 Marwadi University Marwadi Chandarana Group	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology
Subject: Capstone Project	Aim: Deployment and Operations
Date: 24-9-2025	Enrolment No: 92310133004

1. Live Deployment

1.1 Platform Selection

1.2

The system was deployed on AWS Cloud, leveraging multiple managed services:

- Frontend (React.js): Deployed on AWS EC2 globally distributed access.
- Backend (Flask API): Containerized with Ec2(Linux) and hosted on AWS Elastic Beanstalk (EC2 instance behind a load balancer).
- Data Storage:
 - Student images → AWS S3 bucket
 - Face embeddings & metadata → AWS DynamoDB
 - Face matching → AWS Rekognition
 - Attendance records → Excel files stored in S3


This architecture ensures scalability, low latency, and availability beyond localhost.

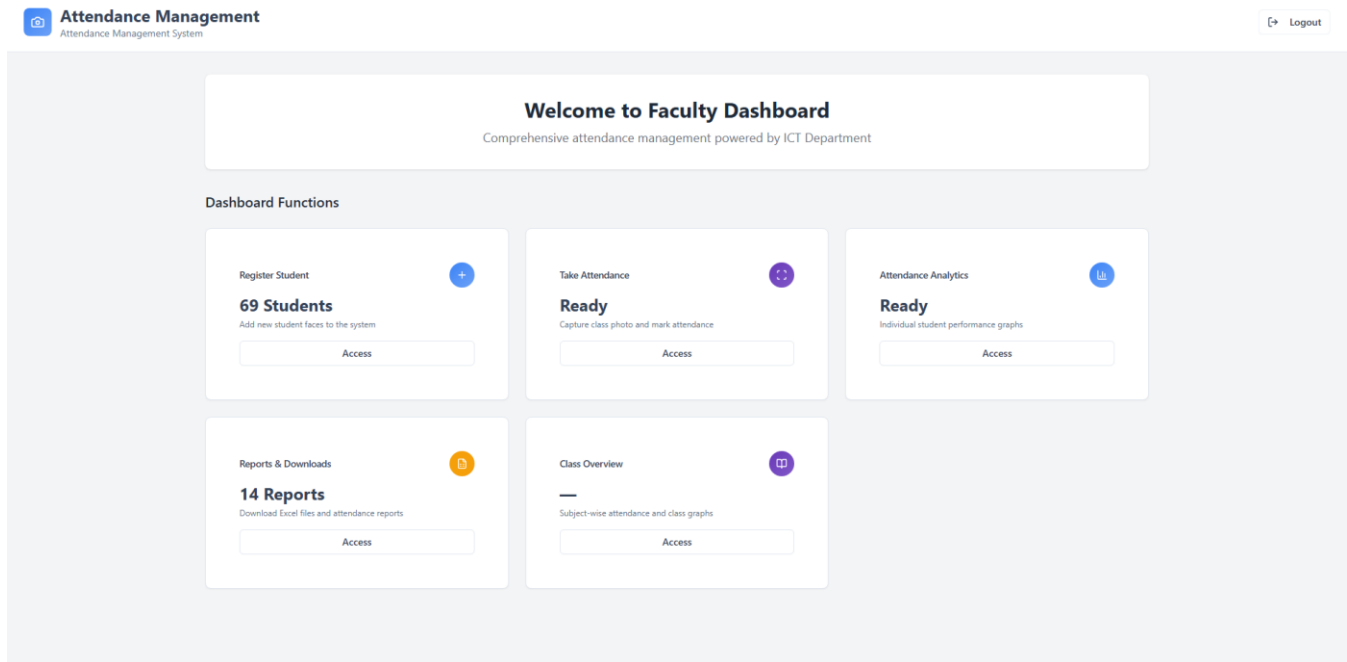
1.2 Deployment Process

1. Frontend Deployment (React):
 - Build React project → npm run build.
 - Configure CloudFront for caching + HTTP.
 - Set custom domain: <http://ictattendance.me>
2. Backend Deployment (Flask API):
 - EC2 app.py and services.
 - Deploy on → EC2 instance auto-managed by AWS.
 - Set environment variables (AWS keys, bucket names, DB tables).
 - Configured Nginx reverse proxy to forward requests.
 - Run 24*7 using (nohup python3 main.py > output.log 2>&1 &)
3. Database & AI Integration:
 - Created DynamoDB table (students) with partition key: roll_no.
 - Rekognition collection (attendance_collection) initialized.
 - S3 bucket policies configured with correct IAM roles for secure read/write.
4. Domain & DNS setup:
 - Purchased domain → namechip.
 - Applied DNS → Cloudflare.

