FRANKFURT
UNIVERSITY
OF APPLIED SCIENCES

Cloud Computing
Final Project Presentation
Under Guidance of Prof. Dr. Christian Baun

Jatin // Kaival // Sameer // Santosh // Usman Tariq

Winter term 22/23
09/02/2023

1. Need a system to detect rat in the surroundings
2. System should should use ML/AI to detect rat
3. System should perform Edge computing and only send processed data
4. System should use Kubernetes cluster to store, access, view detections
5. System should notify user via telegram on rat detection

Solution Architecture
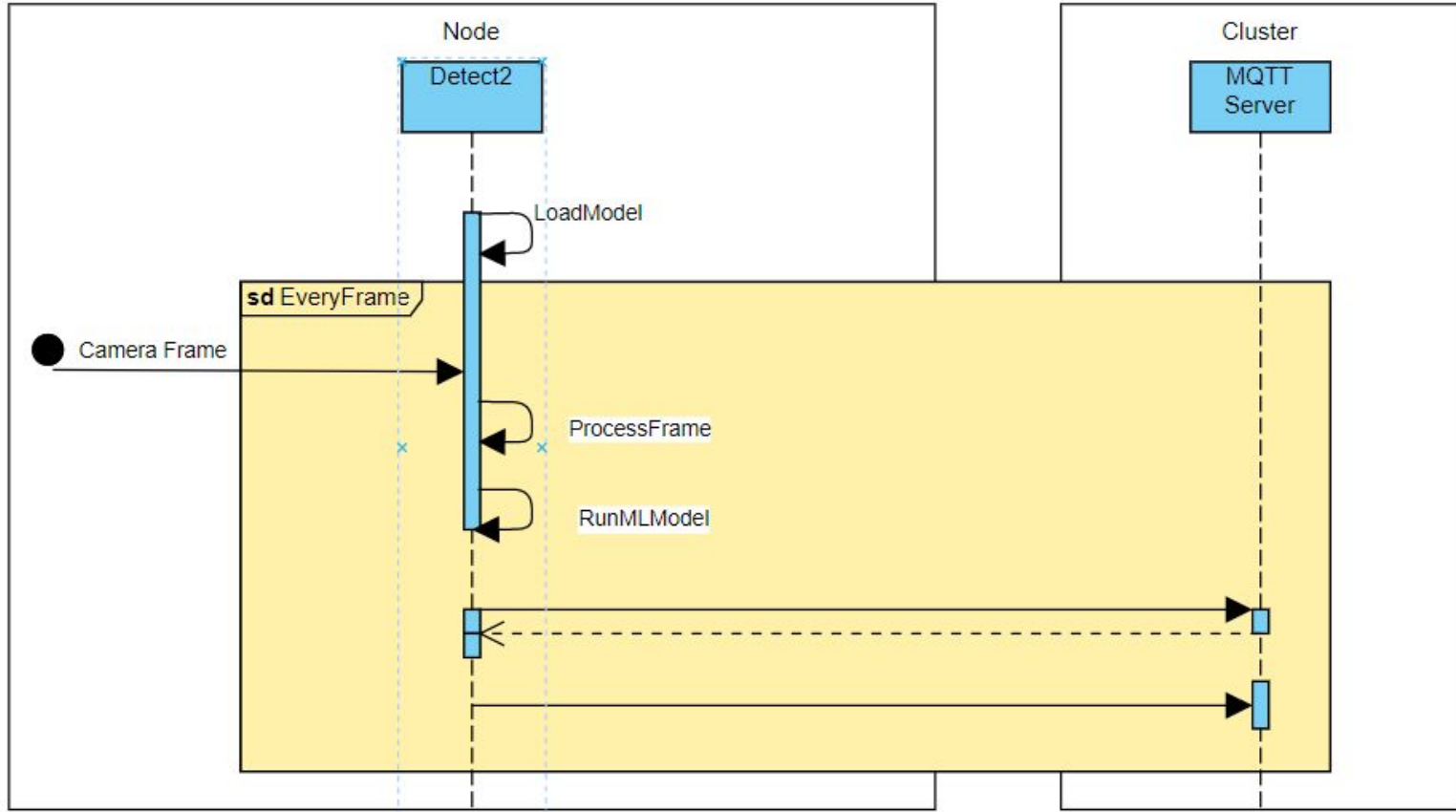
