

Abstract Submitted
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A System of coupled ODEs as a Cyber Model for Analyzing Wavelike Information Transmission from Data Mining Tweets MORGAN TAYLOR, ARMIN SMALHODZIC, KEITH ANDREW, LANCE HAHN, PHIL WOMBLE, CATHLEEN WEBB, BLAIR THOMPSON, Western Kentucky University — We are tracking social events such as the spread of Chikungunya, the activity of a school related shooting or an active crowd surge similar to the Hong-Kong political unrest via data mining of active Twitter accounts. Using selected word memes we search the Twitter database for indications of activity, illness, and travel as indicators of possible life altering events such as the spread of a virus. Memes of interest relate activity to location and spreading which are coupled to the density of Tweets and re-Tweets. The meme spreads through the community of social users in a fashion similar to nonlinear wave propagation- like a soliton, visualized as a moving spike in Tweet activity. We model the spreading of the virus as a system of ODEs isomorphic to a modified Tweet-Erase-Retweet (TER) system of three coupled nonlinear differential equations using Twitter variables. Numerical methods are used in Mathematica to generate solutions to the system for regions of interest. The nonlinear terms in this model lead to feedback mechanisms that result in unusual behavior that can lead to Retweet growth.

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