InnovateFPGA

AS026

UNIVERSIDADE FEDERAL DE PERNAMBUCO

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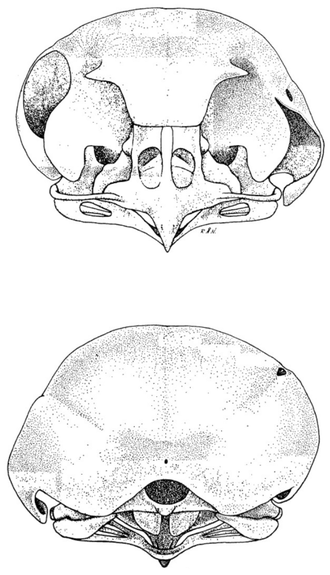
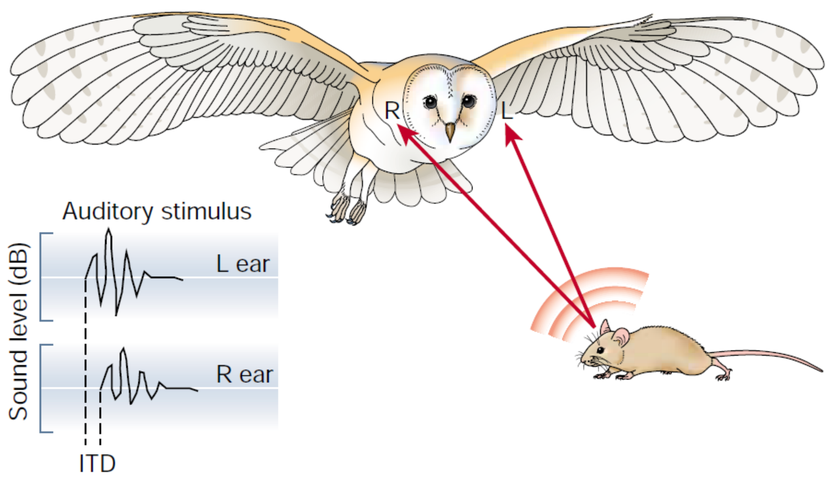
iOwlT: Sound Geolocalization System

MOTIVATION AND PURPOSE

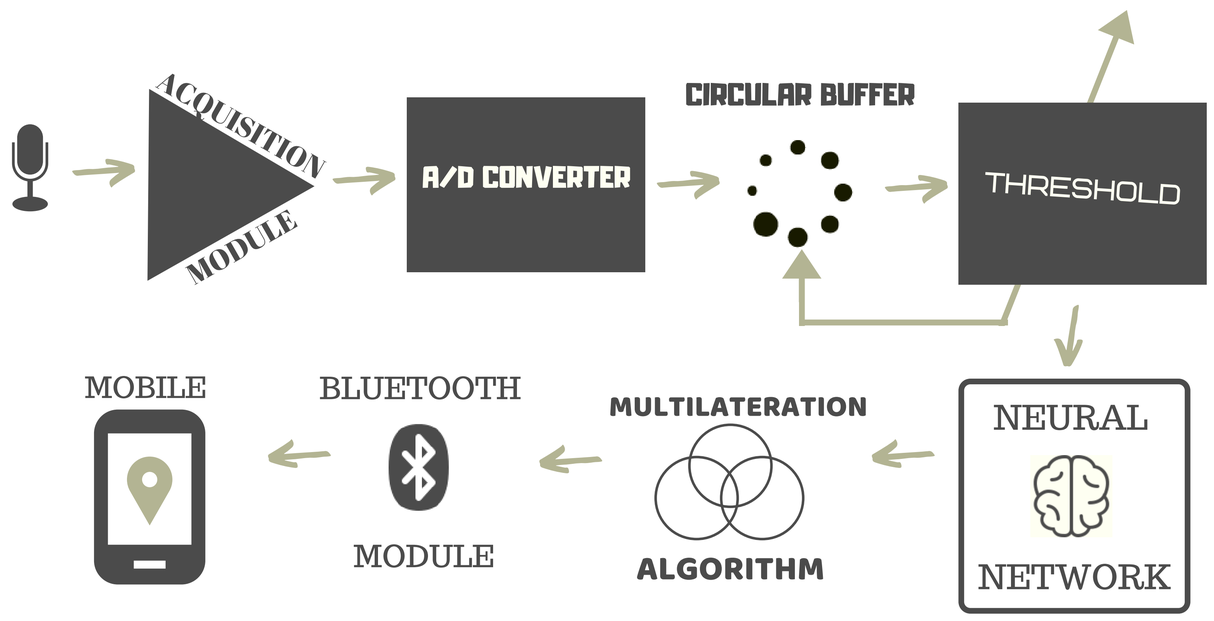
- "Brazil leads the ranking of firearm deaths in the world"
- "Nearly 40,000 people died from guns in U.S in 2018"
- "Brazil has 7.6 million illegal guns"

The **iOwlT** is an intelligent neural network geolocalization system based on the nature of prey searches by an nocturne owl. Using the technique of multilateration of signals and the phase shift of a signal detected by distinct sensors, the system is capable to determine the target.



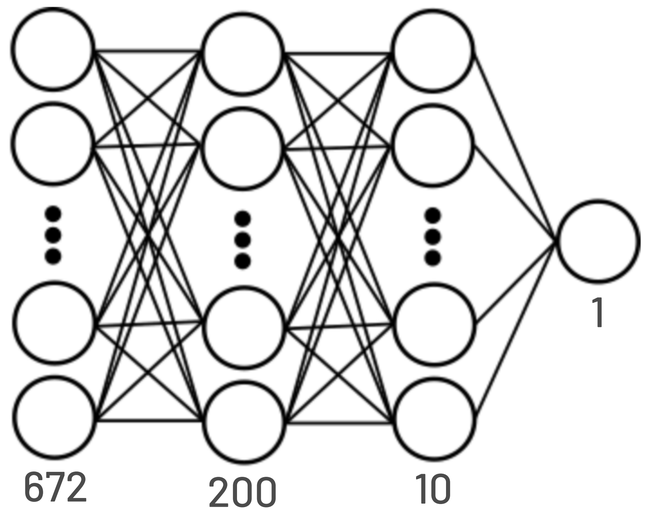


SYSTEM OVERVIEW



NEURAL NETWORK

- MLP Fully Connected
- MFCC Feature Extraction
- 2 Hidden Layers
- Holdout cross-validation
- Cooperation with local police authority for training



FPGA VIRTUES

Adapt to Changes

Adaptive threshold

Boost Perfomance

Outstanding time precision (Real-time Processing)

Expands I/O

Multiple microphones

RESULTS

- The system's neural network performed **91.38%** accuracy.
- The multilateration algorithm performed **97.21%** accuracy on determining the gunshot direction.
- The multilateration algorithm performed **88.32%** accuracy on determining the gunshot position.

iOwlT

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