Sequence Diagram

Communication API
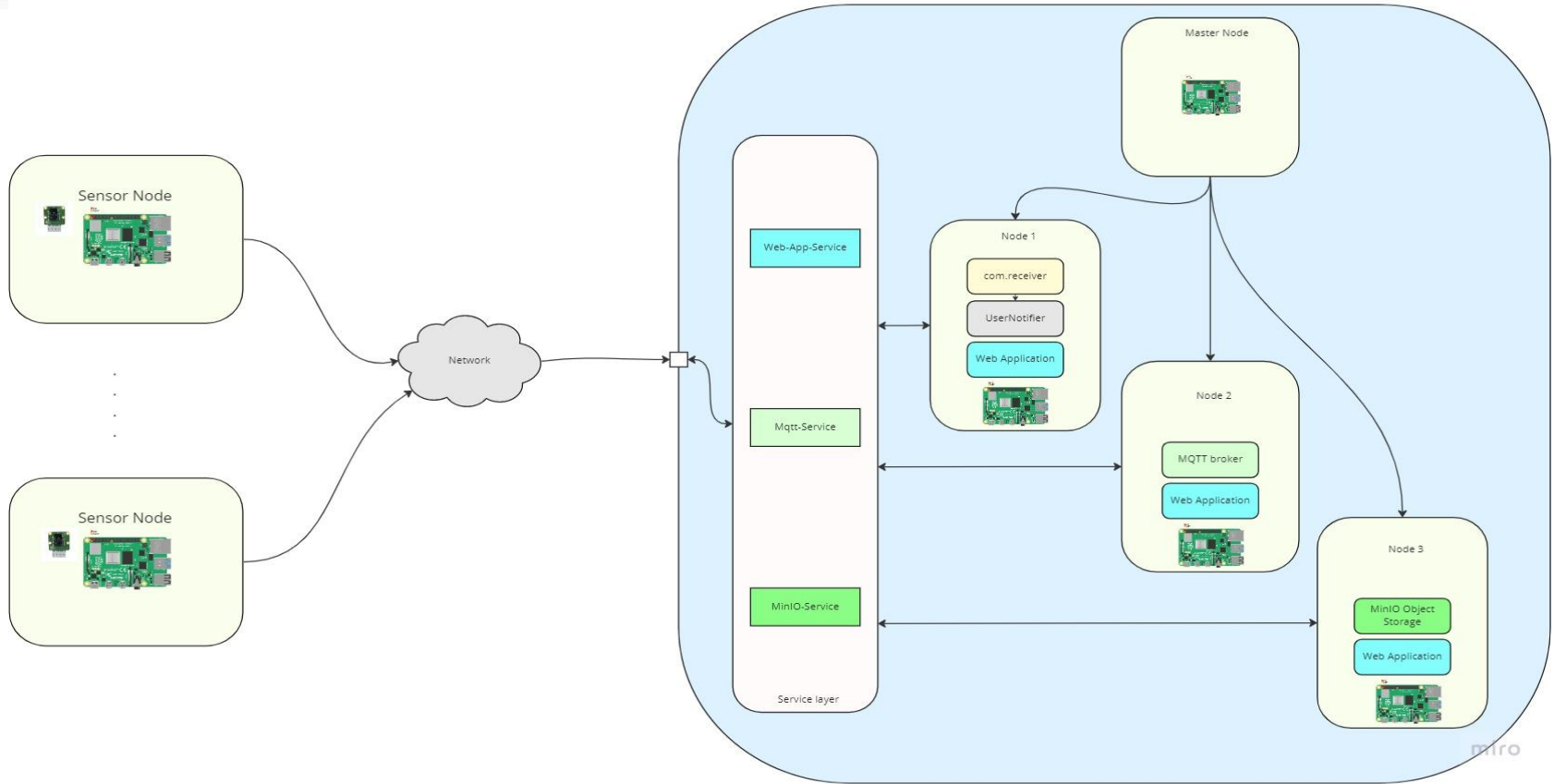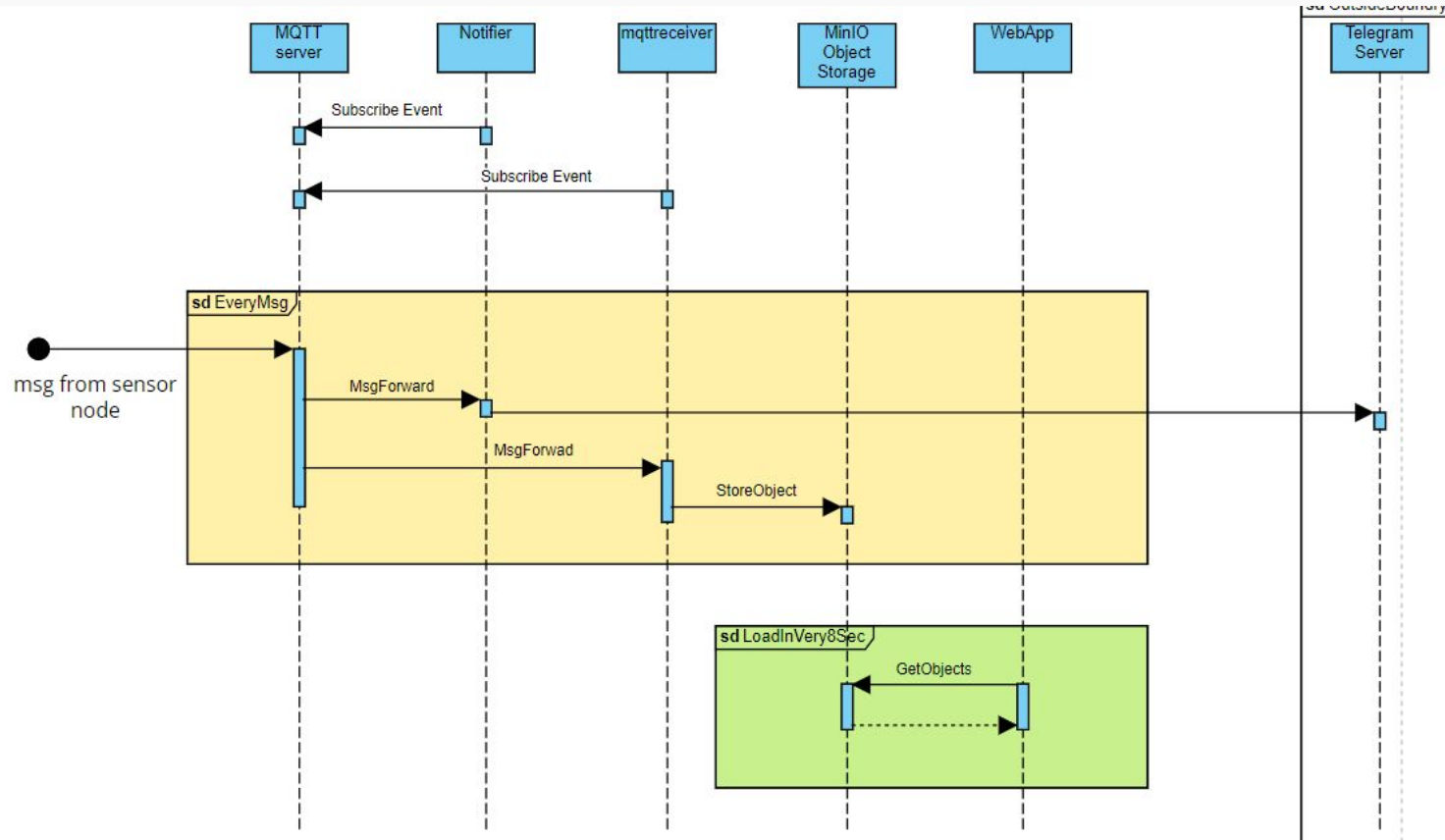
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        "match_parent": "0.608",
        "img_content": "/9j/4AAQScndbsjjsdnodsnonsmpcndjksmpamp……….."
}

