Shell .ai
Futures Summit

Overview

The Changemakers of Tomorrow, organised by Shell at the Shell Technology Center Bangalore, is a three-day event that unites innovators, entrepreneurs, and industry leaders. Aligned with Shell's strategic vision, this immersive experience aims to foster collaboration, inspire innovation, and drive progress in the energy sector. Through workshops, seminars, and presentations, participants will get an opportunity to exchange ideas, showcase their knowledge, and build lasting relationships. The event embodies Shell's commitment to shaping the future of energy through collaboration, innovation, and celebrating remarkable achievements.

One part of the Changemakers of Tomorrow is the Shell.ai Futures Summit — a platform created to inspire, showcase and accelerate collaborations with the start-up ecosystem. The Start-up Conclave consists of several events, including E4 demo day, networking events, start-up showcase and the Shell.ai startup a pitching competition. The Shell.ai startup pitching competition aims to bring the start-up ecosystem and Shell together to accelerate and explore opportunities to learn and work jointly on someof the world's toughest energy challenges.

During the Shell.ai start-up pitching competition, start-ups will pitch their solutions to one of the challenges described in the problem statements below. The winning start-up will be awarded a prize of $5000 and may be awarded a collaboration opportunity with Shell.

Objective

Your task is to demonstrate how your start-up is well-positioned to address this challenge. Following the initial submissions, a virtual jury will shortlist the best start-ups will pitch their start-up live at the Changemakers of Tomorrow Start-up conclave at the Shell Technology Centre in Bangalore, Wednesday October 11.

Problem Statements:

- Transport fleet scheduling for multi-product, inventory-based supply chain
- Biodiversity assessment toolkit
- Predictive analysis of oil and gas production facilities (plants)

Problem Statement 1

Transport fleet scheduling for multi-product, inventory-based supply chain.

Background

- Given a maritime supply chain network, a supply plan for products of varying type to flow in the network to meet customer demand in a given time horizon, and a fleet of heterogeneous ships, find the optimal route and schedule for each ship in order to realise the plan, maximising vessel utilisation and minimising cost.
- Inventory levels at each node (plants, depots and customers) in the network must be maintained within allowed levels. If the supply plan cannot be met by the fleet of ships in the given time horizon, vessels may be chartered from 3rd parties. Partial unloading of vessels may occur at any node. A vessel may have multiple compartments for different products to carry.

Scope

- Provide an optimum supply chain delivery schedule for a fleet of vessels to deliver products from various production assets to customers whilst considering uncertainties in production profiles and voyage durations.
- Create optimal, value driven dynamic decision-making model for schedule adjustment based on current schedule, inventory levels, vessel positions and production and demand forecasts. Dynamic decision making tool to be linked to real-time data to optimize supply chain.
- Explain to user why decisions are proposed given the current and expected supply chain conditions.

Out of scope

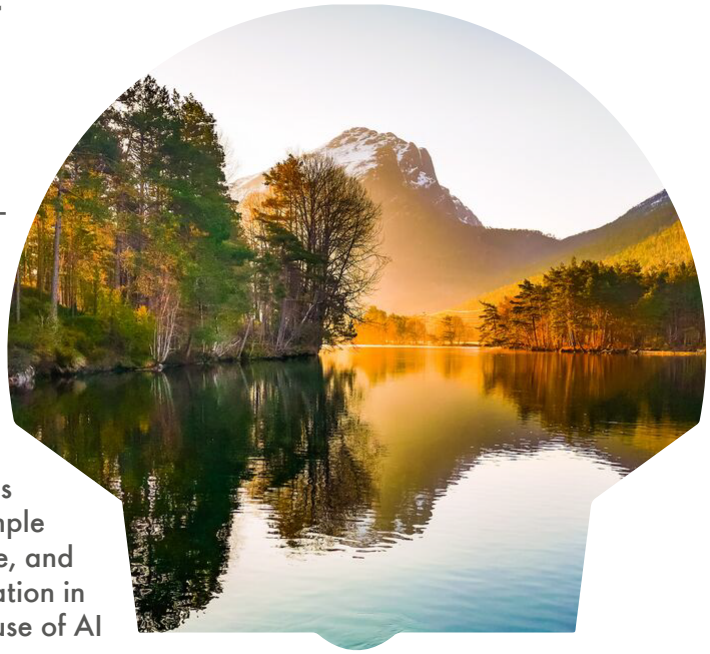
- Upstream production process, the production capacity profiles into storage are given.
- Detailed port loading and discharge operations

Digital Capabilities

- Digital twin, data science, optimization, stochastics, analytics, and AI capabilities.

