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SMART MICROALGAE FARM FOR BLUE CARBON (PROPOSAL SKECTCH)

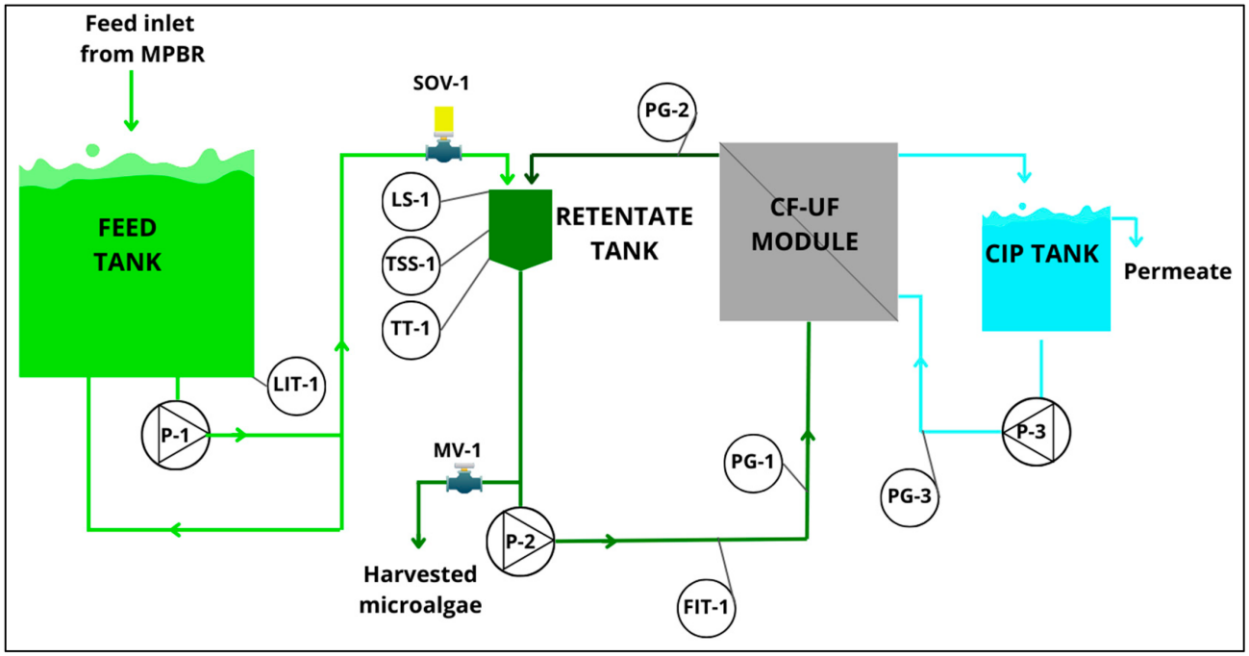
ABSTRACT

The project aims to make microalgae for the biomass as well as a protein source and by that process ty to make the microalgae absorb the CO_2 to offset the emission of CO_2 due to industrial activity

MAIN IDEA

- Sensors and IoT: Real-time monitoring of water quality, light, and nutrients.
- GIS & 3D Imaging: Mapping and analyzing sequestration potential and ecosystem health.
- Big Data & AI: Predictive modeling for carbon capture optimization.

The project is built around a microalgae tank, and using sensor and controlling unit to modify the best environment for the algae cultivation as well as make the whole process ecofriendly



HARDWARE

- base controlling unit is
  - ESP32
- SENSOR
  - Temperature Sensor (e.g., DS18B20) – Monitors water and ambient temperature.
  - pH Sensor (e.g., Atlas Scientific pH Kit) – Monitors acidity/alkalinity levels.
  - Dissolved Oxygen (DO) Sensor – Measures oxygen concentration in water.
  - Turbidity Sensor (e.g., SEN0189) – Measures water clarity to detect algal growth.
  - Light Sensor (e.g., BH1750 or TSL2561) – Measures light intensity for photosynthesis.
  - Nutrient Sensors – Detects nitrate, phosphate, and ammonia levels in water
- Actuators
  - Air Pumps & Diffusers – Provide aeration and CO_2 dispersion.
  - Water Pumps & Valves – Manage water flow and circulation.
  - LED Grow Lights (e.g., Full-Spectrum LEDs) – Supplemental lighting for photosynthesis. Cooling & Heating Systems – Maintain optimal temperature conditions
  - Peristaltic Pumps – For nutrient dosing and CO_2 injection.
  - Camera 2mp for observation of the tank.
- IoT Controllers & Communication Modules
  - LoRa Modules (e.g., RFM95) – For long-range communication.

PROJECT OUTPUT

To offset a significant amount of CO2 emission and to imitate the actual microalgae cultivation at industrial scale for carbon credit and blue carbon purposes