1.3 Deployment Evidence

- Frontend URL: <http://ictattendance.me>
- Backend API Endpoint: [http://ictattendance.me /api/upload](http://ictattendance.me/api/upload)
- Screenshots:
 - Live dashboard (React frontend).

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- Flask API returning Student Info and excel info.

```

< > ↺ 10.138.246.47:5000/upload-image
cyberpanel - Micros... Log In to Canvas https://my.pcloud.c... https://portal.azure... Inbox - bhargavpat... Top
Pretty-print
{
  "message": "\u2705 Upload successful and Excel updated.",
  "results": [
    "\u2705 Uploaded: 1234-1234/92310133004_Bhargav_1.png",
    "\u2705 Excel updated and uploaded to S3 root."
  ],
  "student": {
    "batch_name": "1234-1234",
    "bucket_name": "ict-attendance",
    "er_number": "92310133004",
    "name": "Bhargav"
  },
  "success": true
}

* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://10.138.246.47:5000
Press CTRL+C to quit
* Restarting with stat
* Starting Flask server on http://0.0.0.0:5000 ...
* Debugger is active!
* Debugger PIN: 128-163-947
10.138.246.47 - - [25/Sep/2025 23:29:25] "GET / HTTP/1.1" 200 -
10.138.246.47 - - [25/Sep/2025 23:29:25] "GET /static/style.css HTTP/1.1" 200 -
10.138.246.47 - - [25/Sep/2025 23:29:25] "GET /favicon.ico HTTP/1.1" 404 -
10.138.246.47 - - [25/Sep/2025 23:29:28] "GET /dashboard HTTP/1.1" 302 -
10.138.246.47 - - [25/Sep/2025 23:29:28] "GET / HTTP/1.1" 200 -
10.138.246.47 - - [25/Sep/2025 23:29:28] "GET /static/style.css HTTP/1.1" 304 -
10.138.246.47 - - [25/Sep/2025 23:29:34] "GET /dashboard HTTP/1.1" 302 -
10.138.246.47 - - [25/Sep/2025 23:29:34] "GET / HTTP/1.1" 200 -
10.138.246.47 - - [25/Sep/2025 23:29:34] "GET /static/style.css HTTP/1.1" 304 -
10.138.246.47 - - [25/Sep/2025 23:29:36] "POST / HTTP/1.1" 302 -
10.138.246.47 - - [25/Sep/2025 23:29:36] "GET /home HTTP/1.1" 200 -
10.138.246.47 - - [25/Sep/2025 23:29:36] "GET /static/style.css HTTP/1.1" 304 -
10.138.246.47 - - [25/Sep/2025 23:29:38] "POST /home HTTP/1.1" 302 -
10.138.246.47 - - [25/Sep/2025 23:29:38] "GET /action/upload HTTP/1.1" 200 -
10.138.246.47 - - [25/Sep/2025 23:29:38] "GET /static/style.css HTTP/1.1" 304 -
No face detected in 1234-1234/92310133004_Bhargav_1.png
Uploading to S3 - Bucket: ict-attendance, Key: students.xlsx
Excel synced successfully with 69 students.
10.138.246.47 - - [25/Sep/2025 23:30:08] "POST /upload-image HTTP/1.1" 200 -