Sequence Diagram

Technologies and Tools Used

Sensor Node:

YOLOv5
Python
PyTorch

Cluster:

k3s Kubernetes
Docker
MinIO Object Storage
Mosquitto MQTT Server
Python
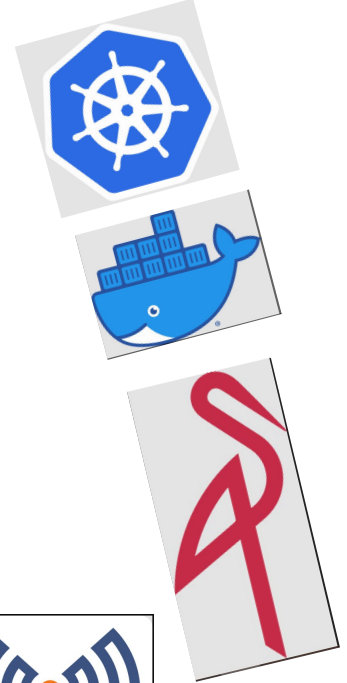
Sensor Node ML/AI Application

TYPE	TITLE	PROJECT	STARTED	UPDATED
Training	yolov5s_results	YOLOv5	Nov 15 2022 23:35	Nov 16 2022 0:50
Training	test1	tensorflow-lite-expriments	Nov 10 2022 2:45	Nov 10 2022 6:20
Training	yolov5s_results	YOLOv5	Nov 10 2022 1:20	Nov 10 2022 1:34
Training	yolov5s_ModelMatric_DSv6	YOLOv5	Nov 10 2022 0:46	Nov 10 2022 0:53

