IEEE CIS Distinguished Lecture Program

By Prof James C Bezdek, University of Melbourne

Date of Event:	1st October 2021
Time:	7 PM – 8.30 PM (GMT+8)
Event Platform:	Virtual (Google Meet)
Hosted by:	IEEE Computer Intelligence (CIS) Malaysia Chapter
Coordinator:	Dr Veronica Lestari Jauw (Veronica.Jauw@nottingham.edu.my) Executive Committee, IEEE CIS Malaysia Chapter
Attendance:	43 (Registered)
DLP Title:	Streaming Data Analysis: Clustering … or Classification?

Abstract

This talk concerns models and algorithms that are generally described as "streaming clustering". Some of the semantics and methods that are used in this field are co-opted from static clustering: but often, they don't serve their purposes for streaming data very well. A review of "state of the art" methods such as sequential k-means, Birch, Clustream, Denstream, etc. shows that methods borrowed from classical batch techniques don't transfer well to the streaming data case. Most of these models fail to acknowledge that the data are seen but once in real streaming analysis (e.g., intrusion detection). When the data are not saved, batch clustering ideas such as pre-clustering assessment, partitioning, and cluster validity are not relevant. I do not argue that current approaches to streaming clustering are wrong: rather, they are transitional methods which will eventually lead to a new and useful paradigm for this type of computation. Several new models are briefly reviewed and illustrated (albeit poorly, with small labeled data sets!). The conclusions? Useful analysis of real streaming data is in its infancy. We need to carefully define the objectives of streaming analysis, and then choose terminology and methods that suit this evolving paradigm.

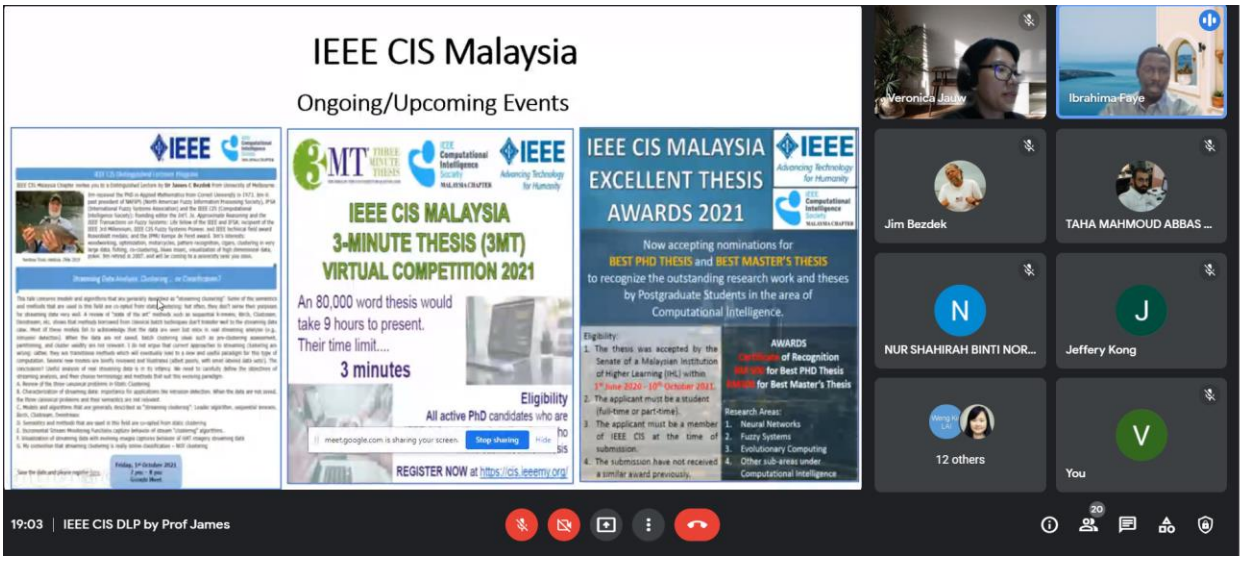
A. Review of the three canonical problems in Static Clustering
B. Characterization of streaming data: importance for applications like intrusion detection. When the data are not saved, the three canonical problems and their semantics are not relevant.

