IssueOps

Continuous AI for GitHub Issues.

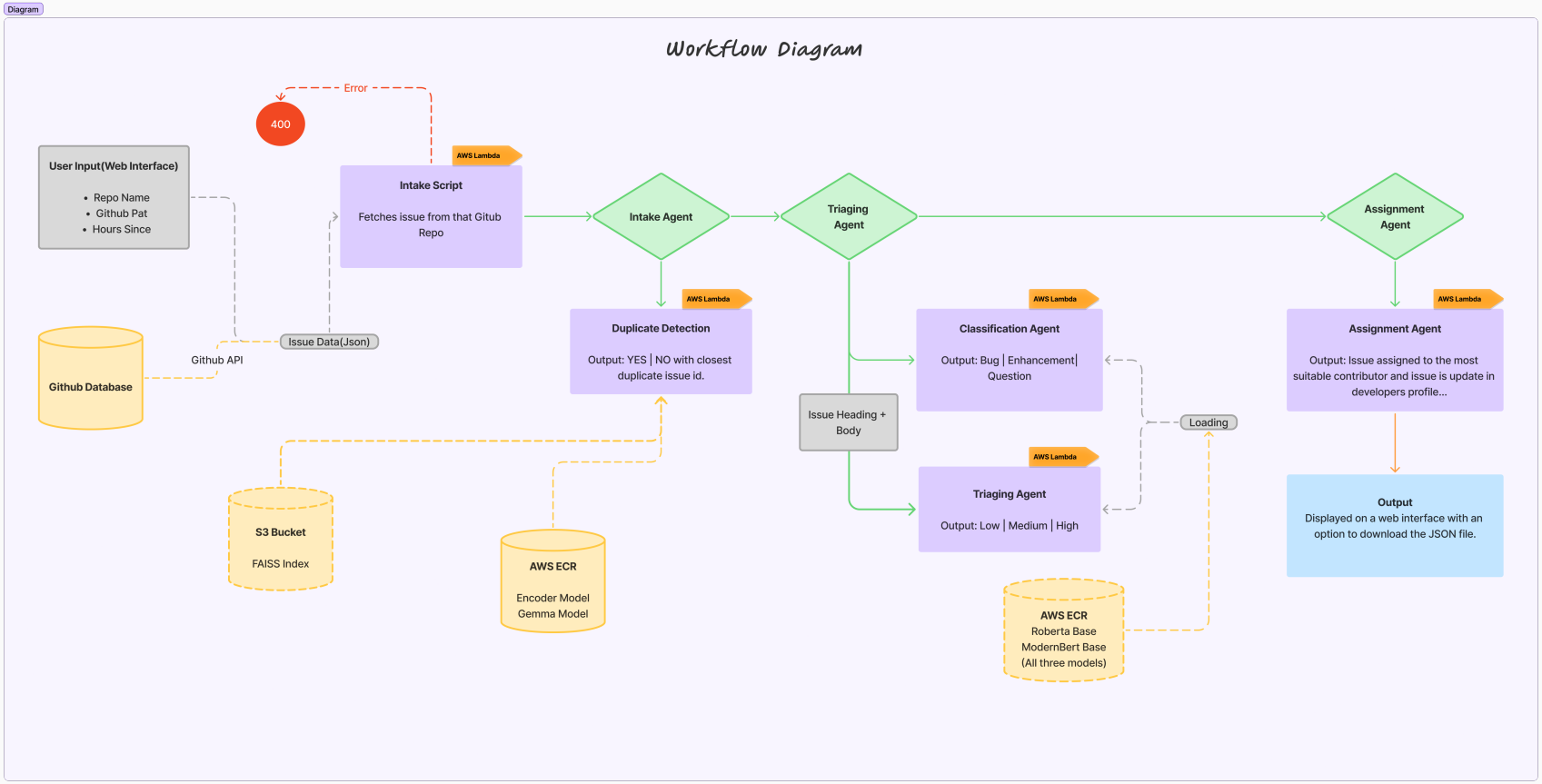
Mid-Term Review

Team: VaaS

DS 252 : Introduction to Cloud Computing

October 10, 2025

Diagram


Workflow Diagram
Error
400
User Input(Web Interface)
• Repo Name
• Github Pat
• Hours Since
AWS Lambda
Intake Script
Fetches issue from that Gitub Repo
Intake Agent
Triaging Agent
Assignment Agent
Github Database
Github API
Issue Data(Json)
AWS Lambda
Duplicate Detection
Output: YES | NO with closest duplicate issue id.
AWS Lambda
Classification Agent
Output: Bug | Enhancement| Question
AWS Lambda
Assignment Agent
Output: Issue assigned to the most suitable contributor and issue is update in developers profile...
Issue Heading + Body
AWS Lambda
Triaging Agent
Output: Low | Medium | High
Loading
S3 Bucket
FAISS Index
AWS ECR
Encoder Model
Gemma Model
AWS ECR
Roberta Base
ModernBert Base
(All three models)
Output
Displayed on a web interface with an option to download the JSON file.