RECENT EXPERIMENTS

Sensor Node ML/AI Application
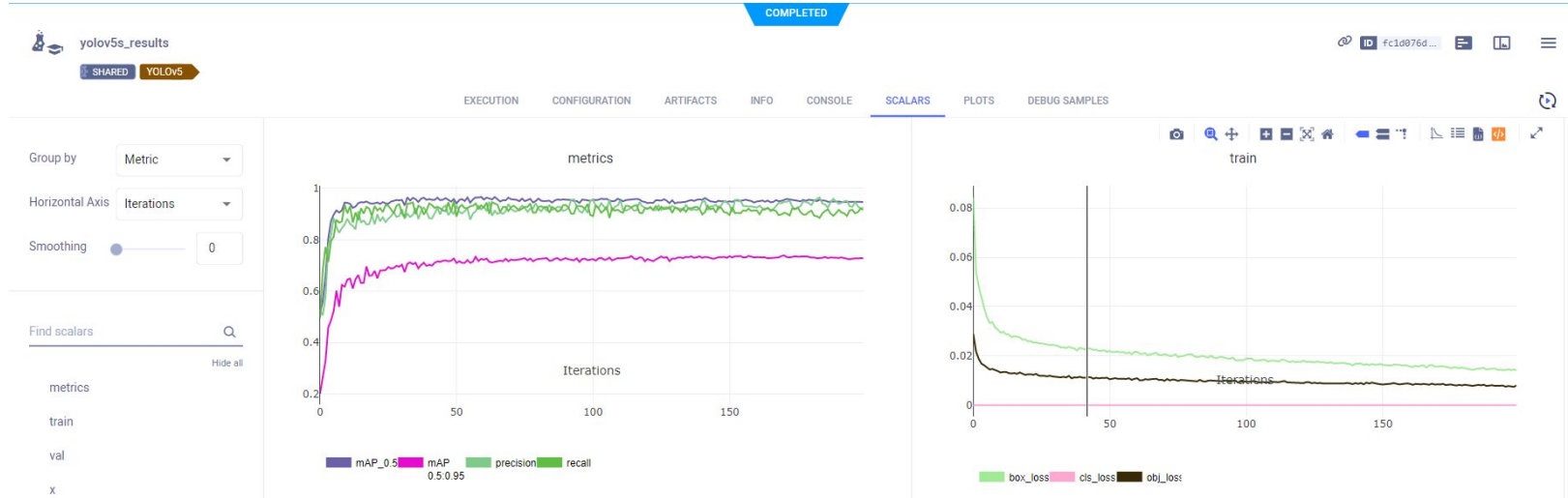
Sensor Node ML/AI Application
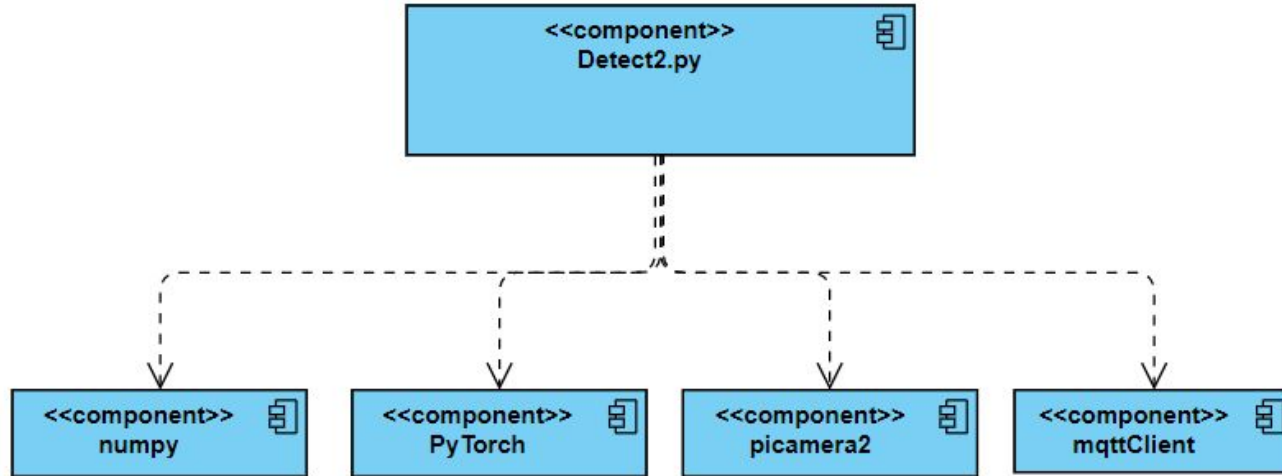
- Node Detection application loads the yolo model weights
- runs the detection on captured camera frames
- In case of rat detected, it generates the bounding boxes, and encodes the images binary information into base64 and generates utf-8 string
- App connects to Mqtt broker and publishes the message on topic detect/rat

mqtt Receiver App

- sensor node association with MQTT broker with specific Topic (detect/rat)
- prepare Json data and convert image into json string
- publish json file on broker
- receiver receive json file with topic
- connect with minio and store json file to container

mqtt Receiver App

mqtt Receiver App

👁 **Preview - 533b4ad0a7294f0b8eb87ef3d0e8f20e.json** ✕

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14

MQTT

WebApp

- Python
- Jinja Templating
- UI libraries used: Bootstrap
- Minio
- Javascript

WebApp

RAT DETECTION SYSTEM

Show [10 ⌄] entries

Search: [_____]