C. Models and algorithms that are generally described as "streaming clustering"; Leader algorithm, sequential kmeans, Birch, Clustream, Denstream
D. Semantics and methods that are used in this field are co-opted from static clustering
E. Incremental Stream Monitoring Functions capture behavior of stream "clustering" algorithms.
F. Visualization of streaming data with evolving images captures behavior of iVAT imagery streaming data.
G. My contention that streaming clustering is really online classification – NOT clustering.

Bibliography

Jim received the PhD in Applied Mathematics from Cornell University in 1973. Jim is past president of NAFIPS (North American Fuzzy Information Processing Society), IFSA (International Fuzzy Systems Association) and the IEEE CIS (Computational Intelligence Society): founding editor the *Int'l. Jo. Approximate Reasoning* and *the IEEE Transactions on Fuzzy Systems*: Life fellow of the IEEE and IFSA; recipient of the IEEE 3rd Millennium, IEEE CIS Fuzzy Systems Pioneer, and IEEE technical field award Rosenblatt medals; and the IPMU Kempe de Feret award. Jim's interests: woodworking, optimization, motorcycles, pattern recognition, cigars, clustering in very large data, fishing, co-clustering, blues music, visualization of high dimensional data, poker. Jim retired in 2007, and will be coming to a university near you soon.

Events



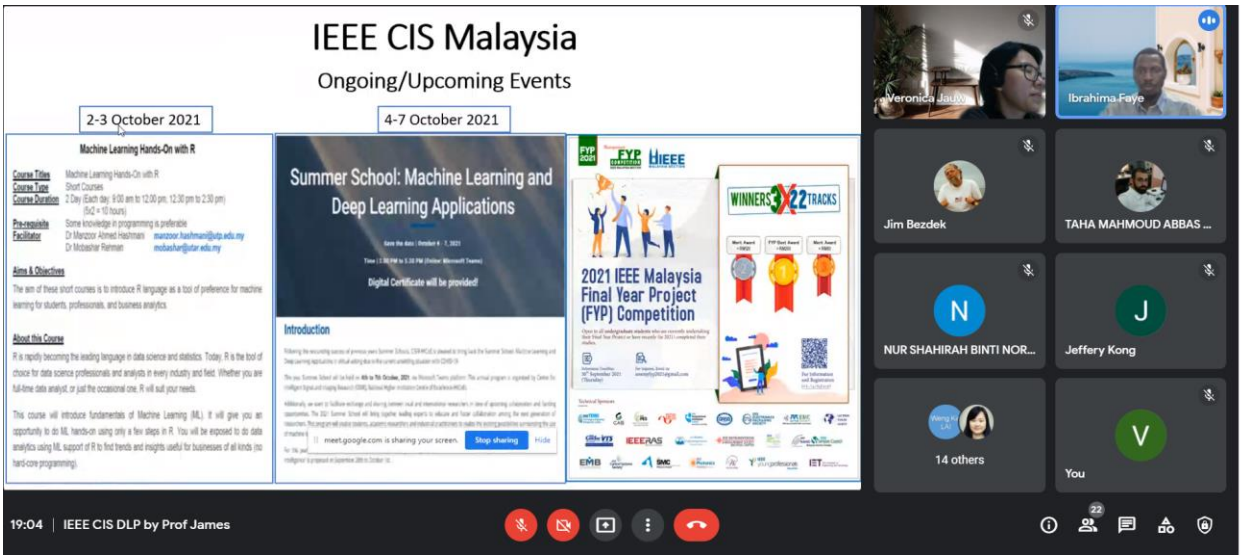
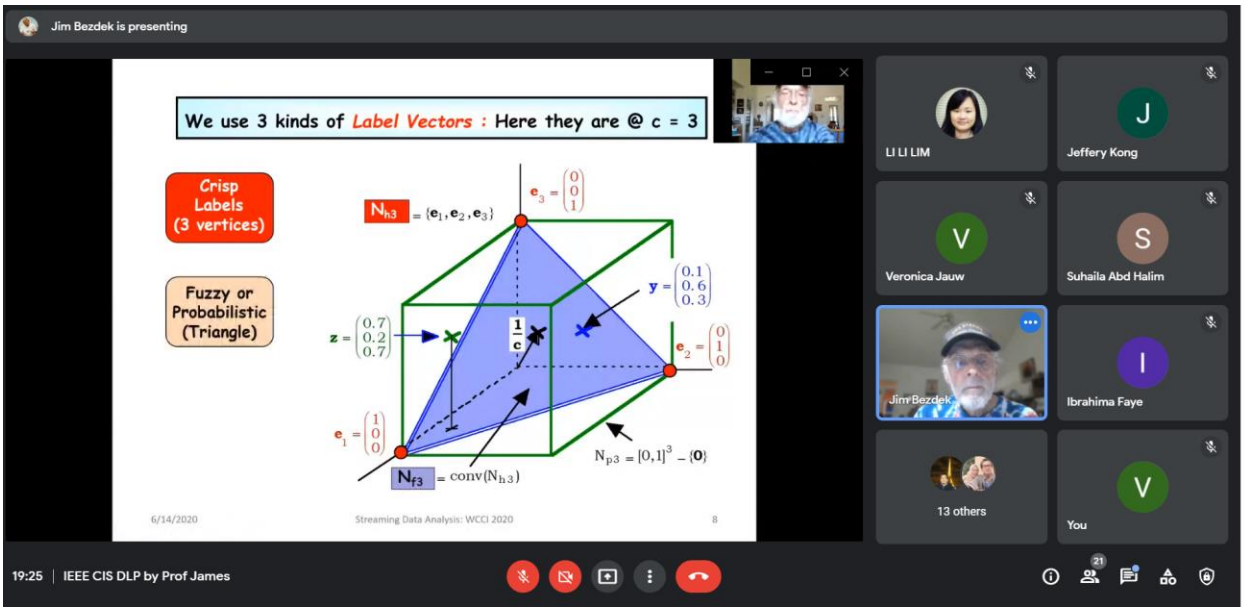


