SmartCities: Anticipating Agents of Change
RogueWolf
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**Motivation**

- IoT - $4.6 Trillion value-at-stake for public sector
- Cities will generate 63% of total value-at-stake
- City infrastructure transformed through IoT

**Approach**

Support Anticipatory Thinking (trajectory tracking) with Artificial Intelligence (Intentional planning) and structured analytic techniques (AFA + backcasting) to produce Anticipatory Intelligence for an emerging use case (SmartCities)

**Examples**

- Government
- NGO
- Collaboration: Government + NGO

**Anticipatory Thinking**

- Different from prediction, relies on expertise
- Generate a view of the future
- Identified forms:
  - Pattern Matching
  - Convergent Thinking
  - Trajectory Tracking:
    - “Narrative...is of particular use in trajectory tracking to understand the possible moves of other actors in the decision space” - Klein et al. (2011)
    - Trajectory Tracking:
      - Actors actions influence our decision space
      - Does not scale, hard to incorporate new actors

**Intentional Planning**

- Intentional path
  - Character actions are believable, goal-oriented
  - Motivated when goals are not the current state

- Intentional plan
  - Consists of intentional paths
  - Character goals conflict + collaborate

**Structured Analytic Techniques**

Mechanisms to guide analysts to think about a problem
- Externalize and decompose thinking
- Help analyst mitigate cognitive limitations
- Enable peer review

- Alternative Futures Analysis
  - Identified alternative trajectories
  - Based on critical uncertainties
  - Inform and illuminate decisions, plans and actions today

- Backcasting
  - Scenario analysis
  - Desirable futures
  - Plot a point in time, work backward to present

**SmartCities**

- Interconnected power grids reducing power waste
- Smarter transportation increase traffic management
- Smarter infrastructures reduce hazards and increase efficiency

But also means:
- Expanded attack surface for malicious actors
- Cyber vulnerabilities resulting in physical consequences

Recent global events such as the Ukraine power grid hack and the Mirai DDoS attacks demonstrate the the intent to use cyber in military operations and the ability to use IoT devices in large-scale attacks. To impact this newly forming arena, need to use Anticipatory Thinking to understand what entities will influence the value at stake.