PROMISING FIELDS OF APPLICATION FOR A.I. AND CUTTING EDGE TECHNOLOGIES IN PORT AND LOGISTICS

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https://i-sense.iccs.gr/

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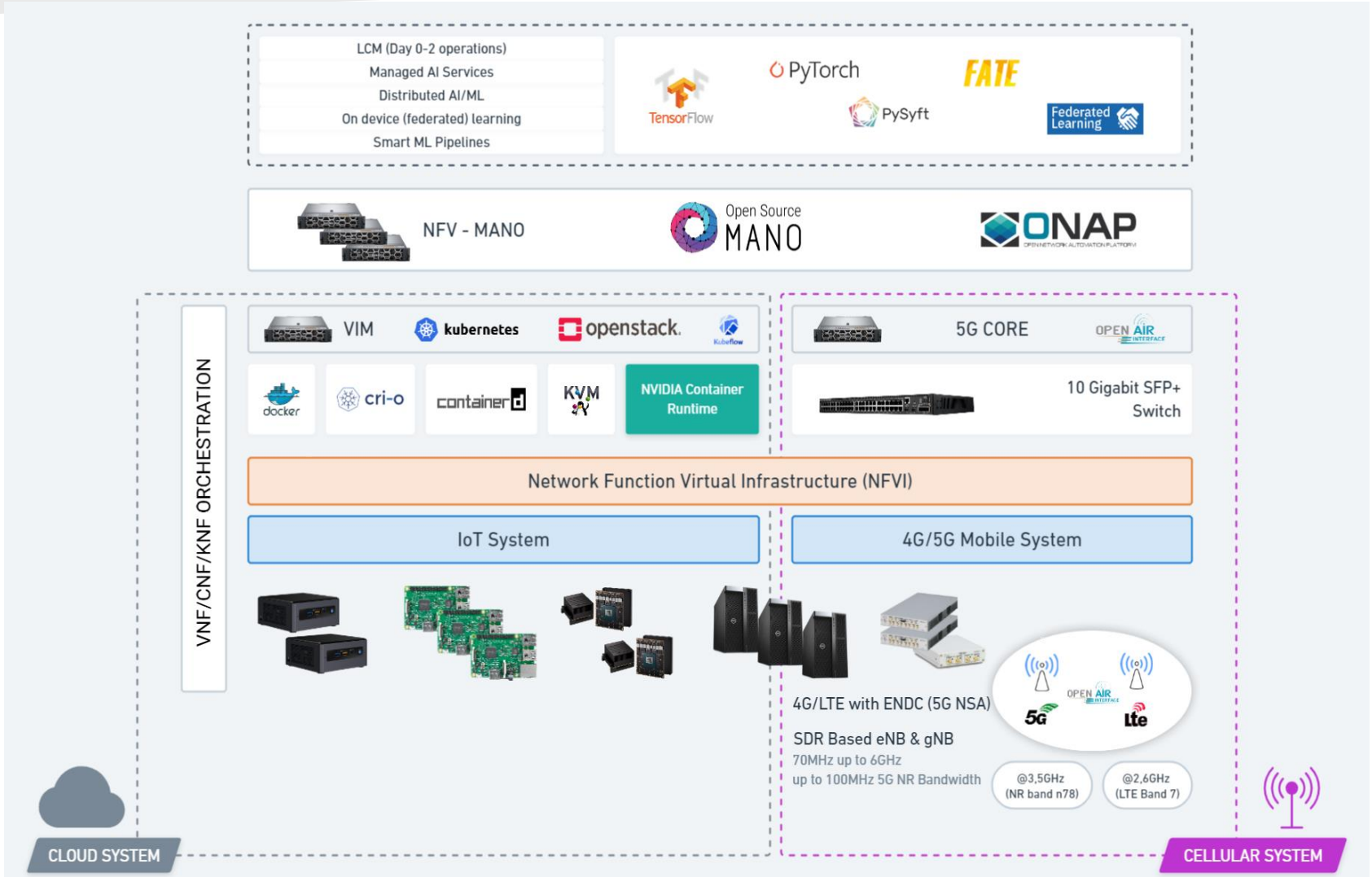
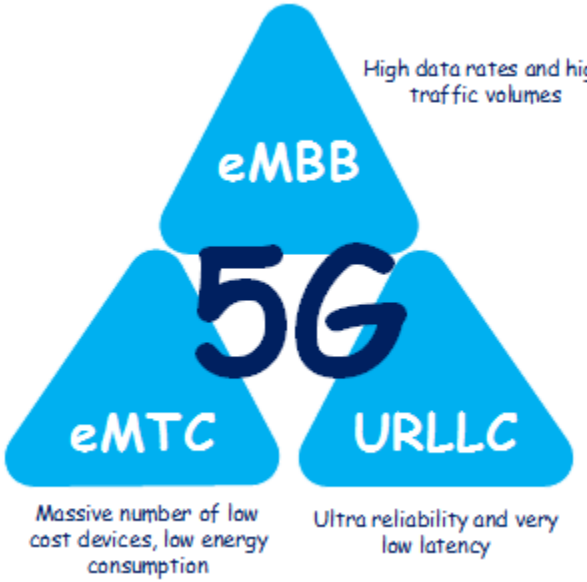
OUTLINE

