TEAM 096

Solar-powered Autonomous Lifeguard Submarine (S.A.L.S.)

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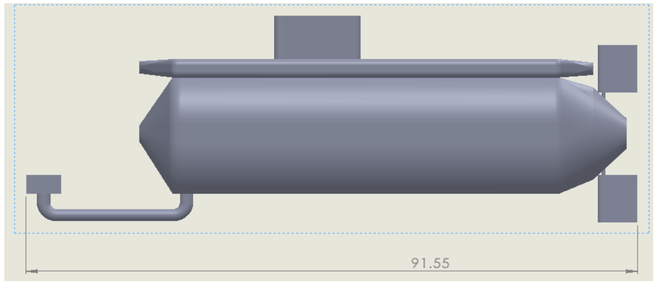
CHE AE 4 ICS ME

Overview

Rescue operations in water often face challenges like slow response times and environmental risks. S.A.L.S. is a solar-powered, AI-driven, autonomous submarine engineered to revolutionize water rescue. Designed for pools, beaches, and water parks, it detects and reaches drowning individuals within seconds, minimizing human risk and operational cost.



Our Innovative Approach

The team designed a hydrodynamic body for improved maneuverability, optimized a solar-powered energy system and created a corrosion-resistant structure. Also, the team developed an AI-based detection system for real-time victim identification and designed a deployable life ring system and buoyant frame.

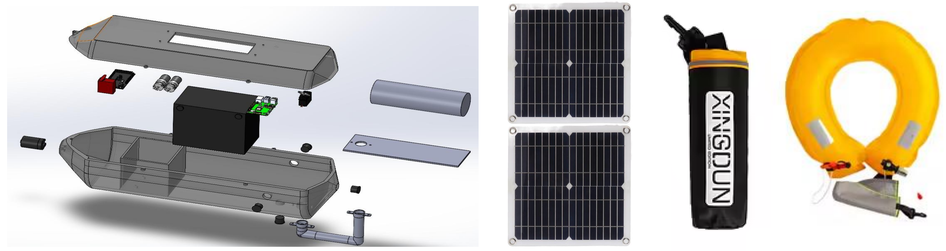
Constraints

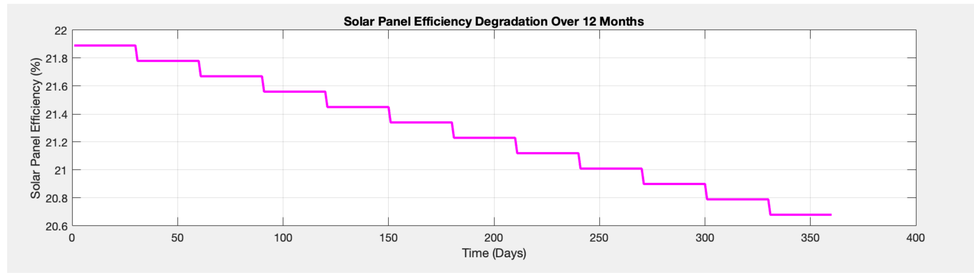
- Seawater salinity of 37g/m^3
- Submarine net weight of 15 kg
- Submersion depth of 3 meters
- Detection time of 5 seconds
- Maximum drag force of 50 N

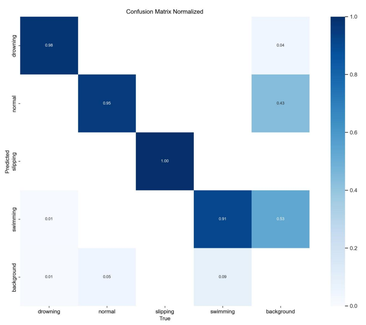
Target Specifications

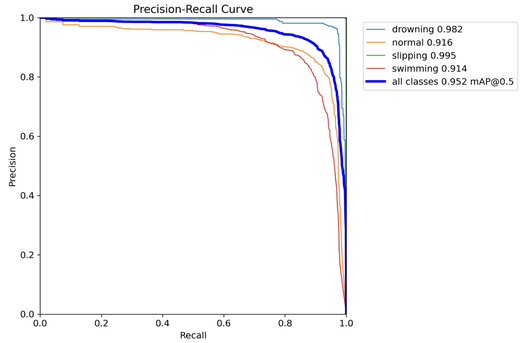
1. Solar panel charging rate of 80W
2. Speed of 2 knots (1 m/s)
3. Operates for 1.5 hrs at nighttime
4. Volume of 1 cubic meter
5. Detection accuracy of 90%
6. Life expectancy at least 1 year
7. Carrying at most 15 kg
8. Reaching in at most 60 seconds

Prototype Design









Conclusion & Future Work

To validate that the prototype satisfies all the design requirements in actual sea conditions, the team will simultaneously optimize detection algorithms, optimize the rescue mechanism, maximize hydrodynamic performance, and carry out full-system testing.