Laila EL Moujtahid, MSc

Senior Product Manager

Experience:
Aeronautics, simulation, data science and AI

air

AI Redefined

Artificial intelligence

Human-machine interaction

CONVERA

Mila masa

Google

cmlabs

ACTIVISION BLIZZARD CAE

EA

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Inria VIGILANT

UBISOFT OPAL-RT

matrox

BioWare

A day in the life of an airline operator

Operating complex processes and systems remotely

Data overload
-**Time consuming** to respond to complex, critical or unusual events

High cognitive load
-High mental fatigue, stress, errors, and **decreased performance**

Outdated data
-Outdated data, or sometimes incomplete/limited, makes it difficult to **trust quality** of data source

Inputting information
-Multitasking results in **expensive mistakes**

Critical decisions
-Inaccurate **manual inputs** from multiple sources and users simultaneously in real time

AI assistant as a solution ?

AI Assistants lack context & trust: act like stochastic parrots

Data overload
-Time consuming to respond to complex, critical or unusual events

Recommendations & visualization

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Automating repetitive tasks and large multi-tasks

Critical decisions
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Lack of trust
-AI assistant operates as "black boxes," with no transparency with limited trust

AI Assistant Solution

AI apprentice as a solution ?

AI Apprentice helps operator prioritize inputs to make best decisions decisions

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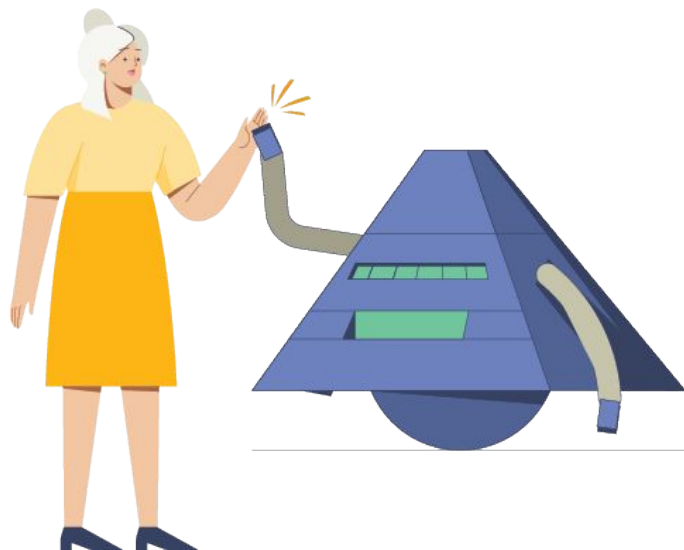
Bidirectional Recommendations & visualization

Dynamic assistance through decision making on lower impact elements to free human cognitive load

Real-time up to date trusted data (Connector)