- ICCS 5G Testbed
  - Technologies used for AI/ML and Edge Computing
- Problem solving using AI/ML
  - Different deployment options (Cloud/Edge/On-Device)
- Edge Computing and Applications in Port Operations
  - Indicative Use Cases
  - EU Funded project -- 5G and Edge Computing

ICCS 5G Testbed – Edge computing Technologies and service Orchestration

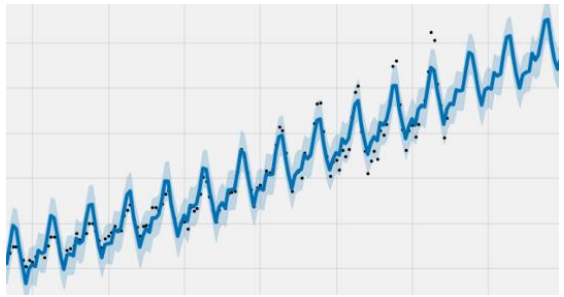




PROBLEM SOLVING USING AI/ML

Regression tasks

Time-series analysis/forecasting

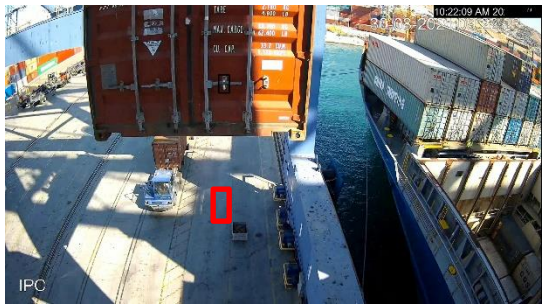


Big Data & Analytics

Scheduling & Process Optimization

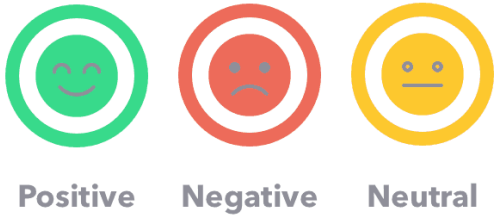
Classification tasks

Object recognition



Automatic speech recognition (ASR)

