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## Habit monitoring over sensor streams

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## Context

- Use emerging **sensing and monitoring technologies** to improve ageing at home
- **Monitor the activity**, assess autonomy, improve well-being and security

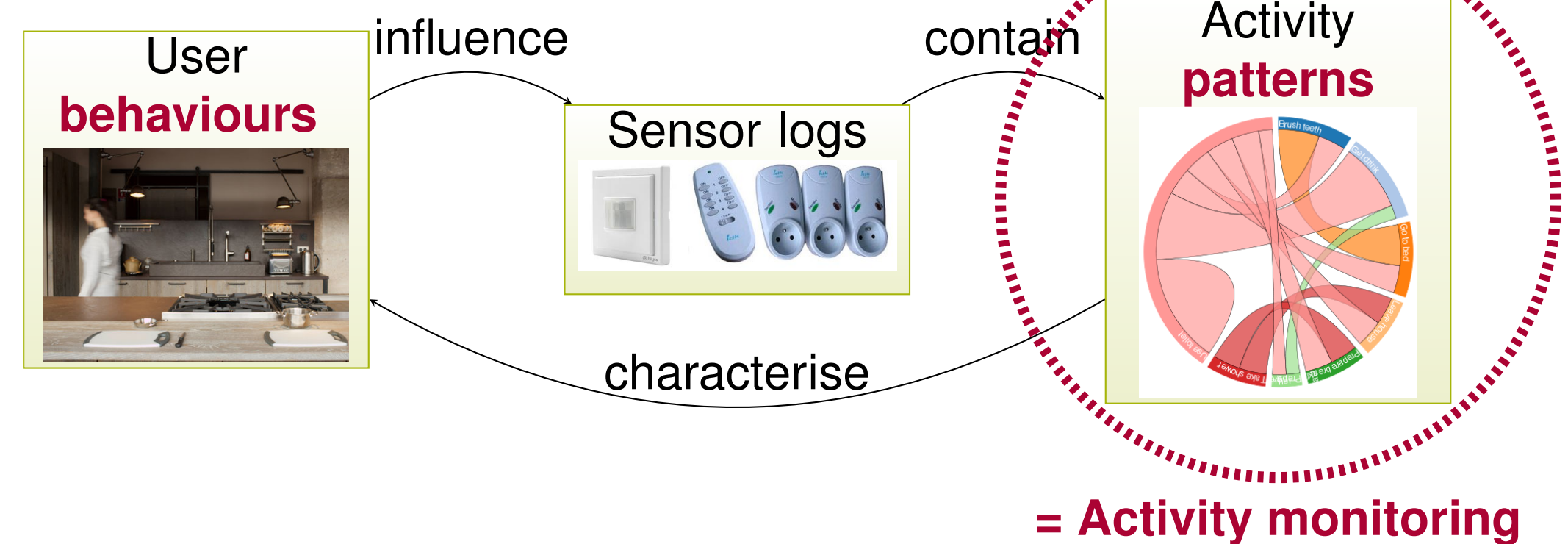


Figure 1: Activity monitoring

## Challenge

Monitor the habits through the **unsupervised** discovery of **relevant patterns** and the analysis of their **evolution**