Image ▲	Time	Match	Image
IMG_5981.jfif	15-01-2023 13:10:23	64	View Image
IMG_5982.jfif	15-01-2023 13:12:02	64	View Image
IMG_5983.jfif	15-01-2023 13:12:03	64	View Image
IMG_5984.jfif	15-01-2023 13:12:04	64	View Image
IMG_5985.jfif	15-01-2023 13:12:05	64	View Image

Showing 1 to 5 of 5 entries

◄ Previous   Next ►

Features

Image Store
Image Comparence
Current Date & Time
Caculate Comparison Result

Under the Guidance of

Prof. Dr. Christian Baun

Team Members

Sameer Soni
Jatinkumar Nakrani
Kaival Akbari
Usman Tariq
Santosh

WebApp

Notifier App

- Notifier application is a custom application which sends detection pictures directly to Telegram bot.
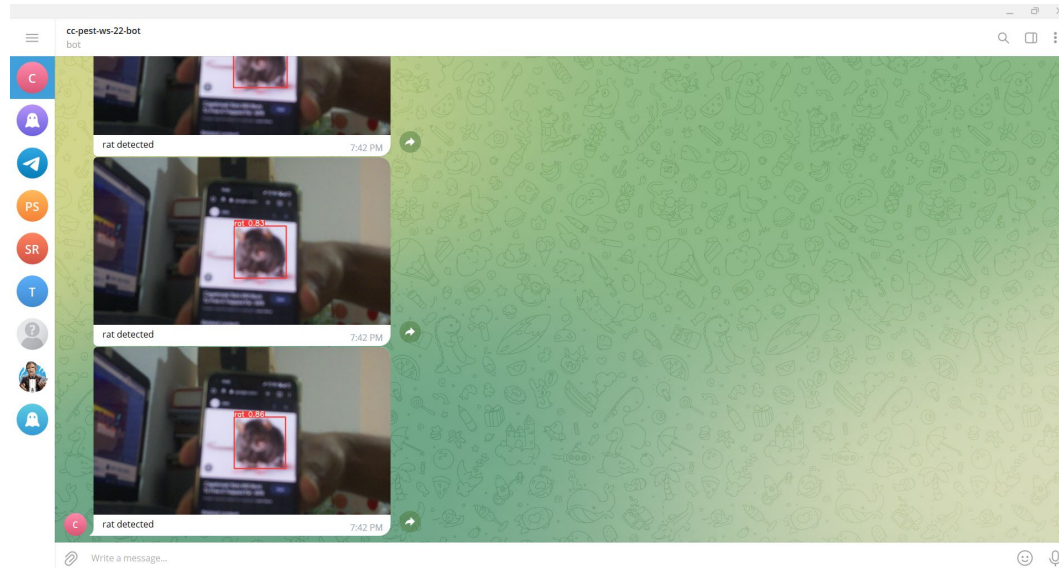
Proposed Solution

| dockingsameer ▼ | Search by repository name 🔍 | All Content ▼ | | **Create repository** |

dockingsameer / webappimage
Contains: Image | Last pushed: 2 days ago
⊗ Not Scanned   ☆ 0   ⬇ 34   🌐 Public

dockingsameer / mqttreceiverimage
Contains: Image | Last pushed: 2 days ago
⊗ Not Scanned   ☆ 0   ⬇ 13   🌐 Public

dockingsameer / notifierappimage
Contains: Image | Last pushed: 13 days ago
⊗ Not Scanned   ☆ 0   ⬇ 14   🌐 Public

Usman // Jatin // Kewal // Santosh // Sameer

Demo Time!

References

1. https://datatables.net/
2. https://themes.getbootstrap.com/
3. https://jinja.palletsprojects.com/en/3.1.x/
4. https://app.clear.ml/projects/0d968b51d41e46159c2993cb616054cd/experiments/fc1d076d5a6949 70aed3728334e3c6d2/output/execution
5. https://min.io/docs/minio/linux/developers/python/minio-py.html

Questions?