Human Behavior is a matter of Time!

Modeling Events Interactions through Temporal Processes

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Problem Definition

- **Data** = Sequences of events generated by some complex process
    - Each event is labeled by a specific category, i.e., the event type
    - Each event has associated a timestamp, i.e., when the event occurs and its duration

$$E = \{e_1, e_2, \dots, e_N\}$$
$$e_i = (a_i, t_i)$$

$t_0 \quad t_1 \quad t_2 \quad t_3 \quad t_4$
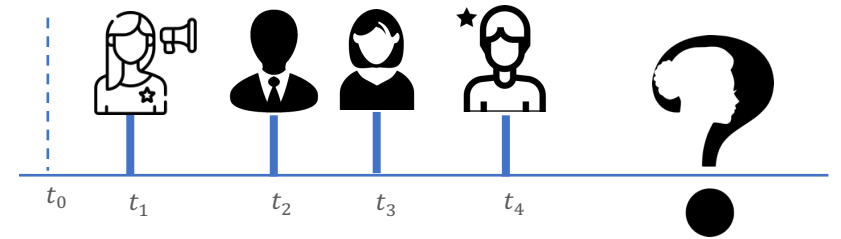
- **Goal** = Study prediction problems from event sequences in social media
    - Understand the structural and temporal dynamics that characterizes them
    - Extrapolate insights to forecast future events

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Challenges

- Different possible evolution in a sequence of events

- Exogenous causes can change considerably the unfolding of an event sequence

- Time-to-event is difficult to predict accurately

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Scope of MP

- Investigate probabilistic models based on latent representations
  - Latent variables can model the hidden causal relationships that characterize data

  - Event evolution can be modeled through the probability of the next event conditioned on its history

  - Probabilistic models can efficiently support simulation, data generation, different form of collaborative human-machine reasoning and allow humans to audit the output of the model

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Conclusions

- Investigate probabilistic models to provide an overview of the current advances

- Focus not only on the prediction task, but also on explanaibility and interpretability issues

- Provide a repository of available datasets

Thank you for your attention!