```

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```
< > <
10.138.246.47:5000/api/reports
cyberpanel - Micros...
Log In to Canvas
https://my.pcloud...
https://portal.sure...
Inbox - bhargavpat...
Top 100 AWS Interv...
Free AI Writing, PDF...
Mind Luster 300.00...
Voilà AI Assistant, C...
AI-App
Movie
devops
Sound Infinity
pretty-print
{
  "batch": "-",
  "date": "2025-09-23T04:41:53+00:00",
  "fileName": "20250923_044152_2024-2028_A_COA.xlsx",
  "id": "reports/20250923_044152_2024-2028_A_COA.xlsx",
  "records": 68,
  "size": "8.0 KB",
  "status": "ready",
  "students": [],
  "subject": "-",
  "url": "https://ict-attendance.s3.ap-south-1.amazonaws.com/reports/20250923_044152_2024-2028_A_COA.xlsx"
},
{
  "batch": "-",
  "date": "2025-09-23T04:46:50+00:00",
  "fileName": "20250923_044649_2024-2028_A_COA.xlsx",
  "id": "reports/20250923_044649_2024-2028_A_COA.xlsx",
  "records": 68,
  "size": "8.0 KB",
  "status": "ready",
  "students": [],
  "subject": "-",
  "url": "https://ict-attendance.s3.ap-south-1.amazonaws.com/reports/20250923_044649_2024-2028_A_COA.xlsx"
},
{
  "batch": "-",
  "date": "2025-09-23T04:49:57+00:00",
  "fileName": "20250923_044956_2024-2028_A_DPGT.xlsx",
  "id": "reports/20250923_044956_2024-2028_A_DPGT.xlsx",
  "records": 68,
  "size": "8.0 KB",
  "status": "ready",
  "students": [],
  "subject": "-",
  "url": "https://ict-attendance.s3.ap-south-1.amazonaws.com/reports/20250923_044956_2024-2028_A_DPGT.xlsx"
},
{
  "batch": "-",
  "date": "2025-09-23T04:56:37+00:00",
  "fileName": "20250923_045636_2024-2028_A_OS.xlsx",
  "id": "reports/20250923_045636_2024-2028_A_OS.xlsx",
  "records": 68,
  "size": "8.0 KB",
  "status": "ready",
  "students": [],
  "subject": "-",
  "url": "https://ict-attendance.s3.ap-south-1.amazonaws.com/reports/20250923_045636_2024-2028_A_OS.xlsx"
},
{
  "batch": "-",
  "date": "2025-09-23T05:12:17+00:00",
  "fileName": "20250923_051216_2024-2028_A_CN.xlsx",
  "id": "reports/20250923_051216_2024-2028_A_CN.xlsx",
  "records": 68,
  "size": "8.0 KB",
  "status": "ready",
  "students": [],
  "subject": "-",
  "url": "https://ict-attendance.s3.ap-south-1.amazonaws.com/reports/20250923_051216_2024-2028_A_CN.xlsx"
},
}
```


3. Maintenance Plan

3.1 Regular Maintenance Tasks

- **Weekly:**
 - Backup DynamoDB data to S3.
 - Review CloudWatch error logs.
- **Monthly:**
 - Security patching of Flask dependencies (requirements.txt).
 - Domain validation check.
- **Quarterly:**
 - Load testing with JMeter to ensure performance under peak load.
 - Review IAM roles and policies for least-privilege compliance.

3.2 Potential Issues & Mitigation

Potential Issue	Impact	Mitigation
Low-light or blurry classroom images	In blurry img recognition accuracy (~50%)	Faculty guidelines + pre-processing (histogram equalization in future version)
Scalability under 100+ concurrent uploads	High latency	Auto-scaling EC2 with Elastic Load Balancer
Dependency vulnerabilities	Security risks	Monthly pip-audit and patching

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Potential Issue	Impact	Mitigation
VM failure	Service downtime	AWS Elastic Beanstalk auto-redployment + backups

4. Challenges Faced During Deployment

Challenge	Resolution
IAM permission errors (S3 + Rekognition access denied)	Configured custom IAM policy with minimum required privileges
CORS issues between React frontend and Flask API	Added CORS headers in Flask + CloudFront distribution rules
Domain DNS not applying initially	Re-issued certificate and re-linked CloudFront
Load balancing delays during stress testing	Enabled auto-scaling for EC2 instances