Adaptive Knowledge Networks: A Time Capsule

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MOTIVATION

❖ Real world events are dynamic in nature. Periodic events e.g. US Presidential Election.
Non-periodic events e.g. Cyclone Idai.
❖ Need for real-time predictive analysis, trend analysis, spatio-temporal decision making, public opinion analysis for events.
❖ Current state-of-the-art curates dynamic knowledge graph from structured text.
❖ We propose creating an Adaptive Knowledge Network from incoming real-time multimodal spatio-temporally evolving data.

WHY

❖ Search for event-relevant information on the web is prone to incorrect or incomplete or stale information.
❖ Inferring temporal information associated with events and related assertions can significantly improve the quality of Q/A on the Web.
❖ Hence, there is a need to identify and maintain temporally changing information to analyze complex temporal dynamics and interactions of entities during a series of evolving events.

WHAT

❖ We rely on reasoning over unstructured and structured Knowledge Graphs (KGs).
❖ However, most traditional KGs capture static multi-relational data.
❖ Effectively capturing the temporal dependencies across knowledge sources can help improve the understanding of complex temporal dynamics of entities, relationships and their evolution over time.

HOW

We define two problems:
1. (1) Automatically extracting and predicting patterns for a class of periodic events (e.g. US Presidential Election).
2. (2) Inferring temporal information for non-periodic events (e.g. disasters) from real-time multimodal data to create an Adaptive Knowledge Network.

We rely on combining text mining approaches with machine learning and neural networks using knowledge from: (1) hierarchical and non-hierarchical relationships in KGs, (2) unstructured textual event-specific information, and (3) semi-structured collaborative KGs.

OVERVIEW

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