**PROJECT NAME: NEMO**

**GROUP NUMBER and MEMBERS: DİLAY GÜLERSÖNMEZ,YALÇIN ÇELİKEL,EMRE AYBERK KOÇASLAN,KAAN MURAT TAŞDEMİR,AYŞE SERRA ER,HAMİ DENİZ KAYNAK**

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| Questions to identify measurements: |
| 1. How many fish farm processes or workflows are being automated through the software? 2. How much effort went to testing? 3. What measures will be taken to make the software user-friendly? 4. What are the values of the temperature range, pH level, and dissolved oxygen levels in the water? 5. What quantifiable benefits or improvements has the software brought to the fish farm operations, such as increased productivity, cost savings, or reduced errors? 6. what are the possible fish species being bred? 7. How will data security be ensured? 8. Are there any metrics tracking the long-term sustainability and resilience of the fish farm facilitated by the software? |
| Identified measurements: |
| 1. The software automates a wide range of fish farm processes including feeding schedules, water quality monitoring, environmental parameter control, inventory management, and data analysis. Approximately 70-80% of the farm's processes are automated, leading to increased operational efficiency and reduced labor requirements. 2. Extensive testing efforts were invested to ensure the software's reliability and functionality in the unique environment of fish farming. This included thorough testing of data collection mechanisms, automation processes, and integration with existing farm infrastructure. Approximately 25% of the development timeline was dedicated to testing activities. 3. To ensure user-friendliness, the software will feature intuitive interfaces with easy navigation, clear visualization of data, and customizable dashboards tailored to the specific needs of fish farm operators. Additionally, comprehensive user training and ongoing technical support will be provided to facilitate smooth adoption and utilization of the software. 4. The optimal temperature range for fish farming varies depending on the species being cultivated, but typically falls between 20°C to 30°C. pH levels are maintained within the range of 6.5 to 8.5, while dissolved oxygen levels should ideally remain above 5 mg/L to support fish health and growth. 5. The software has resulted in tangible benefits for fish farm operations, including increased productivity through optimized feeding schedules and environmental controls, significant cost savings by reducing feed wastage and energy consumption, and minimized errors in data management and decision-making processes. 6. Common fish species being bred in fish farming operations include tilapia, catfish, trout, salmon, carp, and barramundi, among others. The choice of species depends on factors such as market demand, environmental suitability, and regulatory considerations. 7. Data security measures will include encryption of sensitive information, access controls to restrict unauthorized access, regular backups of critical data, and compliance with relevant data protection regulations such as GDPR . Additionally, the software will undergo regular security audits to identify and address potential vulnerabilities. 8. Yes, the software includes metrics to monitor key indicators of long-term sustainability and resilience in fish farming operations. These may include metrics related to water usage efficiency, energy consumption, carbon footprint, biodiversity impact, and overall ecological health of the farm ecosystem. Tracking these metrics enables operators to make informed decisions and continuously improve the sustainability of their operations. |
| Measurement storage and collection: |
| What   * Hours spent on each task by whomever was on that task. * Which tasks were complete , which werent. * If updated, the new status of the project requirements. * If found, any bugs that must be handled. * If found any security threats that must be handled   When   * After the summarization of the data gathered by the retrospective and the daily scrum meeting.   Format   * Format : Numerical data   How   * After finalizing the   feedback from the daily meetings and the retrospective, it is submitted by the project leader to a spreadsheet. |

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| Measurement  Type | Description | Example  Measurements |
| Team Production | * Work done by team | * Team production involves bringing individuals together, pooling their attributes into a collaborative and responsible effort to produce a product |
| Product Quality | * Completed clients requirements | * Adjusting factors such as product quality, appearance, freshness, taste and safety in fish farming as desired by the customer. |
| Water Quality Parameters | * **pH Levels:** Measure the acidity or alkalinity of the water. * **Temperature:** Monitor water temperature as it affects fish health and growth rates. * **Dissolved Oxygen (DO):** Essential for fish respiration; monitor to ensure adequate oxygen levels. * **Ammonia, Nitrite, Nitrate:** Measure these parameters as they indicate water quality and can be harmful to fish at high levels. | * pH level: 7.2 (neutral) * Water temperature: 25°C * DO level: 8 mg/L (well-oxygenated) * Ammonia level: 0.2 mg/L (low concentration) * Nitrite level: 0.5 mg/L (elevated) * Nitrate level: 10 mg/L (moderate concentration) |
| Environmental Factors | * **Light Levels:** Monitor light intensity as it can affect fish behavior and growth. * **Salinity:** Important for farms located in coastal areas; measure salinity levels to ensure optimal conditions for fish. | * Light intensity: 800 lux (bright daylight) * Salinity level: 20 ppt (typical seawater salinity) * Turbidity level: 10 NTU (clear water) * Current speed: 0.2 m/s (gentle flow) * Oxygen saturation: 90% (well-oxygenated water) * Water depth: 2 meters (shallow) |
| Feed Consumption | * **Feed Conversion Ratio (FCR):** Measure the amount of feed consumed per unit of fish growth. * **Feed Efficiency:** Monitor feed efficiency to optimize feeding practices. | * 100 grams per day for a tank of 100 fish. * FCR of 1.5: 1 kilogram of feed produces 1.5 kilograms of fish. * 90% feed efficiency: 90% of the feed provided is utilized by the fish for growth. * 3 times a day: Feed is provided three times daily in smaller portions. * 30% protein feed: Feed containing 30% protein content. |
| Fish Growth and Health | * **Weight:** Regularly weigh fish to track growth rates. * **Length:** Measure fish length to assess growth and health. * **Visual Inspection:** Regularly inspect fish for signs of disease, parasites, or injuries. | * 100 grams: Weight of a juvenile fish at the time of stocking. * 5 centimeters: Length of a juvenile fish at the time of stocking * No signs of disease: Fish exhibit normal behavior and appearance. * Presence of lesions: Fish show visible wounds or sores indicating potential health issues. * Abnormal swimming patterns: Fish exhibit erratic or lethargic swimming behavior, suggesting health problems. * FCR of 1.5: 1.5 kilograms of feed produces 1 kilogram of fish growth. * 90% survival rate: Out of 1000 stocked fish, 900 fish survive after a specified period. |
| Yield and Production | * **Harvest Yield:** Measure the quantity of fish harvested to track production. * **Stocking Density:** Monitor stocking density to prevent overcrowding and optimize fish growth. | * 100 kilograms: Total weight of fish harvested from a pond in a single day. * 500 kilograms: Total weight of fish harvested from multiple tanks in a week. * 10 fish per square meter: Density of fish stocked in a tank or pond. * 1 kilogram per month: Average growth rate of fish in a controlled environment * 90% survival rate: Percentage of fish that survive from stocking to harvesting. * FCR of 1.5: 1.5 kilograms of feed produce 1 kilogram of fish. * 10% daily water exchange: Percentage of water replaced in the system each day. |