Intake Agent

Intake Script

1. Initialization
   - Receives repo name & GitHub PAT
   - Configures time window (default: 1hr)
2. Issue Collection
   - Queries GitHub API with time filter
   - Fetches recent issues and PRs
   - Distinguishes Issues vs Pull Requests
3. Classification Pipeline
   - Heavy Type Classifier
   - Priority Classifier (P0-P3)
   - Assignee Recommender
   - Aggregates results with scores

Duplicate Detection Agent

1. Preprocessing Pipeline
   - Extracts title and body from JSON
   - Cleans whitespace and special chars
   - Normalizes text formatting
2. Embedding Generation
   - HuggingFace Google embeddings
   - Converts text to dense vectors
3. FAISS Index Search
   - S3-backed FAISS index storage
   - Cosine similarity search
   - Retrieves top-K candidates
4. Cross-Encoder Validation
   - Threshold-based filtering
   - Reranks using Cross-Encoder
   - Assigns similarity scores (0-1)
   - Returns YES/NO decision

Triaging Agent

Classification Agent

RoBERTa-base (125M params)
12 layers | 768 hidden | 12 heads
Context: 512 tokens

Fine-tuning: 55K GitHub issues
Labels: Bug | Enhancement | Question

Performance Metrics:

Category	Precision	Recall	F1	H-Loss
Bug	81%	81%	81%	0.14
Enhancement	78%	72%	74%	0.15
Question	79%	81%	80%	0.15
Macro-Avg	**79%**	**78%**	**78%**	**0.15**

Training: 48 min (Google Colab T4 GPU)

Priority Agent

ModernBERT-base (149M params)
22 layers | 768 hidden | 12 heads
Context: 8192 tokens

Architecture: Ensemble of 3 Models (Low vs. Not-Low | Medium vs. Not-Medium | High vs. Not-High)

Fine-tuning: GitHub & Jira

Performance Metrics:

Priority	AUC	Precision	Acc	F1
Low	0.90	0.81	81%	0.81
Medium	0.92	0.83	83%	0.83
High	0.91	0.82	82%	0.82
Macro-Avg	**0.91**	**0.82**	**82%**	**0.82**

Binary classification outperforms multiclass

[1] "Automatic Issue Classifier: A Transfer Learning Framework for Classifying Issue Reports" arXiv 2022

[2] "Enhancing Task Prioritization in Software Development Issues Tracking System" google scholar 2025

Assignment Agent

① **Developer Profiles**

Contains developer names, expertise keywords, and an initially empty list for issues.

② **New Issue Created**

GitHub forwards the new issue's data (title, body, labels) to a server using a webhook.

③ **Text-to-Numbers**

The issue's is converted into a numerical vector so the model can understand it. This is done using Sklearn's TfidfVectorizer.

④ **Prediction**

A pre-trained MultinomialNB classifier calculates the probability for each developer and selects the one with the highest score.

⑤ **Assign and Update**

The issue is officially assigned to the predicted developer on GitHub, and the local developer profile is updated.

AI Tools & Assistants Used by Team

Vinay

Tools Used:

- Cursor IDE
- Perplexity
- Google Gemini
- Warp Agentic Terminal

Ashwin K M

Tools Used:

- Claude Sonnet
- Perplexity AI
- Gemini 2.5 Pro
- ChatGPT-5

Sai Harsh

Tools Used:

- Perplexity AI
- Gemini 2.5 Pro
- ChatGPT-5
- Github Copilot

Anmol Gill

Tools Used:

- Gemini 2.5 Pro
- ChatGPT-5
- Github Copilot
- Perplexity AI

Challenges Faced

- **Context Limitations:** AI struggled with understanding complex project architecture and proposes complex fixes to bugs
- **Code Quality Issues:** Generated code required significant review and refactoring (30% error rate)
- **Integration Challenges:** Difficulty adapting AI outputs to existing codebase standards and team conventions.

Plan for Completion

Agent Development

- Build remaining Intake, Triage, and Assignment Agents
- Start building Notification Agent
- Fine-tune embeddings for improved accuracy
- Conduct load testing and performance optimization

Infrastructure & Deployment

- Deploy application on GitHub Marketplace
- Use Terraform for infrastructure management
- Implement failover mechanisms and feature engineering

Final Deliverables

- Record comprehensive demo video
- Finalize project report with performance metrics
- Prepare and deliver final presentation
- Submit complete codebase and documentation

Success Criteria

- Reduce triage time from 2+ days to **<4 hours**
- Achieve **60%** reduction in notification noise
- Handle **100+ issues/hour**
- Deploy production-ready system on AWS