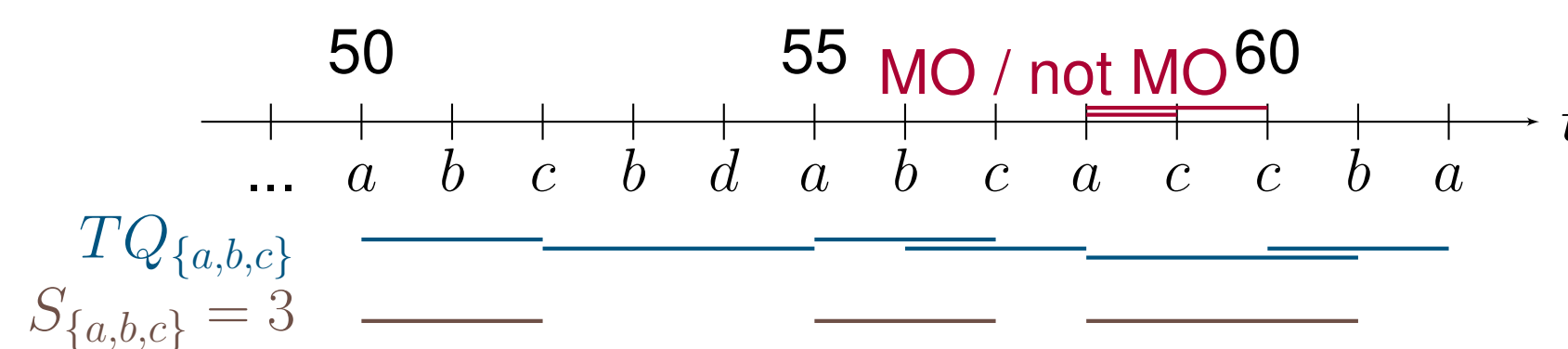


Figure 2: Episode occurrence mining

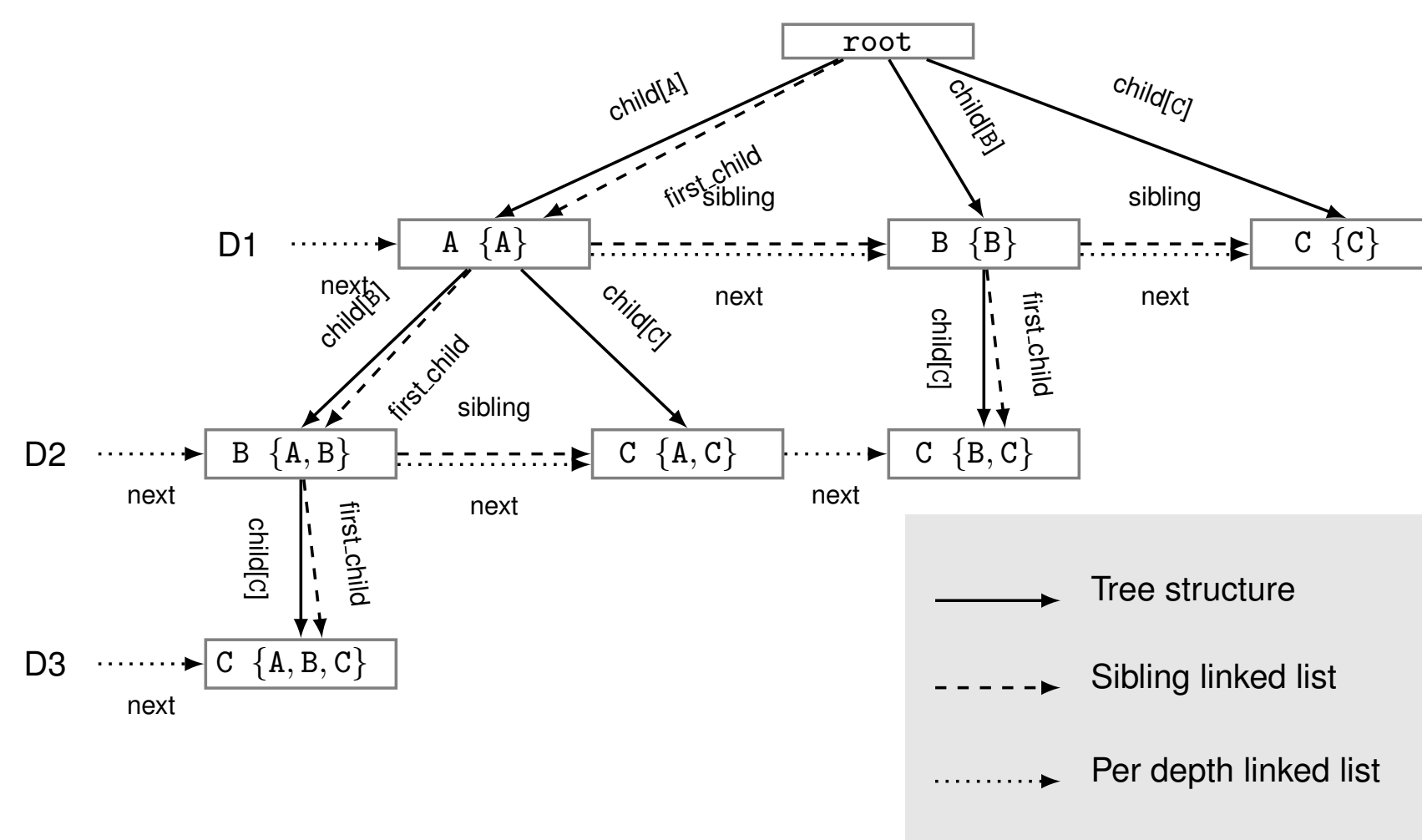


Figure 3:  $k$ -tree

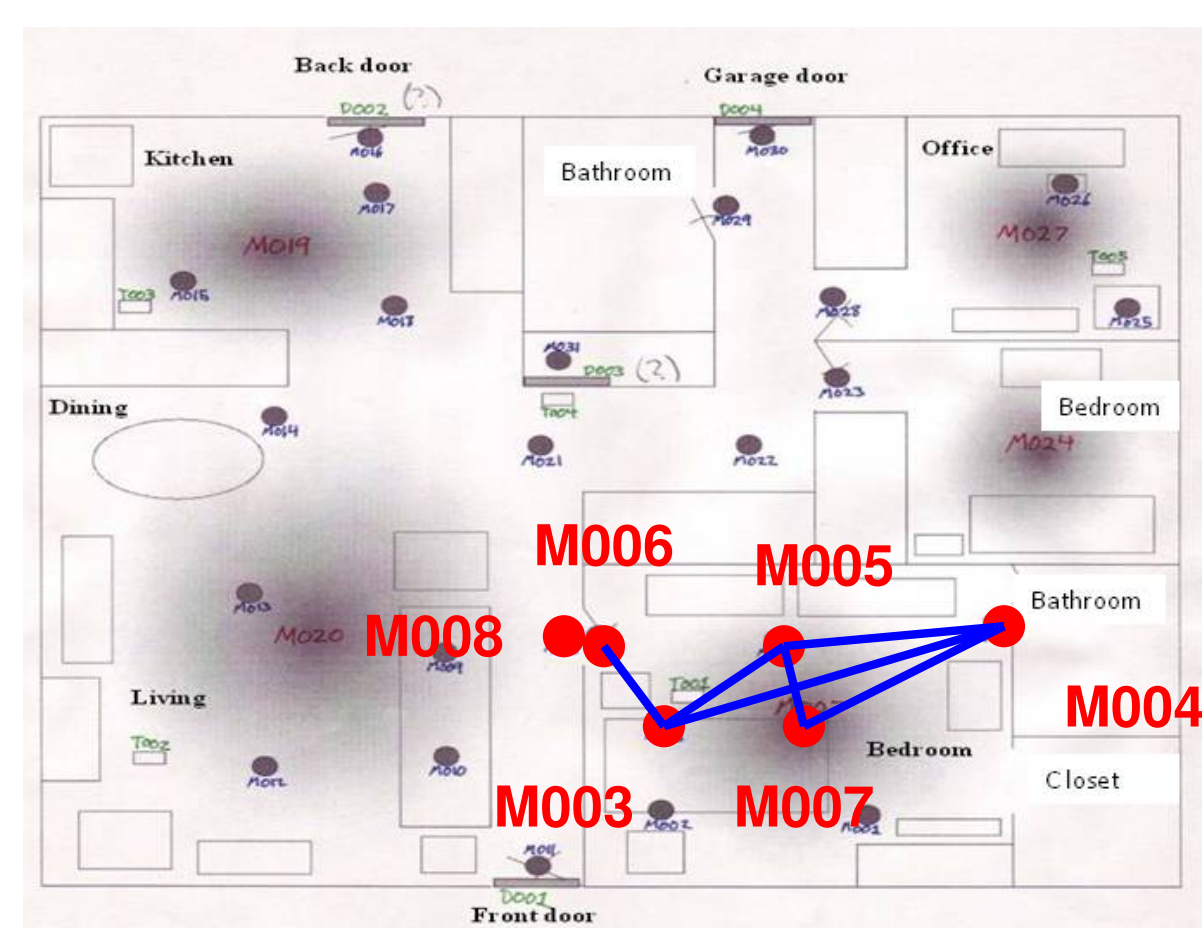


Figure 4: Most regular patterns

## Proposed solution

- General framework, for the **discovery** of the **top- $k$**  most relevant **episodes**
