

Appalachian Multi-purpose Apiary Informatics System (AppMAIS)

Rahman Tashakkori, PhD

Lowe's Distinguished Professor of Computer Science



APIMUNDIA 2025

SCANDINAVIA

September 23-27, 2025



PP-187 [Beekeeping Technology and Quality] Appalachian Multi-purpose Apiary Informatics System (AppMAIS)

Rahman Tashakkori

Appalachian State University

Beekeepers traditionally monitor honey beehives manually to evaluate their health and determine their growth and yield. With the emergence of Internet of Things (IoT) devices and tools, there have been some efforts in recent years to automate such monitoring. Automatic monitoring systems can significantly benefit beekeepers and researchers as they can obtain critical data and provide insight into hives' health and performance more regularly. As part of the Appalachian Multipurpose Apiary Informatics System (AppMAIS), a North Carolina Research Initiative (NC ROI) grant, we installed 28 hives in 14 different locations in the Western region of NC. We used Beemon, a system designed and developed in our Visual and Image Processing (VIP) lab, to collect humidity, temperature, weight, audio, and video recordings from these hives. These hive data are uploaded to a server in our department for analysis. Over the past two years, we have used image processing, signal processing, AI, and ML techniques to analyze AppMAIS data, which has helped us learn much about the health of these hives. For example, we have used image processing and optical flow to estimate traffic in and out of the hives, which is an excellent indicator of their health. Also, we have utilized AI and ML on audio recordings of hives that had swarmed to detect swarms' unique identifiers.

This presentation will provide us with an opportunity to share the Beemon system and its significance with the audience and present some of our results and findings. We hope to expand our collaborations.