Building a DSR Ecosystem for Privacy-Preserving Behavioral Research: The SYNAPSIS Experience

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Privacy regulation has made the sharing and reuse of audiovisual research data a structural barrier in the social sciences and humanities. SYNAPSIS is a 24-month NWO-TDCC-SSH project applying Design Science Research methodology to address this barrier through a coordinated artifact ecosystem anchored by **MaskingOPS**—an end-to-end pipeline for privacy-preserving video de-identification and analytic utility assessment, currently under review at *Behavior Research Methods*. We derive the meta-requirements that shaped MaskingOPS from the project's multi-stakeholder context, trace how each component of the ecosystem responds to a distinct meta-requirement, and report preliminary findings from six active or scoping pilot sites across the Netherlands and South America. Three design principles emerge from the first six months of orchestration work. We argue that the ecosystem's contribution is not the artifacts individually but the feedback infrastructure that converts institutional constraints into transferable design knowledge.

Introduction

Behavioral researchers across the social sciences and humanities collect video as a primary data source: classroom observations, gesture corpora, clinical interaction recordings, interview video. Under the General Data Protection Regulation (European Parliament and Council 2016) and the institutional frameworks built around it, sharing or archiving this data requires prior de-identification. A researcher who wants to deposit a gesture corpus in DANS, share interview footage with a replication team, or use classroom recordings in a multi-site training study must first remove or obscure identifying facial, vocal, and body information—a task for which no shared, researcher-facing infrastructure has existed.

The gap is not primarily technical. Masking tools exist. The barrier is that those tools are designed for computer vision engineers, not for behavioral scientists who lack GPU access, are not fluent in Docker deployment, and face institutional data governance requirements that a command-line masking script cannot document. The problem is an *ecosystem* problem: the full workflow from raw video to FAIR-compliant archived output requires tool integration, training, governance templates, and community standards that no single artifact can provide.

SYNAPSIS (*Synergy Network and Platform for Inclusive Sharing of Identity-Safe AV Data*) is a 24-month NWO project funded through

the Thematic Digital Competence Center for SSH (TDCC-SSH). It applies the Design Science Research methodology (Hevner et al. 2004; Peffers et al. 2007) to build that ecosystem. This paper reports the ecosystem's artifact architecture, the meta-requirements that drove it, and preliminary findings from Month 6 of 24.

Background

DSR Ecosystems and Meta-Requirements

Design Science Research produces knowledge through the construction and evaluation of artifacts (Hevner et al. 2004). Gregor and Hevner (2013) distinguish knowledge contributions by novelty and specificity: exaptation, improvement, and invention. SYNAPSIS spans all three, since masking tools exist (exaptation), no researcher-facing end-to-end workflow exists (invention), and existing GDPR-documentation practices are improved through structured templates.

Central to our framing is the concept of *meta-requirements*: general, class-level requirements from which specific design requirements are derived (Wieringa 2014). Meta-requirements describe what any adequate artifact in a given class must achieve; they justify design decisions across components and make design knowledge transferable to analogous artifact classes. We derive four meta-requirements for the SYNAPSIS artifact class from a community survey (N = 127) and from stakeholder analysis conducted in Month 1–2.

Privacy Barriers in AV Research

An SSH-community survey conducted in Month 2 of SYNAPSIS (N = 127, distributed through CLARIAH, ODISSEI, and DARIAH Netherlands mailing lists) found that 89% of respondents held AV data they could not share due to privacy concerns, while only 23% had access to institutional masking support. Researchers who had attempted institutional review reported average DPIA durations of 4–9 months. The gap between regulatory expectation and available infrastructure is structural, not incidental. [1]

[1] Survey analysis is being prepared for separate publication as part of the SYNAPSIS policy research output (M18 milestone).

The SYNAPSIS Ecosystem

Stakeholder Architecture

Four stakeholder tiers structure the ecosystem's design-evaluate-feedback cycle. *Technical partners*—Hasso Plattner Institute (Potsdam) and Netherlands eScience Center—develop and sustain the core toolchain. *Domain research partners* at Radboud University, Tilburg University, VU Amsterdam, and EUR contribute the behavioral science expertise that defines requirements and evaluates artifact fitness; co-pilot researchers at these institutions are active users