Automating repetitive tasks and large multi-tasks

Human in control by having option to switch from full to partial control

On-the-job-training AI trained by operators, on building a mental model by sharing experience, collaboration and increase trust
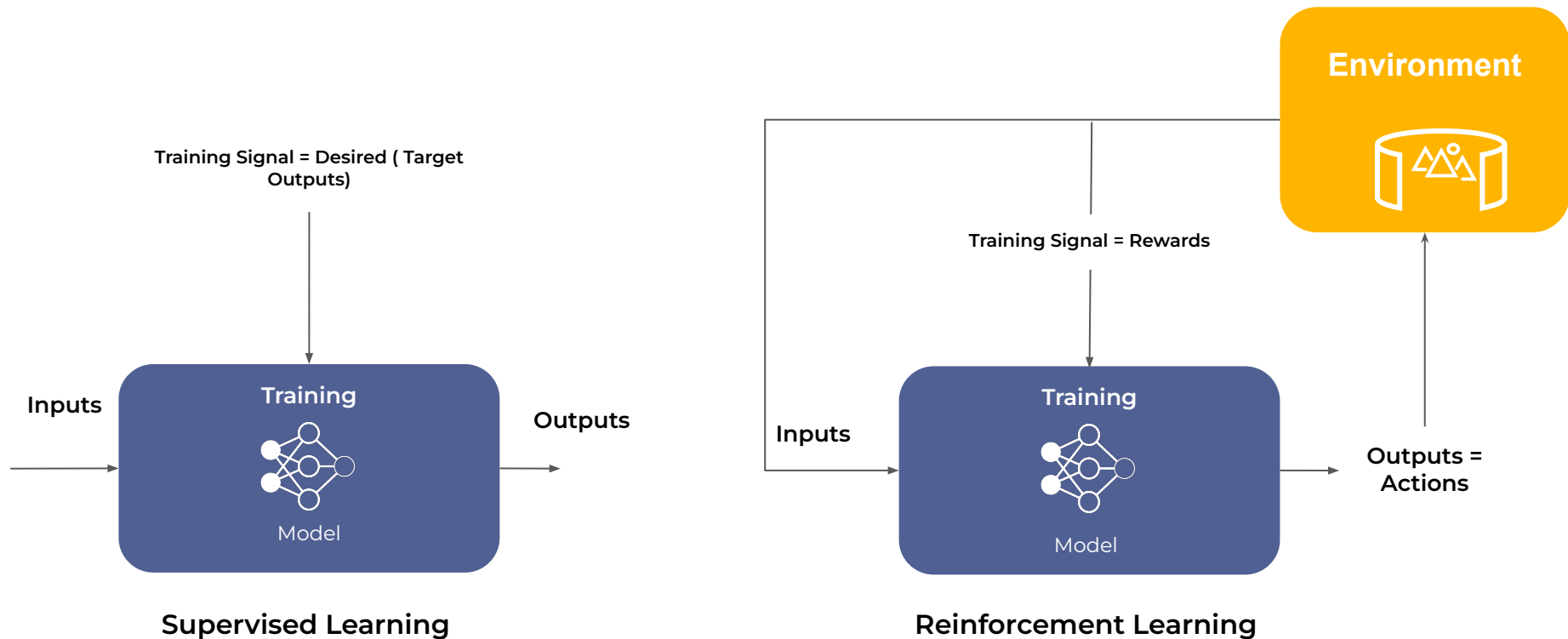
air AI Apprentice Solution

Achieve Human + AI Synergy
Intelligence ecosystems continuously learning through shared experiences
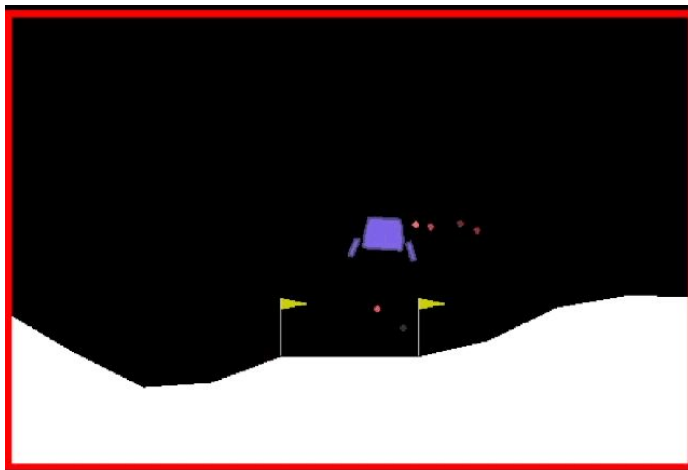
How is this possible?

