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## The Convergence of IoT, Machine Learning, and Big Data for Advancing Flood Analytics Knowledge

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Floods are among the most destructive natural hazard that affect millions of people across the world leading to severe loss of life and damage to property, critical infrastructure, and agriculture. Internet of Things (IoT), machine learning (ML), and Big Data are exceptionally valuable tools for collecting the catastrophic readiness and countless actionable data. The aim of this presentation is to introduce Flood Analytics Information System (FAIS) as a data gathering and analytics system. FAIS application is smartly designed to integrate crowd intelligence, ML, and natural language processing of tweets to provide warning with the aim to improve flood situational awareness and risk assessment. FAIS has been Beta tested during major hurricane events in US where successive storms made extensive damage and disruption. The prototype successfully identifies a dynamic set of at-risk locations/communities using the USGS river gauge height readings and geotagged tweets intersected with watershed boundary. The list of prioritized locations can be updated, as the river monitoring system and condition change over time (typically every 15 minutes). The prototype also performs flood frequency analysis (FFA) using various probability distributions with the associated uncertainty estimation to assist engineers in designing safe structures. This presentation will discuss about the FAIS functionalities and real-time implementation of the prototype across south and southeast USA. This research is funded by the US National Science Foundation (NSF).