Problem Statement 2

Biodiversity assessment toolkit



Background

Biodiversity is one of Shell's four priority topics, alongside Water, Air Quality, and Circular Economy and Waste. As part of Respecting Nature commitment from 2021, new projects in areas rich in biodiversity (incl. critical habitats) will have a net positive impact on biodiversity. This means that each project will need to do a baseline environmental assessment and also regular monitoring during the lifetime of assets.Traditional biodiversity assessment methods often involve labor-intensive field surveys and sample collections. These methods can be slow, expensive, and may not capture real-time changes. Digital innovation in this field seek to advance the data captures and use of AI to interpret the data.

Scope

- Solutions or applications designed to support comprehensive biodiversity assessments in various ecosystems (such as plants, species, or identification of organisms based on DNA) around assets.
- It should provide a range of tools and functionalities that enable users to collect, analyse, and interpret biodiversity data efficiently and effectively – ideally in a rapid, high-level of accuracy and low-cost deployment.
- The solution should ideally minimise human presence inside the study area and should be easy to use by non-specialised professionals.

Digital Capabilities

- Combined innovations in remote sensing, drone customisation, eDNA, robotics, digital and other novel approaches to biodiversity.
- Specialised drones, bio-acoustic devices, portable sequencers and data integration for a rapid,low cost, and reproducible biodiversity assessment.
- Data acquisition, data analysis and data integration.

Data to be collected can be :

(but are not limited to) the following

- Images of vegetation surrounding a location.
- Acoustic/sounds.
- DNA information from water, litter, and soil samples.

Out of scope

- Use of restricted-access data or data that is not in the public domain
- Information that cannot be independently verified
- Use of obsolete or niche technologies that cannot be sustained.

Problem Statement 3

Predictive analysis of oil and gas production facilities (plants).

Background

Plant operators need a data-driven tool to monitor plant processes and equipment to intercept possible failures, do a diagnostic root-cause analysis and fix them to avoid downtimes caused by these failures. There are thousands of sensors attached to a plant's equipment, and it is humanly not possible to manually monitor each sensor trend to know if a plant unit, or a piece of equipment, or a process is heading towards failure. In addition, a process fault cannot be detected by looking at each sensor in a silo. It is important to monitor joint variation/correlations together with sensor trends.

Scope

Develop advanced diagnostics to monitor the health of equipment and process to avoid future failures during operation. The tool must also pinpoint the root cause of the problems to help technologists, engineers and operators identify which parts need attention and where a corrective action is needed.

Digital Capabilities

Data science, machine learning, analytics, deep learning and AI capabilities.

Inclusions in the scope of use case

The solution to be tried in the most realistic possible conditions with minimum simplification.

Omissions from the scope of use case

Reduction of scope size (number of machines covered by the new surveillance solution) to enable a trial and a global deloyment of the solution in real conditions.

Technology Levers

Improved machine learning for technical diagnostics, automation, systems integration, utilisation of technical expertise from failure modes library, unification of Proactive Technical Monitoring processes by new tools, a reduction of quantity and an increase of precision and quality of solutions, potential Natural Language Processing solutions' use for "virtual Subject Matter Expert"

Eligibility

- The competition is open to all registered start-ups (minimum 2 staff members).
- **Startups can be in different TRL levels -**
  - TRL 2 - 5 or have received only pre-seed or seed funding; or
  - 6-9 stage with early revenues, market validation by pilot(s), series A funding (or higher).

Timeline

Milestone	Date
Competition opens for submissions	7 Sept
Submissions deadline	25 Sept
Finalist startups announced	30 Sept
Winner announcement	11 Oct

Rewards

The cash prizes that will be awarded are:

- USD 5000 for the first prize winner.
- USD 3000 for the second prize winner.
- USD 2000 for third prize winner.

And may be awarded a collaboration opportunity with Shell.