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DIY Challenge Blueprint:
From Organization to Technical Realization in Biomedical Image Analysis

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Abstract

Biomedical image analysis challenges are vital for **benchmarking** algorithms and sharing **datasets**. Commercial cloud platforms dominate, but entail high costs, limited flexibility, and reduced data control. We present a **Do-It-Yourself (DIY) blueprint** for hosting challenges on **self-managed infrastructure**, improving **cost efficiency, compliance, and data sovereignty**. The framework integrates organizational and technical aspects such as **stakeholder roles, data management, identity and access management, containerized evaluation workflows**, and **modular open-source services**. It provides a reusable foundation for future challenges, promoting autonomy, transparency, and sustainability.

Key Roles and Their Needs

Challenge Participant
- »Straightforward registration and data access
- »Clear submission process for containerized solutions
- »Fast and reliable feedback on performance
- »Transparent leaderboard to track progress

Data Provider
- »Provision of imaging data and annotations
- »Legal/ethical compliance and consent
- »Updates or corrections when needed

Challenge Organizer
- »Infrastructure with fine-grained access control
- »Robust data security and GDPR compliance
- »Automated, reproducible evaluation pipelines
- »Managed participant accounts, roles, and permits
- »Transparent result presentation (leaderboards, reports)
- »Ethical approvals and data-sharing agreements

Authentification
Annotation
Data Sharing
Evaluation
Feedback
Public Relations
Storage
Submission

SAVE YOUR MONEY
DO-IT-YOURSELF

HTTPS://GITHUB.COM/REMIC-OTHR/PHAKIR_DIY

Workflow

① Planning
Define
- »Ethics approvals
- »Data agreements
- »Clear tasks
- »Robust metrics

② Pre-Challenge
Prepare
- »Curated datasets
- »Infrastructure
- »Onboarding docs

③ Execution
Evaluate
- »Participant registration
- »Secure data access
- »Container submissions

④ Feedback
Provide
- »Continuous support
- »Error handling
- »Dynamic leaderboard

⑤ Post-Challenge
Publish and archive
- »Final results
- »Data/code
- »Joint paper

Case Study

- »MICCAI 2024 EndoVis PhaKIR Challenge
- »Fully self-hosted infrastructure
- »Multi-center endoscopic dataset
- »14 teams with 66 registrations
- »18 international submissions in 3 tasks

Take-Home-Message

- »DIY challenge = feasible and low-cost
- »Greater data sovereignty and compliance
- »Flexible and reproducible infrastructure
- »Blueprint reusable by the community

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