- **Relevancy** as a **combination of measures**, based on user preference
  - Frequency
  - Regularity
  - Length
  - Periodicity

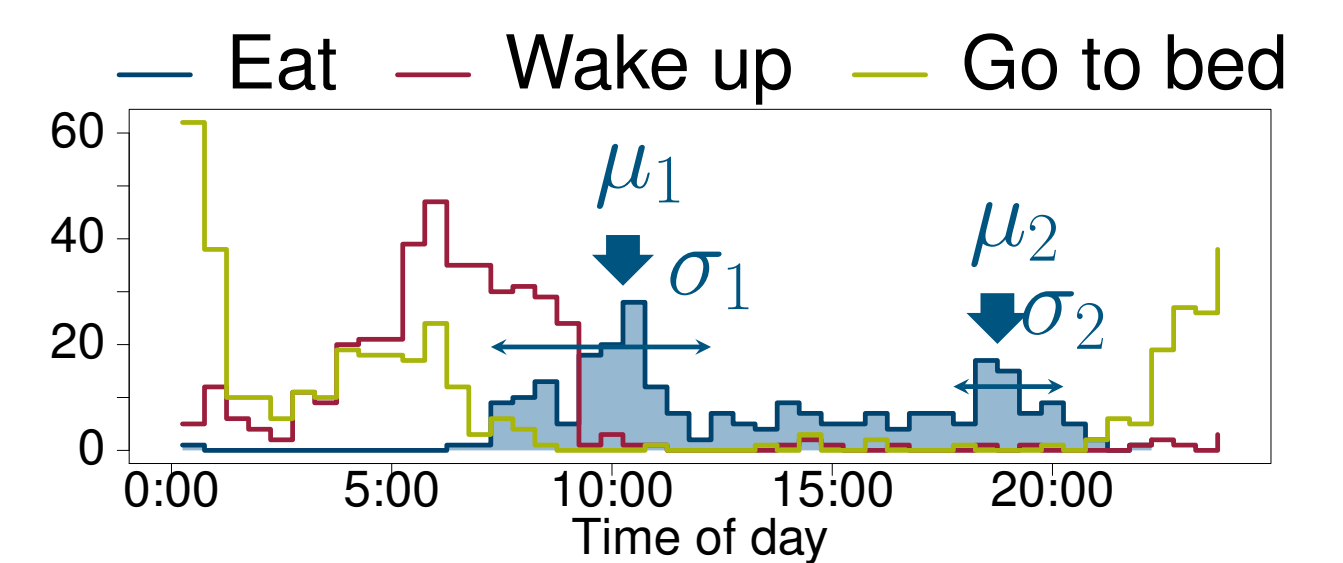


Figure 5: Periodicity modeling

- Handling of **data stream: real-time** discovery and update of the habits over the latest window

## Perspectives

- Integration of the different measures
- Parameter setting
- Trend analysis, anomaly detection

## Keywords

Data mining,  
Ageing at home,  
Sensor networks,  
Pattern discovery,  
Activity monitoring,  
Periodicity monitoring,  
Regularity,  
Top- $k$