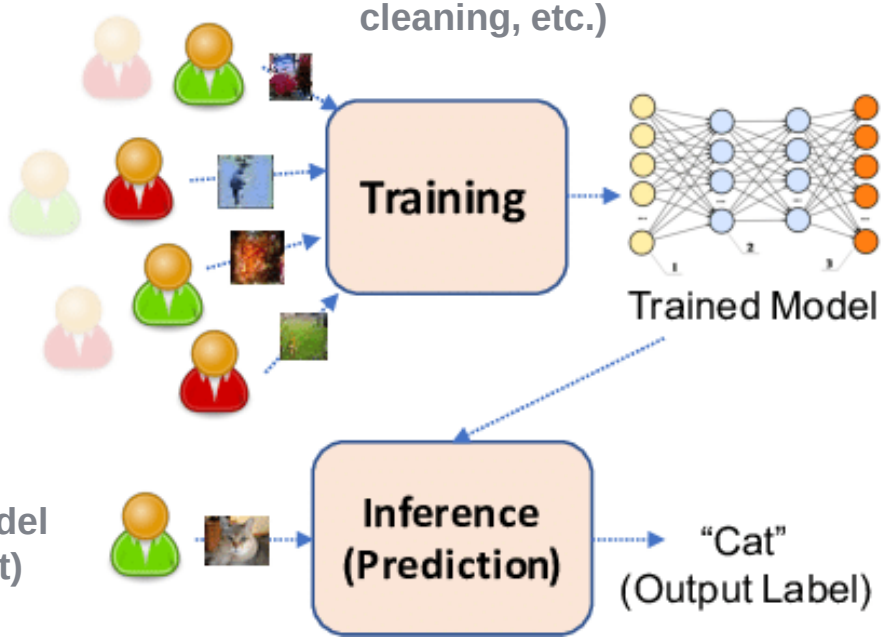
Stress/tiredness Analysis



BUT HOW WE GET TO PROBLEM SOLVING

2. Data preprocessing (incl. labelling, normalization, augmentation, splitting, cleaning, etc.)

1. Data generation/acquisition from various sources

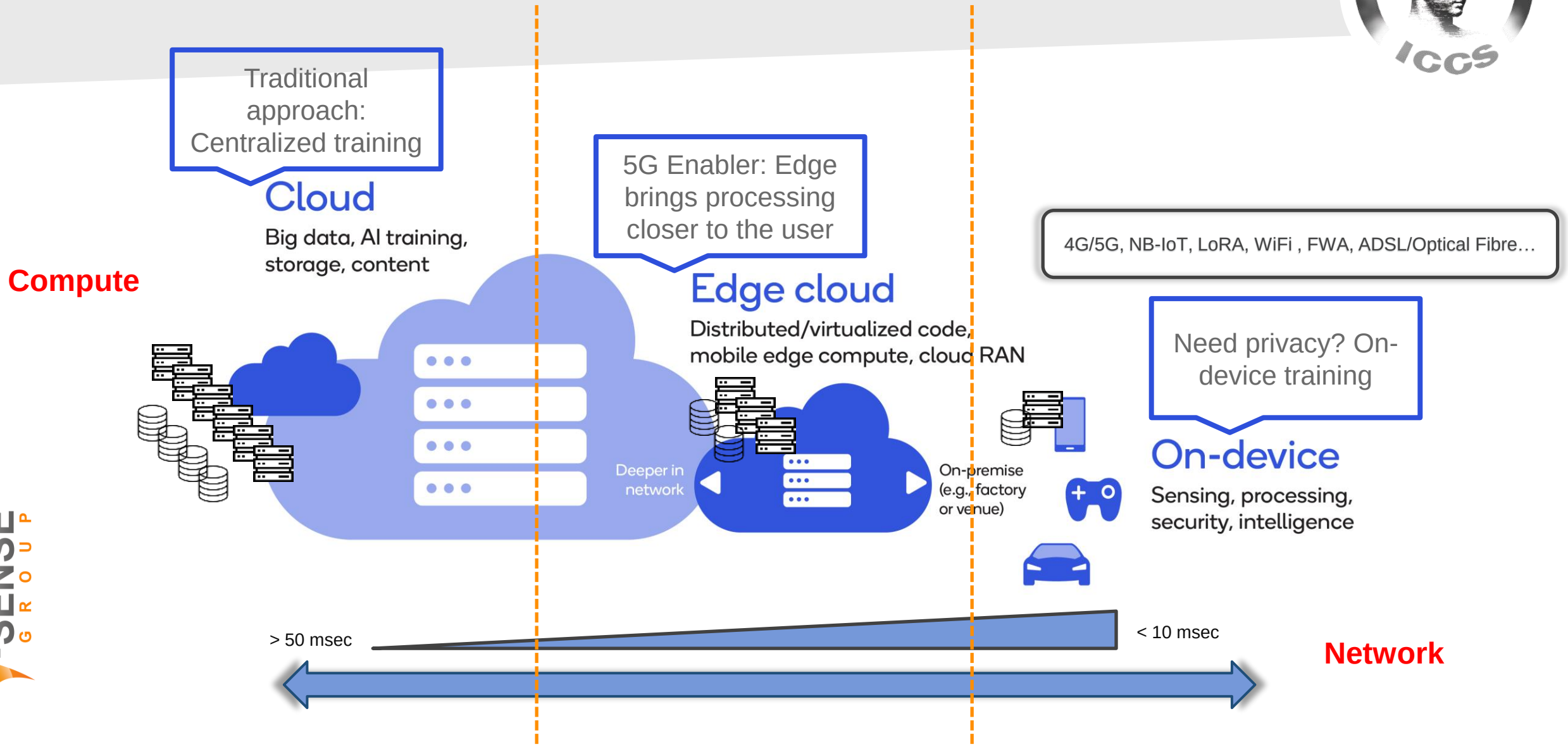


3. ML model training (processing-heavy task)

4. Obtain the trained ML model and to infer on (e.g. predict) newly acquired data

5. Inference & Output

WHERE TO EXECUTE BUT ALSO TRAIN MODELS



PORTS AND GROWTH

- Majority of cargo transported by sea
- Increasingly high demand of cargo vessels
- Advanced vessels (increased length/width, higher capacity)

Ports / Logistics hubs - Need for:

- Technological trends adoption
- Reduction of loading/unloading times and total storage duration
- Respect environmental regulations – minimization of carbon footprint emissions

AUTOMOTIVE: COLLECTIVE ENVIRONMENT PERCEPTION

Edge Computing functionality / features

- Real-time exchange of truck sensor information
- Perception beyond local sensor range
- Aggregation, fusion, delivery of information

Applications

- Collision avoidance
- Automated manoeuvres