Reinforcement Learning, a very short aside

Discovering instead of reproducing

AI apprentice: Dual control

Interactive human demonstrations to accelerate exploration

Superhuman (even optimal) performances

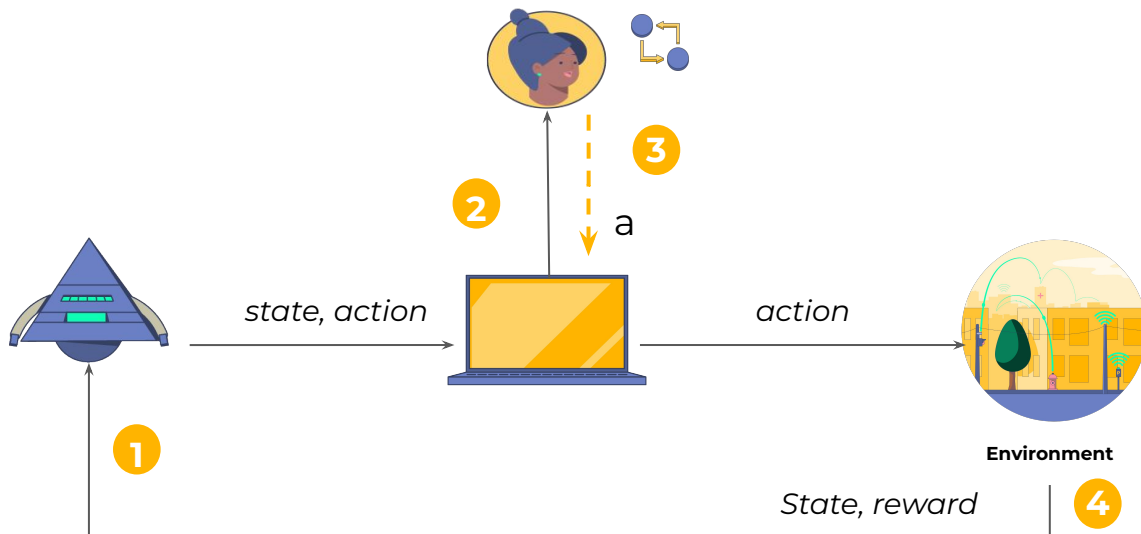**Indirect alignment**

No additional human skills required

Requires collaborative UX during training and operation

Powered by

cogment

AI apprentice: Dual Control

Interactive human demonstrations to accelerate exploration

state, action

action

a

Environment

State, reward

1 Agent sees state s and takes an action a

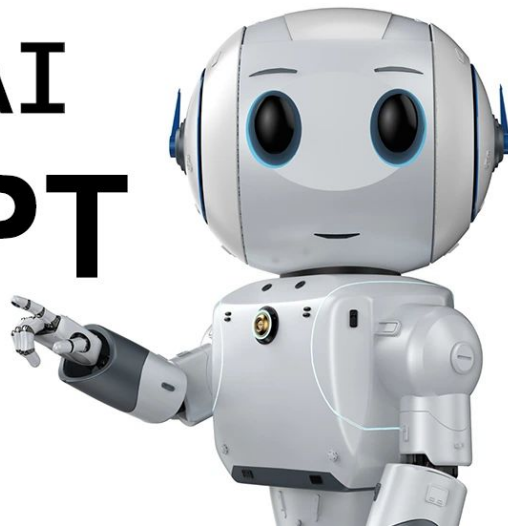2 Human observes the state; and the action taken by the agent

