problem, since CCs have a variety of forms that can change rapidly and because there is no ground truth data of identified and tracked CCs. Hence, this research objectively identifies and tracks CCs, uses a proposed novel oversampling technique to balance the imbalanced data, and identifies predictive features of developing CCs. Three standard classifiers are the Classification and Regression Tree, the Neural Network and the Support Vector Machine were trained using ten-fold cross validation. Our results verify that the proposed techniques can satisfactorily identify developing CCs for each of the nine forecasts. These results are based on the geometric means ranging from 90% to 99.9% and the Heidke skill score ranging from 0.80 to 1 for samples that occur 0-48 hours prior to the TC development.

ABOUT THE SPEAKER

Chaunté W. Lacewell is a Title III PhD fellow at North Carolina A&T State University and expected to graduate in May 2015. She received her bachelor's degree in Computer Engineering and her master's degree in Electrical Engineering from the same university in 2007 and 2011,respectively, both with highest honors. Her current research interests include machine learning, signal and image processing, data mining, and data fusion.

Ms. Lacewell's achievements during her doctorate degree include interning with Intel Corporation in 2012 and 2013 where she received the Division Recognition Award, and accepting their full-time Software Engineer offer for after graduation. Other achievements include being a recipient of the Wadaran L. Kennedy 4.0 Scholar Award, the University Doctoral Assistantship where she mentored students and increased the success rate for College Algebra and Trigonometry, fellow of NSF Expedition, and the Title III PhD Fellowship.