# **Context is King**: Privacy Perceptions of Camera-based Surveillance

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## Introduction

In an age of increasing camera-based surveillance, there is also an increase in privacy concerns being voiced by the surveilled. New video analytics scenarios mean that we have to understand new relationships with corporate system owners, as well as traditional systems controlled by state entities.

How do these new relationships change how people perceive privacy in these contexts? What factors drive their perceptions, and what changes can be made to help people more (or less) comfortable about the presence of cameras?

## Method

This research work investigates privacy perceptions through the use of scenarios – short stories that put the respondent within a specific context. This allows us to understand emotional responses, with a combination of both quantitative and qualitative feedback in a mixed-methods survey.

We asked respondents how "comfortable" they felt about each scenario, and also gave them opportunities to justify their selection. Using ten scenarios, different combinations of factors can be explored, identifying commonalities in perception.

## Hypotheses

What drives changes in perception of privacy? Is it:

**Demographics? Ideology? Context?**

An online survey was completed by 229 respondents globally, with self-selection biases identified through calibration questions before and after the survey. K-means Clustering is used to form four groups of respondents based on their quantitative responses.

## Example Scenario

*The organisers of a city marathon want to use cameras to track the runners in order to prevent cheating and assist with health and safety. Trained referees will be watching the footage in real-time, and the runners are identifiable. The footage is also recorded in case it needs to be replayed during a dispute. The footage may capture the spectators as well, although there will be no identifying information for non-competitors.*

| # | Scenario Title | System Owner | Recorded Footage | Human Observer | Benefit to observed | Scores on a 1 to 7 scale, from "not comfortable" to "very comfortable" (N=229) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Overall Score | C1 (N=44) | C2 (N=55) | C3 (N=83) | C4 (N=47) |
| 1 | **Workplace Biometrics** | Corporation | Maybe | No | Safety/Security | 4.07 | 6.07 | 4.73 | 3.77 | 1.98 |
| 2 | **Disaster Recovery** | Government | Yes | Yes | Emergency Recovery | 5.84 | 6.59 | 5.87 | 6.02 | 4.77 |
| 3 | **Traffic Analysis** | Government | No | No | Improved traffic | 5.62 | 6.82 | 6.22 | 5.67 | 3.89 |
| 4 | **Advertising Analytics** | Corporation | No | No | None | 3.21 | 5.16 | 4.13 | 2.41 | 1.70 |
| 5 | **Sports Tracking** | Corporation | Yes | Yes | None | 5.08 | 6.50 | 5.36 | 5.02 | 3.51 |
| 6 | **Pedestrian Traffic** | Government | Yes | No | Better urban design | 4.24 | 6.23 | 4.82 | 3.82 | 2.47 |
| 7 | **Supermarket Motion Tracking** | Corporation | Maybe | No | Better retail experiences | 3.03 | 5.41 | 3.33 | 2.39 | 1.62 |
| 8 | **Shopping Mall Trespass Enforcement** | Corporation | Maybe | Maybe | Public safety | 3.79 | 6.32 | 4.42 | 3.23 | 1.68 |
| 9 | **Department Store Shoplifting Detection** | Corporation | Yes | Yes | None | 4.19 | 6.45 | 4.42 | 4.01 | 2.13 |
| 10 | **Intelligence Agency Person Tracking** | Government | Yes | Yes | Public Safety | 3.09 | 5.18 | 4.45 | 2.16 | 1.19 |

## Data Analysis (from the Quantitative Data)

**Demographics**: No statistically significant relationships were found between the cluster groupings and gender, age, education, ethnicity, country of origin/current residence, or work experience with surveillance cameras.
**Ideology**: Each cluster represents an attitude towards surveillance cameras – from C1 and C4, respondents tend to become more anti-camera; in the table above, blue scores are more positive, orange are less positive.
**Context**: Even between clusters, some scenarios are commonly positive (2, 3) or commonly negative (4, 7, 10). This is strong evidence that the specific context and its factors can override the underlying ideology.

## Main Factors (from the Qualitative Data)

**Access**: Who has access to the video feed or footage, including secondary data derived from the cameras?
**Human Influence**: Is there a person-in-the-loop? Will the footage be recorded and watched by humans?
**Anonymity**: Are the observed people in the footage personally identifiable? Are there targeted actions?
**Data Use**: How will the data be used? Is the purpose in the public good? Are there secret secondary uses?
**Trust**: Do we trust the owner of the surveillance camera network? Are they competent?

**Designing surveillance camera networks with these factors in mind can help people feel more comfortable.**