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| **System Administration Guide** |

**Overview**

This guide outlines the procedures for administering and maintaining the Lymphoid Malignancy Classification Platform. The system classifies histopathological slide images using deep learning models and is deployed using Streamlit on Azure.

**System Components and Architecture**

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| Component | Description |
| Streamlit UI | Frontend application for user interaction |
| Azure Web App | Hosts the deployed platform |
| Blob Storage | Stores uploaded slide tiles and reports |
| Docker Container | Containerized deployment of the platform |
| PyTorch Model | ResNet-based CNN model for lymphoma subtype classification |
| Grad-CAM Visualization | Generates heatmaps highlighting model attention areas |

**Operation Instructions**

**Initial Deployment**

1. Clone GitHub repo to Azure Cloud Shell.
2. Build and push Docker image to Azure Container Registry.
3. Create Azure Web App from container image.
4. Set environment variables in Web App settings.

**Day-to-Day Operation**

* Log in to Azure Portal
* Navigate to LymphoidWebApp
* View logs and performance under “Monitoring”
* Restart services if updates or patches are applied

**Maintenance Procedures**

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| --- | --- | --- | --- |
| Task | Frequency | Tool/Command | Notes |
| Backup Blob Storage | Weekly | Azure Storage Explorer | Export to local encrypted ZIP |
| Update Model Weights | As needed | Upload new .pth to /models | Ensure model schema consistency |
| Rotate Access Tokens | Quarterly | Azure Portal > App Registration | Notify developers after rotation |
| Container Security Scan | Monthly | docker scan or Azure Defender | Mitigate any flagged vulnerabilities |

**Networking and Connectivity**

* All network communication occurs over HTTPS
* Blob storage is firewalled to only accept requests from Web App IP
* App service has autoscaling enabled

**Access and Authentication**

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| --- | --- | --- |
| Role | Authentication Method | Permissions |
| Developer | Azure Active Directory (AAD) | Push/pull from ACR, edit deployment |
| End-User | Streamlit file upload | No access to infrastructure |

**Backup & Recovery**

* **Manual Backup:** Via Azure Portal or Storage Explorer
* **Disaster Recovery:** Re-deploy latest Docker image and mount blob backup

**Safety & Legal Considerations**

* Data is de-identified and used only for educational research
* Platform does not collect PHI (Protected Health Information)
* Complies with GDPR/FERPA when applicable

**Guide Format and Searchability**

This guide is available in:

* PDF format (linked in README)
* Searchable Markdown within GitHub /docs folder

**Visuals to include:**

* System architecture diagram
* Step-by-step screenshots of deployment and backup
* Sample Grad-CAM output and report

**Summary**

All functional components have been tested per system criteria. The guide supports repeatable operation, documentation of testing outcomes, and safe administration of the platform.