RET Project: "Machine Learning Enabled Smart Nets"

Research Experience for Teachers (RET) Summer 2021

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GLENDALE COMMUNITY COLLEGE
A MARICOPA COMMUNITY COLLEGE

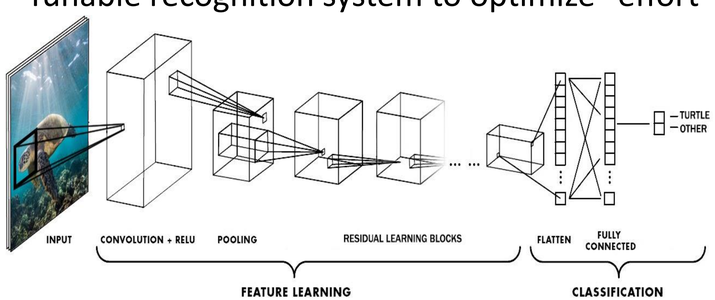
SenSIP INDUSTRY CONSORTIUM

RESEARCH BACKGROUND/DESCRIPTION

- Oceans cover 71% of our planet and hold 97% of all our water
- healthy Marine ecosystem = healthy Planet.
- Bycatch hurts marine life + fisheries
- **ASU has developed Bycatch Reduction Tech**

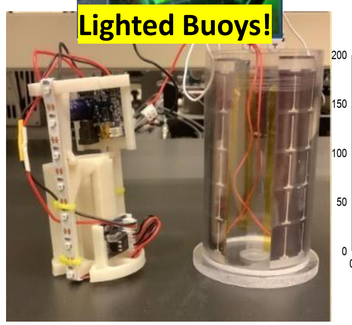
RESEARCH OBJECTIVES/PLAN

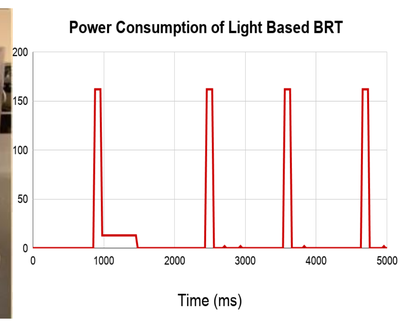
- Develop an Autonomous, Multimodal, Closed-Loop adaptive cyberphysical system (CPS)
- Optimize LBRTs and power efficiency
- Machine vision to produce deterrent stimuli via light and sound.
- Tunable recognition system to optimize "effort"



RESEARCH RESULTS/REMARKS

- Lighted Bycatch Reduction Technology (LBRT) integrated into Smart Nets
- Field tested and realized 65-70% bycatch reduction
- **Plans to further reduce bycatch by including a Machine Learning detection system**



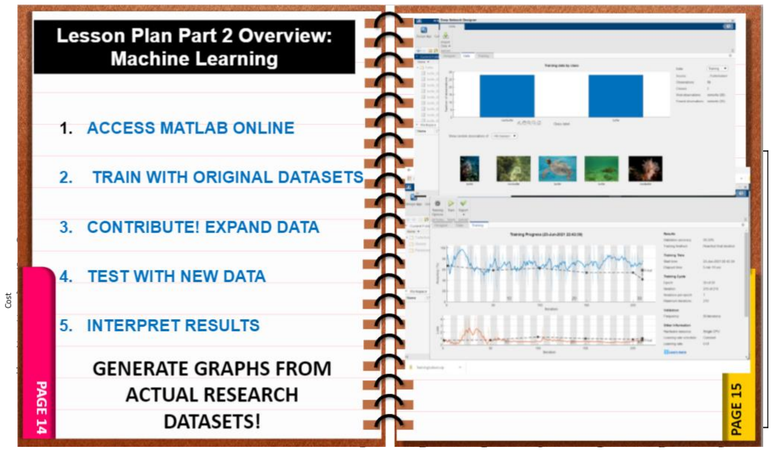


REFERENCES

[1] J. Senko, E. R. White, S. S. Heppell, and L. R. Gerber, "Comparing bycatch mitigation strategies for vulnerable marine megafauna," Animal Conservation, vol. 17, no. 1, pp. 5–18, Feb. 2014.
[2] H. S. Demir, J. B. Christen and S. Ozev, "Energy-Efficient Image Recognition System for Marine Life," in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, vol. 39, no. 11, pp. 3458-3466, Nov. 2020.
[3] A. Bielli et al., "An illuminating idea to reduce bycatch in the Peruvian small-scale gillnet fishery," Biological Conservation, vol. 241, no. 108277, pp. 1-8, 2020.

LESSON PLAN OBJECTIVES

- Satisfy key MCCCD Course Competencies.
- Complete a Digital Dynamic Research Workbook



LESSON IMPLEMENTATION/OUTCOMES

- Successfully graph datasets
- Contribute to valuable ASU research
- Implement machine learning
- Successfully model, analyze and interpret real-world problem
- Present results to class

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https://sensip.asu.edu

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