Figure 1. Dr Ibrahima Faye, Chairman of IEEE CIS Malaysia Chapter, introducing IEEE CIS and our ongoing activities



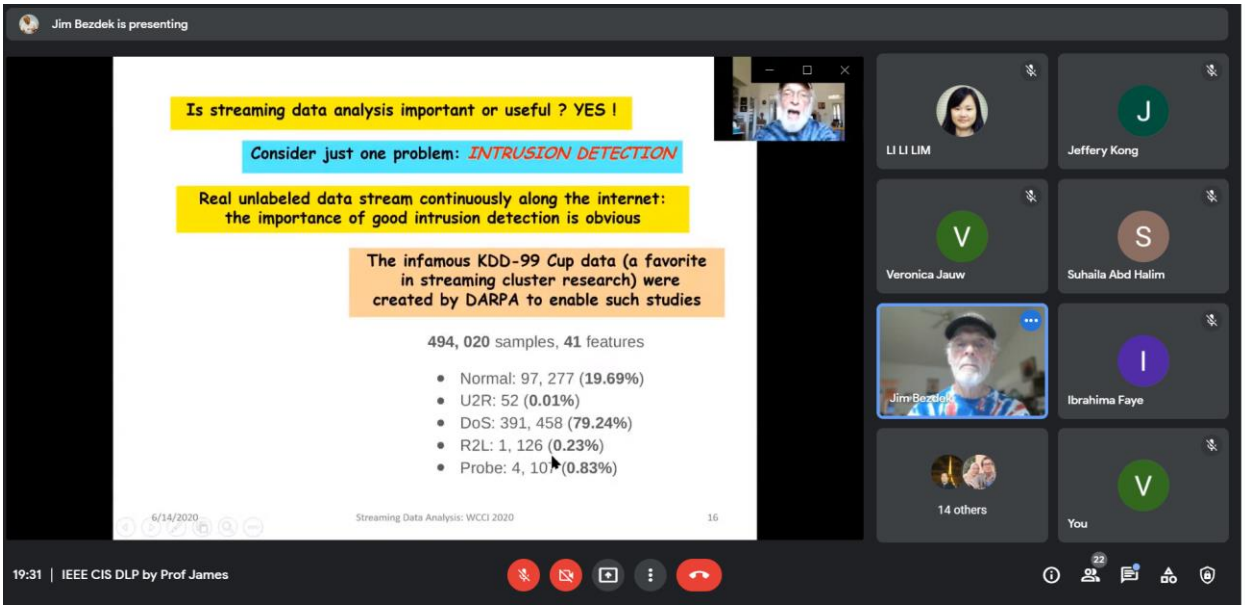


Figure 2. Methodology of data clustering presented by Prof James C Bezdek