3 Human can choose to override the action taken by the agent and send their own action (HIL)

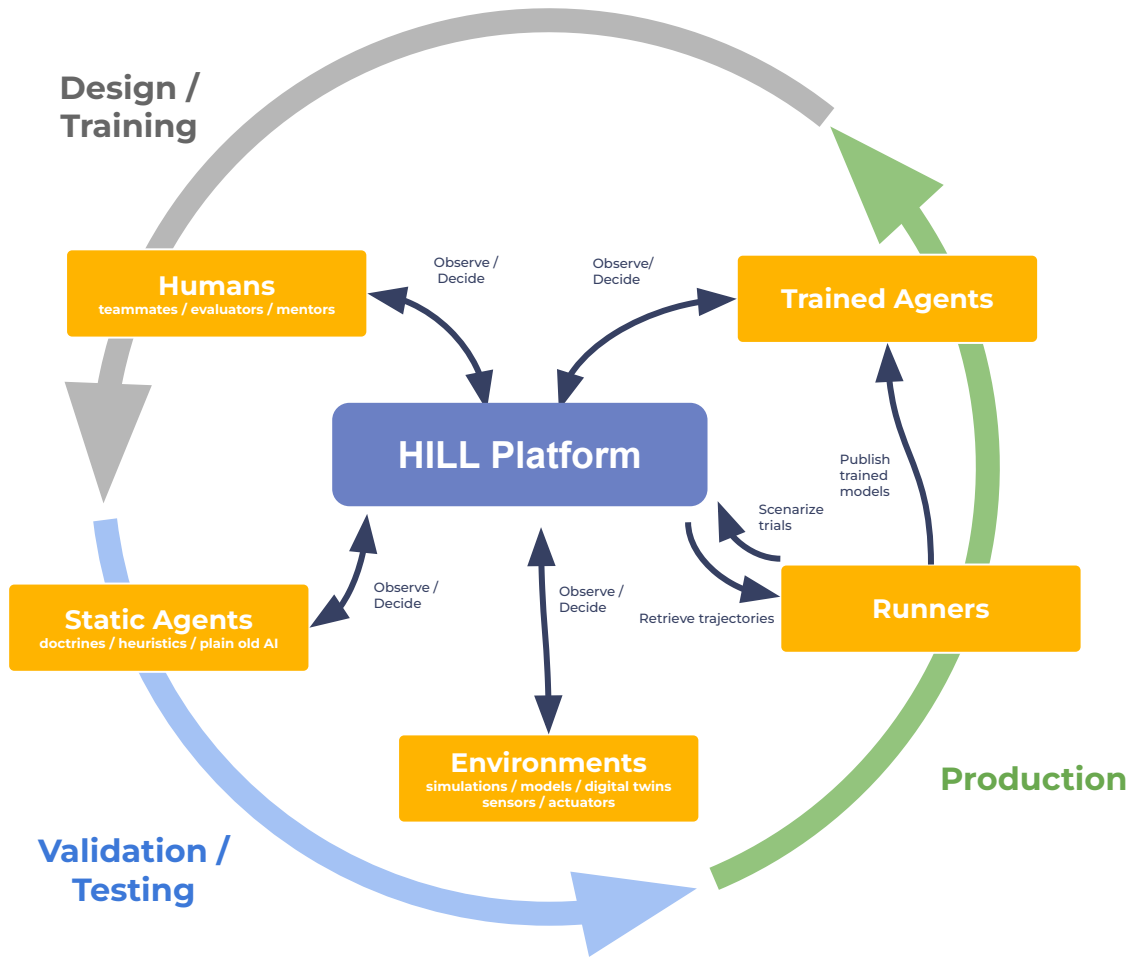4 Environment gives the reward and the next state (S)

Reinforcement learning from human feedback (RLHF)
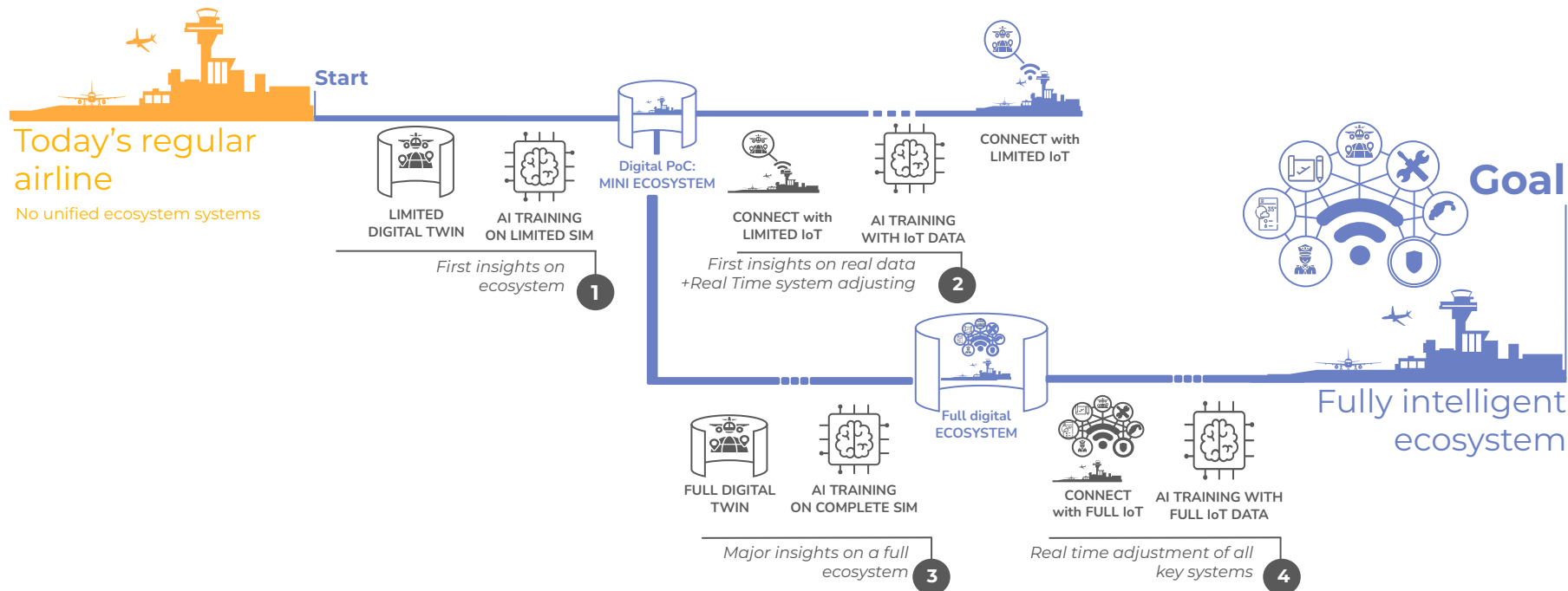
Intelligence Ecosystems

