VITISH 2024

(SIH Internal Hackathon)

SpillDrill-To Spot & Stop

- **Problem Statement ID – 1655**
- **Problem Statement Title – Detecting Oil Spills at Marine Environment using AIS and Satellite Dataset**
- **Theme - Smart Automation**
- **PS Category- Software**
- **Team ID - VIT389**

SpillDrill

SpillDrill is an AI-powered system for real-time oil spill detection, spread prediction, and impact analysis. By integrating satellite data, AIS tracking, and advanced predictive models, it provides accurate forecasts on spill movement and risks to nearby shores.

How we address the Problem?

Potential Hotspot Plot: After analysis of necessary features such as wind speed, disruption rate, tide flow etc we give a hotspot plan on areas to be extra cautious about

Comprehensive Impact Evaluation: The app integrates real-time assessments of both environmental and human impacts, ensuring that response efforts consider the well-being of marine life and coastal communities not just the technical aspects of spill management.

Uniqueness & Innovation

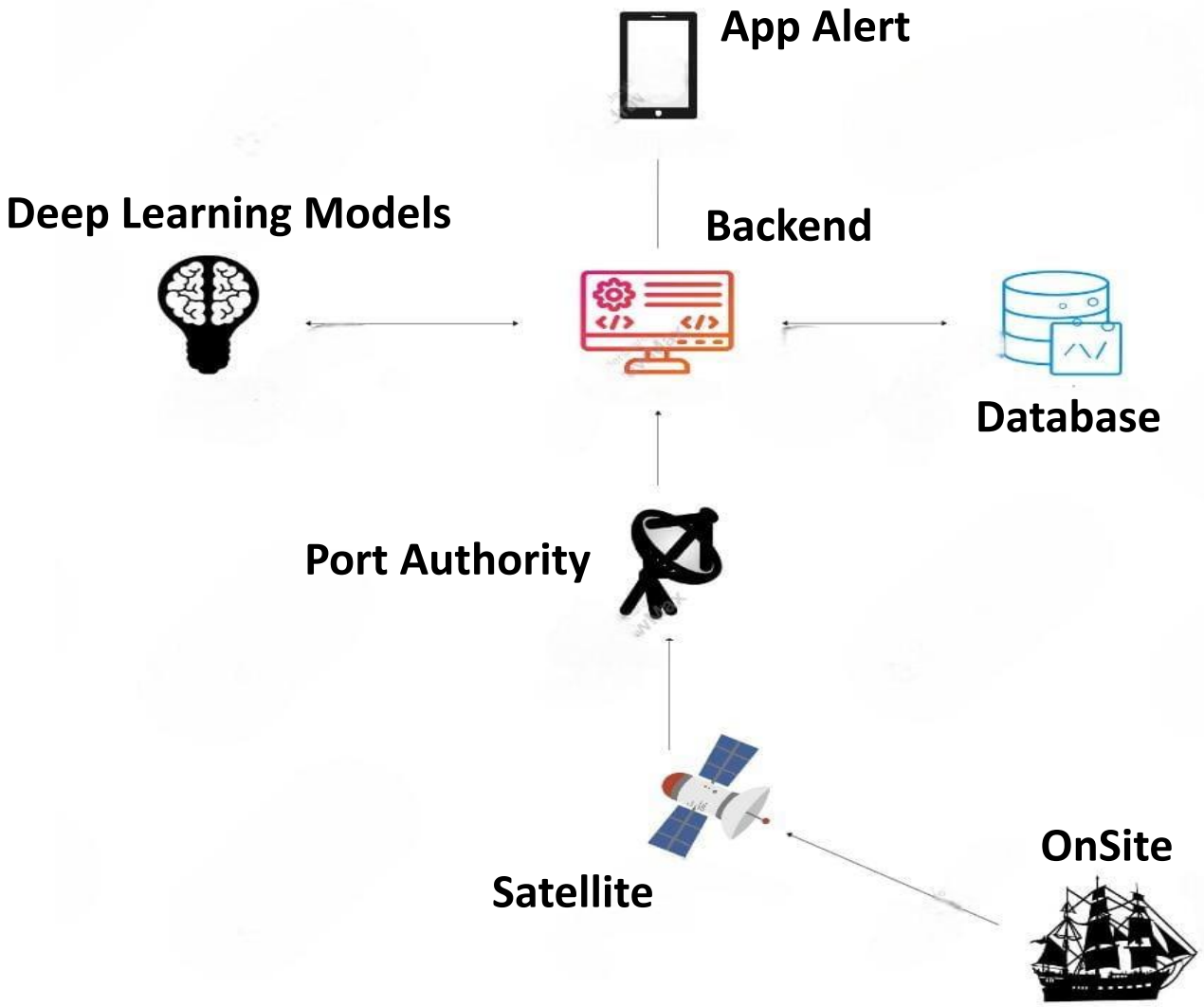
Multi-Coast Alert System: Our built-in alert system notifies not only the affected coast but also nearby coasts at risk, providing a proactive approach to prevent the spread and impact of oil spills.

Integrated Remedial Measures: We propose to release inflatable booms which will surround the oil spread and restrict more damage. Fish repellents are also released to prevent marine life loss rate significantly

TECHNICAL APPROACH

Technologies Used:

React Native, Django, CNN, Streamlit, AccessAIS, Folium, Satellite Imagery, PostgreSQL, Geospatial Analysis



Feasibility of our idea:

SpillDrill is highly feasible, offering a useful tool for real-time oil spill prediction and management by combining **interactive mapping and forecasting** features. We have also proposed two remedial measures which could bring in a significant change.

Potential Challenges and Risks:

Challenges include **false positives and database management**. Risks involve potential errors in predictions and **slow processing speeds** affecting timely decision-making.

Strategies:

For performance, use **data buffering techniques** to handle large datasets efficiently and integrate scalable cloud storage solutions to ensure smooth real-time processing. Real-time data connection time can be reduced with **transmitter-receiver services**.

We also plan on integrating a **reporting feature** onto the platform so that data gathering is much faster and hence a better valuable source along with good user experience.

IMPACT AND BENEFITS

Potential Impact:

SpillDrill enhances response efficiency for oil spills, protecting coastal communities and improving safety through real-time forecasts and accurate predictions. The Exxon Valdez spill caused **$2.5 billion** in cleanup costs, highlighting the critical need for effective forecasting and rapid response indicating the urgent need for timely oil spill management.

Benefits of the Solution:

SpillDrill reduces cleanup costs, which average $15-$40 million per incident, thereby **easing economic burdens on governments and businesses**. Socially, it improves **community safety** and preparedness, potentially saving marine and coastal lives. Environmentally, it helps protect marine ecosystems and wildlife from extensive damage. Politically, it supports regulatory compliance and enhances the credibility **of response efforts**, fostering trust and cooperation among stakeholders.

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