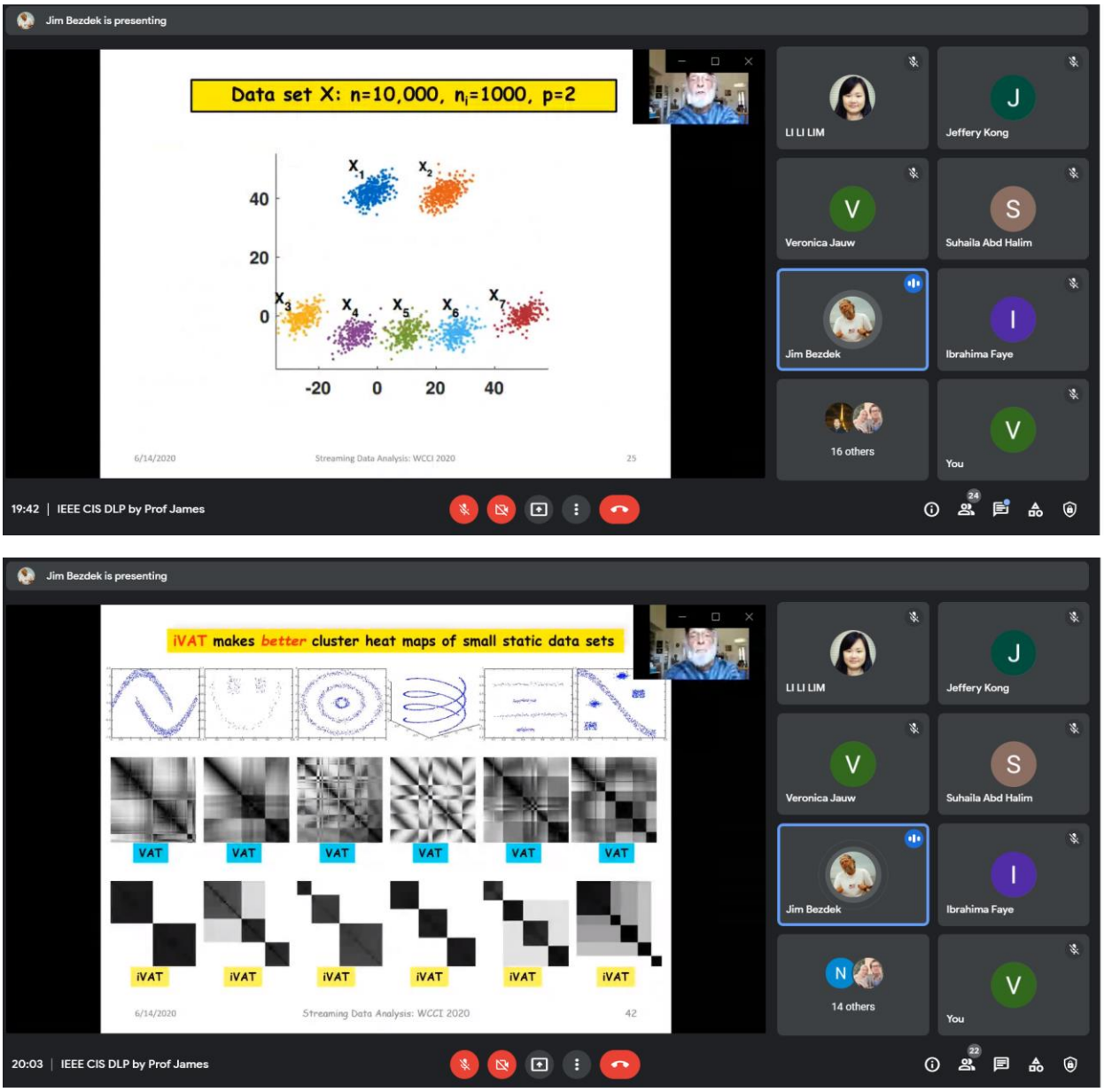


Figure 3. The comparative results of the different clustering methodologies.

List of Participants

Full Name	Affiliations	IEEE Member (Y/N)
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