Individual Work Log

PROJECT NAME:	
STUDENT NAME:	**Dang Khoa Le**
STUDENT ID:	**103844421**

STUDENT ID:	**103844421**	WEEK # (& dates covered): #2 (9/3 – 14/3)

TASKS	STATUS	TIME SPENT	ACTION ITEM/NOTE
Researched Sky Ledge company background	Completed	1.5 hours	Focused on history, core tech, and market position
Analyzed Sky Ledge's core products and services	Completed	0.5 hours	Reviewed operational intelligence platform and fleet management
Investigate Sky Ledge's newly launched mobile application	Completed	0.5 hours	Identified real-time tracking features for fleet managers
Investigated potential AI/ML solutions for truck & driver performance evaluation	Completed	1.5 hours	Explored anomaly detection, reinforcement learning, and predictive maintenance
Discussed potential project ideas with team members	Completed	2 hours	Brainstormed solutions using digital twins, predictive maintenance, and IoT-blockchain
Planned tasks for next week's meeting with Sky Ledge	On hold	1 hours	Defined key questions and objectives for client discussion
TOTAL WEEKLY TIME SPENT		7 hours	

TASKS PLANNED FOR NEXT WEEK	EXPECTED COMPLETION

Meet with Sky Ledge representatives	Introduce the team values, researches and purpose/offer software solution on the company current business activity.
Gather client requirements and expectations	Understand the company, requirements and expectations furthermore.
Refine project proposal based on client feedback	Meet dual agreement, evaluate on self-ability.
Identify technical feasibility of proposed solutions	Offer the best /most-on-demand solution.

Summary/weekly reflection for Week #:

-key tasks done / things attended
1. Conducted in-depth research on **Sky Ledge**, including its **background, products, and services**.
2. Analyzed their **Operational Insights Platform** and new **mobile fleet management application**.
3. Explored potential **AI/ML-driven solutions** for optimizing truck and driver performance.
4. Discussed with the team various **project ideas** that could align with Sky Ledge's business needs.
5. Planned for **Week 3 client meeting**, preparing questions and structuring initial solution proposals.

-key things learned about Engineering Technology projects
- The **importance of operational intelligence and fleet management** in optimizing logistics.
- The critical need for **real-time monitoring and predictive maintenance** in fleet operations.
- The value of **collaborative brainstorming** when defining problem statements and potential solutions.

-any literature read and key things learned
- Research on **IoT-based fleet tracking** and its impact on **fuel efficiency and safety**.

Intro to the company background:
Sky Ledge is an Australian-based technology company that has established itself as a significant player in the operational intelligence and fleet management sector. Founded in 2016 and headquartered in Melbourne, Victoria, the company has positioned itself as "the world's first Situational Awareness & Control platform," focusing on providing real-time operational insights and control mechanisms for businesses managing various assets.
Their solution helps organizations minimize inefficiencies, prevent theft, improve oversight, and ultimately reduce unnecessary operational costs.
The company specializes in a variety of technological domains including IoT, analytics, big data, visualization, data streaming, search capabilities, SaaS platforms, and industrial automation. Their expertise extends to sectors such as mining, oil and gas, resources, utilities, smart cities, fleet management, and logistics.

- Studies on **AI-driven predictive maintenance** and its benefits for cost reduction.

Driver Performance Metrics
1. **Driving Behavior:**
   - Harsh acceleration & braking
   - Speeding violations

- o Cornering sharpness
- o Engine idling time
- o Compliance with traffic laws
2. **Fatigue & Attention:**
   - o Hours driven vs. rest periods
   - o AI-based drowsiness detection (eye tracking, head movement)
   - o Workload balance & stress levels
3. **Delivery Efficiency:**
   - o On-time delivery rate
   - o Route deviation tracking
   - o Idle time at stops
4. **Fuel Efficiency:**
   - o Driving style impact on fuel consumption
   - o Gear shifting patterns
   - o Speed vs. fuel economy analysis
5. **Risk & Safety Score:**
   - o Accident frequency
   - o Near-miss events detection
   - o Collision avoidance behavior

Truck Performance Metrics
1. **Fuel Consumption & Efficiency:**
   - o Fuel usage per mile/km
   - o Weight load impact on fuel
   - o Idle fuel waste
2. **Maintenance & Wear:**
   - o Predictive maintenance (engine diagnostics, tire pressure)
   - o Frequency of breakdowns
   - o Component wear tracking
3. **Load Optimization:**
   - o Proper weight distribution
   - o Empty miles (unloaded distance)
   - o Overloading incidents
4. **GPS & Route Efficiency:**
   - o Adherence to optimal routes
   - o Traffic adaptation
   - o Road condition impact

AI Model Type	Use Case	What It Can Do	Evaluation Metrics
Anomaly Detection (Isolation Forest, One-Class SVM, Autoencoders)	Detect unsafe driving habits, vehicle anomalies	Identify abnormal acceleration, braking, or fatigue behavior	Anomaly score, precision-recall
Computer Vision (CNN, YOLO, OpenCV + DNN)	Driver drowsiness detection, distraction monitoring	Detect eye closure, yawning, mobile phone use while driving	Accuracy, False Positive Rate
Time Series Forecasting (LSTM, GRU, ARIMA)	Predict fuel consumption, truck failures	Forecast fuel efficiency trends & mechanical failures before they happen	RMSE, MAE
Reinforcement Learning (Deep Q-Network, PPO, SAC)	Optimize driving habits for fuel economy & safety	Suggest best acceleration/braking patterns based on real-time data	Reward function (safety, fuel savings)

AI Model Type	Use Case	What It Can Do	Evaluation Metrics
Predictive Maintenance (XGBoost, Random Forest, LSTMs)	Prevent breakdowns	Predict component failures based on sensor readings	Accuracy, recall (for failure prediction)

- Articles on **digital twins in logistics** and how they enhance asset management.

- Sky Ledge's **public documentation and product descriptions** to understand their solutions.

Core Product:

The Operational Insights Platform Sky Ledge's primary offering is an operational insights platform designed to provide businesses with unparalleled visibility and control over their assets and operations. The platform serves as a comprehensive solution for tracking the location, condition, and performance of assets in real-time. This visibility enables organizations to make informed decisions, prevent problems before they escalate, and ensure optimal asset performance. The platform integrates various capabilities aimed at enhancing operational efficiency. At its core, the system allows users to monitor assets with detailed insights, providing a clear view of their whereabouts, condition, and performance. This real-time information, coupled with instant alerts, empowers decision-makers to respond quickly to changing conditions and maintain operational excellence.

Mobile Application:

Fleet Management on the Go In March 2025, Sky Ledge launched a mobile application that extends the functionality of their platform to smartphones, allowing fleet managers to maintain oversight even when away from their desks. This development represents a significant evolution in their product offering, recognizing that "decisions in fleet and operations management don't always happen behind a desk". The mobile app provides real-time alerts about unexpected route changes, collisions, suspicious fuel usage, and other critical events. Available on the Google Play Store, the app enables users to track asset locations, fuel levels, and movement status from their mobile devices. Additional features include access to asset overviews, triggered events, visitation history, and the ability to navigate between different control rooms for seamless fleet management.

-Issues/problems

- Limited direct access to Sky Ledge's proprietary data for deeper analysis.
- Need for more technical details on **current GPS hardware and integration challenges**.
- Defining the **best AI solution** to propose, considering Sky Ledge's existing tech stack.