

Abstract: In the last decade, social networks, such as Twitter, emerged as a new information dissemination medium that propagates information regarding the physical world. Its increased popularity brings forth unprecedented opportunities to monitor evolving events, as well as an unprecedented capacity for spreading rumors and misinformation. This talk draws an analogy between Twitter and imperfect observation instruments (or noisy sensors). Engineers have long used imperfect physical sensing modalities, such as acoustic sensing, magnetic sensing, and seismic sensing to reconstruct events in the physical world. Can social media be thought of as just another such imperfect modality; one of social sensing? Much in the way physical targets cause signal propagation through a physical medium, world events cause information propagation on the social medium. Understanding the properties of such propagation (and the perturbations it suffers) allows one to reconstruct characteristics of both the propagation fabric (people and communities) and the events that cause the propagation in the first place. Inspired by literature on noisy channels, we present signal processing techniques for the social sensing modality, developed over the greater part of a decade, and review experiences using social sensing for event detection, demultiplexing, human bias characterization, veracity analysis, and detection of misinformation campaigns, demonstrating advantages and limitations of this approach.