Week 1: Constructive Research in Object Detection

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**Constructive Research in Object Detection**

Constructive design is one of the most common research methods for information systems and technology (Silvestrini & Sammito, 2012). These studies identify a problem, build solution artifacts, and communicate the implementation’s unique value (Hevner et al., 2004). For example, high-speed broadband internet is not available within many developing countries. These challenges promote researches to create new compression algorithms and improve the existing infrastructure. Typically, these results (artifacts) originate from specific Proof-Of-Concept (POCs) or directed case studies.

# Literature Review

Three constructive design articles from Northcentral University’s Library were selected (see Table 1). These articles identify a specific problem within object detection and then produce reusable artifacts (e.g., business processes and algorithms).

Table 1: Selected Papers

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Chebyshev Filter** | **Abandoned Objects** | **Low-Quality Images** |
| **Problem Statement** |  | * Can AI detect garbage in the real world |  |
| **Data Collection** |  | * PETS 2006 * ABODA * Private Cameras |  |
| **Artifacts Produced** |  | * Generic algorithm * Performance data |  |
| **Contributions** |  | * A mechanism for detecting garbage w.r.t. temporal and spatial rules |  |

## Detecting Abandoned Objects (2020)

Park et al. (2020) state that businesses spend significant resources discovering abandoned objects across their premises. Typically, they address these challenges by hiring staff to monitor security cameras. However, this approach is expensive, manually intensive, and error-prone. Existing artificial intelligence (AI) systems also encounter challenges maintaining abandoned objects in the foreground versus fading into the background. Engineers can overcome this issue through additional computations.

Unfortunately, low-powered cameras lack the necessary resources to execute those algorithms. The researchers solve these issues with a dual-background model supporting objects fading into a long-term and short-term buffer. They also include crude object detection with contour analysis and a hierarchical entity tracking mechanism. These capabilities power a custom rules engine that reduces false positives by accounting for temporal and spatial information.