Scalable approaches in both flexible architecture and human-in-the-loop learning enable to manage multiple environments, multiple intelligences from humans to AI and multiple stage of development together.

How does an AI apprentice work ?

AI & human on the job training journey

From sim or digital twin to real world deployment

Today's regular airline

No unified ecosystem systems

Start

LIMITED DIGITAL TWIN

AI TRAINING ON LIMITED SIM

First insights on ecosystem **1**

Digital PoC: MINI ECOSYSTEM

CONNECT with LIMITED IoT

AI TRAINING WITH IoT DATA

CONNECT with LIMITED IoT

First insights on real data +Real Time system adjusting **2**

FULL DIGITAL TWIN

AI TRAINING ON COMPLETE SIM

Full digital ECOSYSTEM

CONNECT with FULL IoT

AI TRAINING WITH FULL IoT DATA

Major insights on a full ecosystem **3**

Real time adjustment of all key systems **4**

Goal

Fully intelligent ecosystem

Real World Use cases

Adaptive Learning for simulation training

AI for software based training for improved, more practical, more personalized and more scalable training
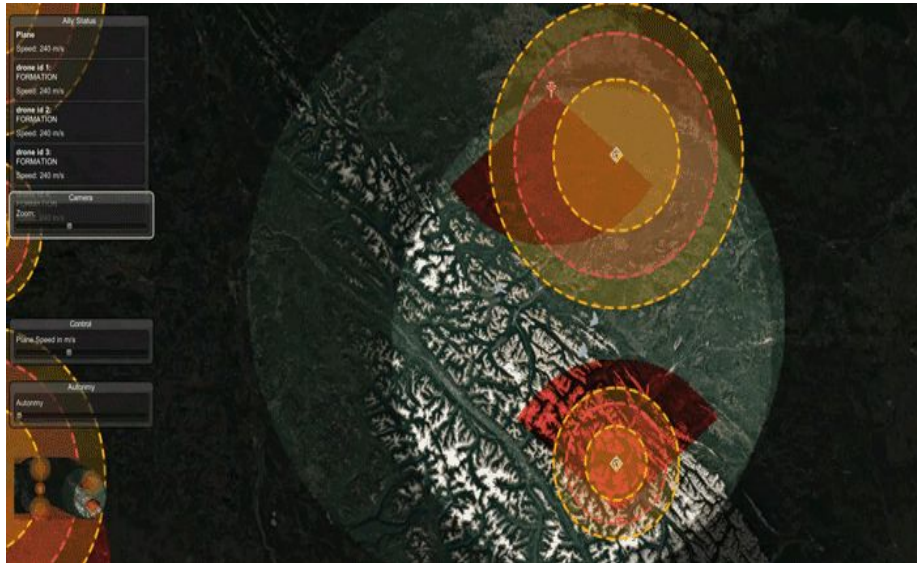
A few current examples:
- eVTOL pilot training
- Fixed-wing plane pilot training
- Air traffic controller training
- Heavy duty operator training

Human-Machine teaming

Allowing a fleet or group composed of autonomous platforms and humans to act as a cohesive unit, and take the best out of AI and humans respectively.

