

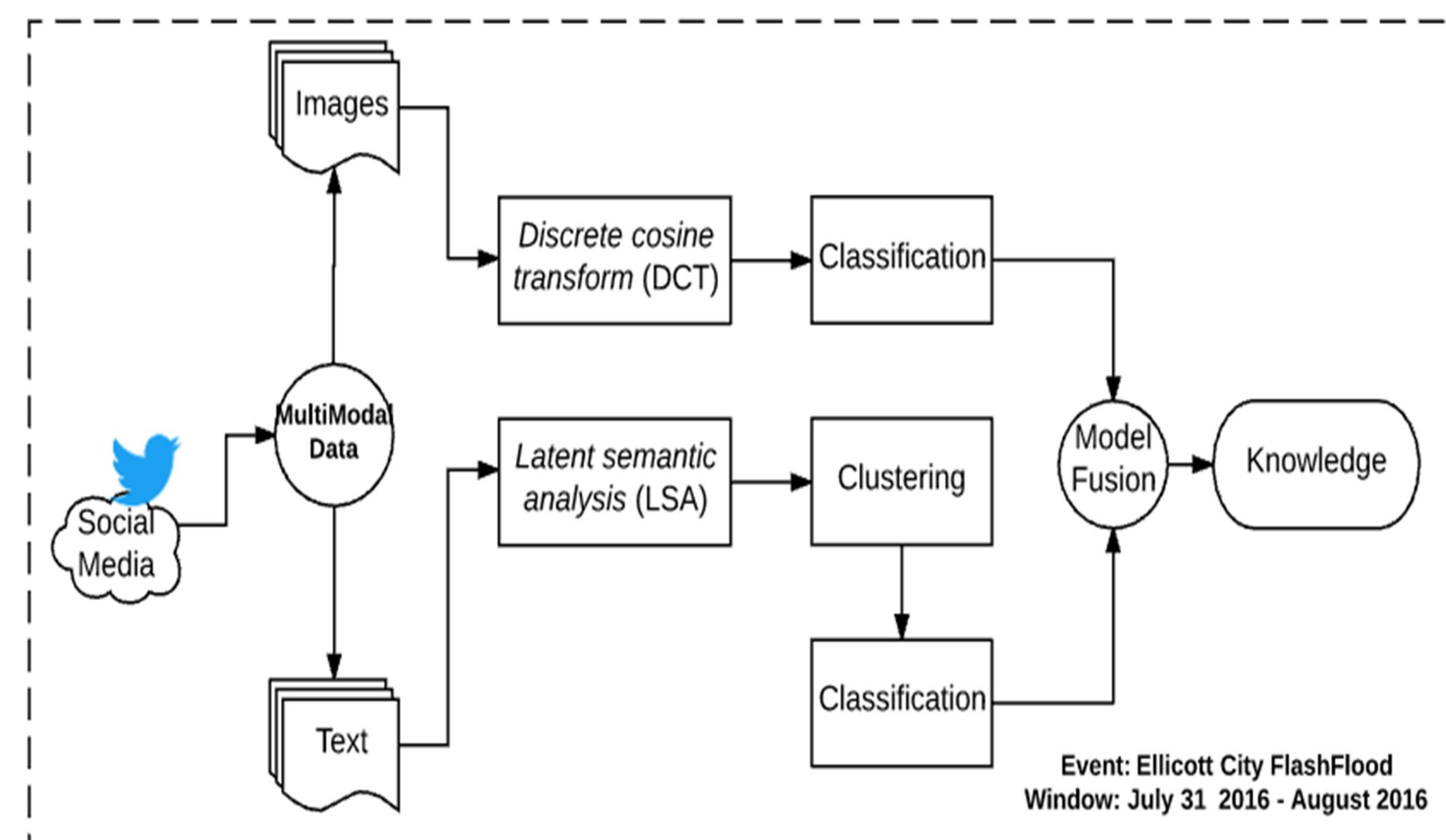


Challenge:

- Flash floods are instantaneous
 - response time is critical
- Real-time decision making
 - measure the rising level of water for just-in-time notification and emergency announcement

Solution:

- Fuse social feeds (texts & images) with sensor network data streams
 - Latent Semantic Analysis (LSA) to analyze the texts
 - Discrete Cosine Transformation (DCT) to analyze the images
 - Cross-correlations between the textual and image dimensions
 - Constrained topic modeling on heterogeneous data streams



Scientific Impact:

- Real-time situational awareness of physical events
 - harnessing the combined power of sensor network data streams with social networking feeds
 - modeling spatiotemporal, trajectorial and semantic evolvement of an event
 - incorporating the sentiments of crowd for improving first responders' services

Broader Impact:

- City partners
 - Baltimore County dept. of Public Works
 - Howard County Office of Community Sustainability & Bureau of Environmental Services
 - UMBC Facility Services
 - improve operational efficiency & manpower management
 - smartphone based real time notifications to municipal officials
 - ensure safety & security of human lives & critical infrastructures

CNS: EAGER: Distributed Data Analytics for Real-Time Monitoring and Detection of Flash Floods in Smart City (CNS 1640625, 9/1/16 – 8/31/18, UMBC, Nirmalya Roy, Aryya Gangopadhyay)