

# AI ASSISTED WILDLIFE DETECTION AND ALERTING SYSTEM

By

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# MOTIVATION

Why this project...?

Because we hear news such as...





# MOTIVATION

Why this project...?



The screenshot shows the homepage of The Hindu news website. At the top, the masthead reads "THE HINDU" with social media icons for Facebook, Twitter, LinkedIn, YouTube, Email, and a mobile app icon, followed by an "ePaper" link and a search bar. Below the masthead is a "JUST IN" section with three breaking news items: 1. "7mins U.S. judge orders WikiLeaks source Chelsea Manning released from" (with a red "JUST IN" badge), 2. "14mins Hong Kong church streams mass online to prevent coronavirus", and 3. "34mins Coronavirus | Bengaluru-based software engineer tests positive". A "MENU" section follows with links to HOME, NEWS, OPINION, BUSINESS, SPORT, CRICKET, LIFE & STYLE, and THREAD. Below the menu is a "CITIES" dropdown menu with options for BENGALURU, CHENNAI, COIMBATORE, DELHI, HYDERABAD, and BUFFALOES, THE. The main content area shows the breadcrumb "NEWS > CITIES > COIMBATORE" and a headline "50-year-old man injured in elephant attack" by a "STAFF REPORTER" in Coimbatore. The article was published on March 09, 2020, at 00:13 IST and was updated at the same time. The background of the slide features a large, detailed image of a tree trunk cross-section.

THE HINDU

f t in y e ePaper Search here

< **JUST IN** 1 ⌚ 7mins U.S. judge orders WikiLeaks source Chelsea Manning released from 2 ⌚ 14mins Hong Kong church streams mass online to prevent coronavirus 3 ⌚ 34mins Coronavirus | Bengaluru-based software engineer tests positive >

MENU

HOME NEWS OPINION BUSINESS SPORT CRICKET LIFE & STYLE THREAD

CITIES ▾ BENGALURU CHENNAI COIMBATORE DELHI HYDERABAD BUFFALOES, THE

NEWS > CITIES > COIMBATORE

COIMBATORE

## 50-year-old man injured in elephant attack

 STAFF REPORTER

UDHAGAMANDALAM, MARCH 09, 2020 00:13 IST  
UPDATED: MARCH 09, 2020 00:13 IST

# MOTIVATION

Why this project...?

THE HINDU

f t in i ePaper Search here

5 59mins Coronavirus | Canadian Prime Minister Justin Trudeau's wife tests

6 1hr Morning Digest: India's first COVID-19 death in Karnataka; No doubtful

7 1hr U.S. Football president Cordeiro resigns over court filing

MENU

HOME NEWS OPINION BUSINESS SPORT CRICKET LIFE & STYLE THREAD

STATES ANDHRA PRADESH KARNATAKA KERALA TAMIL NADU TELANGANA BUFFALOES, THE

NEWS > STATES > KARNATAKA

KARNATAKA

## Man injured in elephant attack in Tumakuru dies

 S. Bhuvaneshwari

TUMAKURU, MARCH 10, 2020 12:19 IST  
UPDATED: MARCH 10, 2020 18:14 IST





# MOTIVATION

Why this project...?

**hindustan**times

[Home](#) / [India News](#) / 3 killed in elephant attack in Odisha's Puri

## 3 killed in elephant attack in Odisha's Puri

Puri's divisional forest officer Sushant Ray said the elephant tossed 60-year-old Jugalkishore Bhatt of Gopinathpur panchayat while he was working in his field on Sunday morning.

**INDIA** Updated: Feb 23, 2020 13:54 IST



Debabrata Mohanty

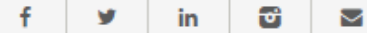
Hindustan Times, Bhubaneswar



# MOTIVATION

Why this project...?

THE HINDU



- <
- JUST IN**
- 5 **3hrs** Old lighthouse to be renovated
- 6 **3hrs** National Science Day held at Annamalai University
- 7 **3hrs** Disappointed by denial of RS seat: DMDK
- 8 **3hrs** Road Safety World Series | Kohli's success because of hard work, says

MENU



HOME NEWS OPINION BUSINESS SPORT CRICKET **7 days free** CROSSWORD+ ENTERTAINMENT

NEWS **NATIONAL** INTERNATIONAL STATES CITIES

NEWS > NATIONAL

**SUNDAY SPECIAL** | NATIONAL

## Human-elephant conflict kills 1,713 people, 373 pachyderms in 3 years



Sanjana Ganesh

MADURAI, FEBRUARY 09, 2019 20:50 IST  
UPDATED: FEBRUARY 10, 2019 00:28 IST





# MOTIVATION

Why this project...?