Drone Swarm Escort

- Man and AI apprentices teaming in operating autonomous systems in complex environment
- Man and AI collaboration through various tactical scenarios to scale and augment human judgment to deal with volatile situation in real time

Renewable energy grid optimization

As energy needs continue to grow, so does the complexity of managing the energy grid. This initiative is designed to empower energy operator managers with tools and knowledge they need to optimize business revenue by making critical decisions in real-time.
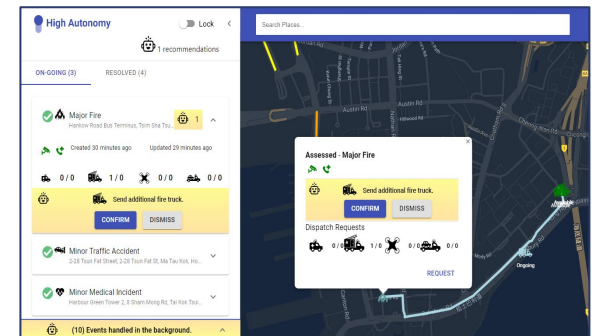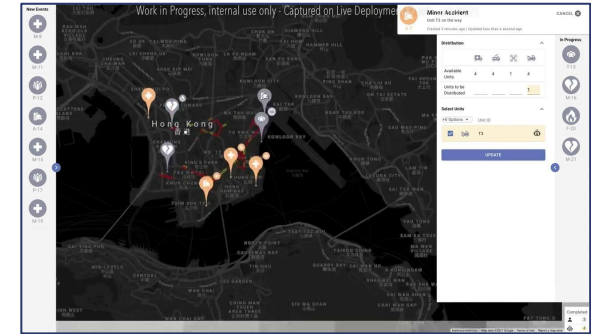

Objective: Understand local environmental and financial factors to predict optimal revenue opportunities for solar farms segment :

- Access to a variety of data sources enriched with the recommendations to maximize revenue
- Informed decisions on when to dispatch and store energy in batteries
- Enable operators to manage multiple assets at scale with trustworthy controls (human/AI workloads)

Emergency service dispatch

In order to better deal with different types of emergencies, a "Recommender" AI agent supports a human 911 operator with suggestions of optimized dispatches of various First Responder Units (fire trucks, ambulances, tow trucks). The Recommender can also dynamically change autonomy to face work load and keep human operators focused on the human part of their work :

- Access to a variety of data sources to enriched the diagnostics & assessment of the situation to maximize use of resource
- Informed decisions on when to dispatch a calls to operational crew
- Enable 911 operator to quickly assess the severity of a situation and prioritize calls with trustworthy controls (human/AI workloads)
- Enable 911 operator to manage multi crew scheduling and location

Potential applications for aerospace

Satellite inspection

When data scarcity is so high that even synthetic data is not enough to train an AI, HIL plateform can solve this problem with an active learning process between the AI and human experts.

Partial automation of satellite operations

High risks and costs can dissuade us from taking advantage of the full automation potential of satellite tasks. Pairing an AI apprentice with operators can deliver the best of both worlds: efficient automation and the security that comes with constant human supervision.

Moving from physical models to digital twins to reality

The unified multi-environment orchestration of HIL platforms can reduce the gaps between today's static simulations and reality. Physics-based models used today can now be supplemented with learning agents trained on both satellite telemetry and human expertise, in order to accurately simulate satellite's changes during its lifespan. Therefore, the same agents can be used between digital twin environments and real ones.

Digital twins can also prepare AI assistants for several projects

One example could be a lunar base project, where the AI apprentice could help with life support, health, and performance of the astronauts, energy management, etc.

Bidirectionality & lifelong learning

are needed to increase productivity and trust

to account for drift

AI apprentices are not a theoretical or research subject

they are real and they are

solving real world complex problems

AI Redefined:
Humans and AI elevating each other

Laila EL Moujtahid
laila@ai-r.com

 https://www.linkedin.com/in/laila-el-moujtahid-87793273/

ai-r.com
cogment.ai
github.com/cogment