  - In confined work space of the port hosting large number of yard (and external) trucks
- Coordination for vessel load/unload

USE CASES

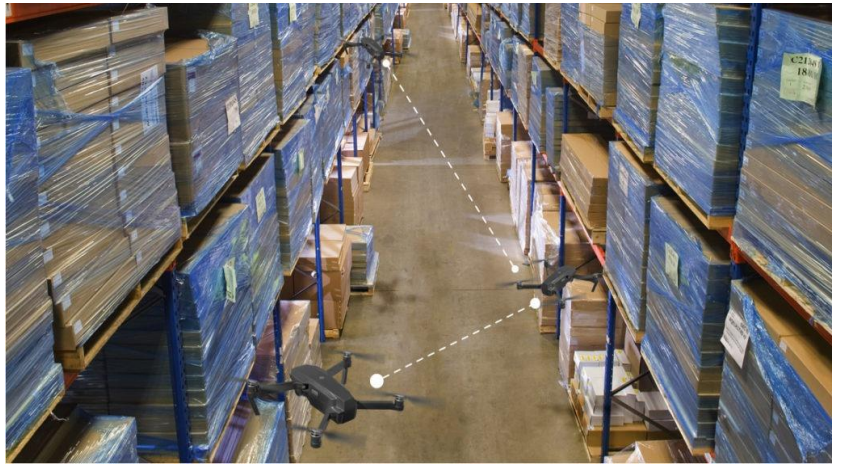
WAREHOUSE PORT OPERATIONS

Edge Computing functionality / features

- Real-time collection of component sensor data
- Real-time video analytics
- Closing the control loop: decision making & actuation
- Privacy/Security: non-public deployments

Applications

- Factory/warehouse automation e.g., robotics w/ computer vision
- HMIs – AR/VR – Digital Twins
- HD Maps



EU Funded Projects -- Ports and logistics use cases

- 5G-LOGINNOV (https://5g-loginnov.eu/)
  - 5G NSA/SA, Edge Computing, MEC, Logistics supply chain, mission critical coms, CCAM
- 5G-VITAL (https://www.vital5g.eu/)
  - Automated Vessel Transport (DT, AI/ML), Warehouse logistics, 5G IoT data connected navigation
- 5G-BLUEPRINT (https://www.5gblueprint.eu/)
  - tele-operated and tele-monitored transport on roadways and waterways (5G, AI, logistics supply chain
- 5G-SOLUTIONS (https://5gsolutionsproject.eu/)
  - Autonomous assets & logistics for smart port; Port safety: monitor & detect irregular sounds

THANK YOU !

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