And Most Recently !...



# MOTIVATION

Why this project...?



[CORONAVIRUS](#)

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[Home](#) > [Kerala](#) > [Another Elephant Death In Kerala Likely Due To Crackers, Jaw Was Broken](#)

READ IN [OTHER LANGUAGES](#) ▼

## Another Elephant Death In Kerala Likely Due To Crackers, Jaw Was Broken

Pineapples with country-made crackers are usually used by locals to protect their fields against wild boars.

[Kerala](#) | Reported by [Sneha Mary Koshy](#), Edited by [Deepshikha Ghosh](#) | Updated: June 03, 2020 09:45 pm IST





# MOTIVATION

Why this project...?

Wildlife Isn't a Nuisance ... Human Expansion and  
Development is What's Plaguing Our Planet



And we have a solution !  
Prevention Better Than Disaster....





# PROBLEM STATEMENT

## AI Assisted Wildlife Detection & Alerting System

The system is a decentralized system that works with real-time detection and reduces the burden on the server by integrating TensorFlow environment for raspberry pi and able to run the MobileNet architecture for elephant detection that facilitates computationally intensive Deep Learning algorithm on low end computer device such as Raspberry Pi.



# OBJECTIVES

- The main objective of this project is to set up a highly scalable multi-object detection system on a raspberry Pi using TensorFlow and mobile optimized Neural Network models.
- To detect elephants from camera feed and alert the concerned officials through an android app and send the image over the internet.



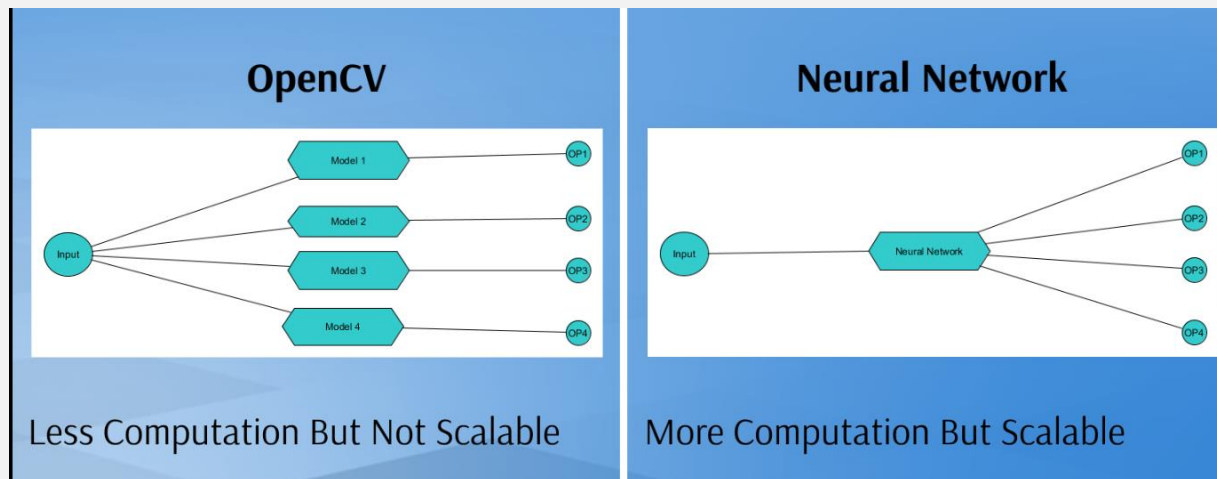


# LITERATURE SURVEY/EXISTING SYSTEM

[1]“Evaluation of an active wildlife-sensing and driver warning system at Trapper's Point.” by Department of Civil and Architectural Engineering, University of Wyoming talks about implementing the system using cloud based detection , that is expensive to implement and is not designed to work on regions with low internet connectivity.

[2] Mobilenets: Efficient convolutional neural networks for mobile vision applications.“ talks about the efficient light weight model that is able to run light weight NN on devices with low computation power.

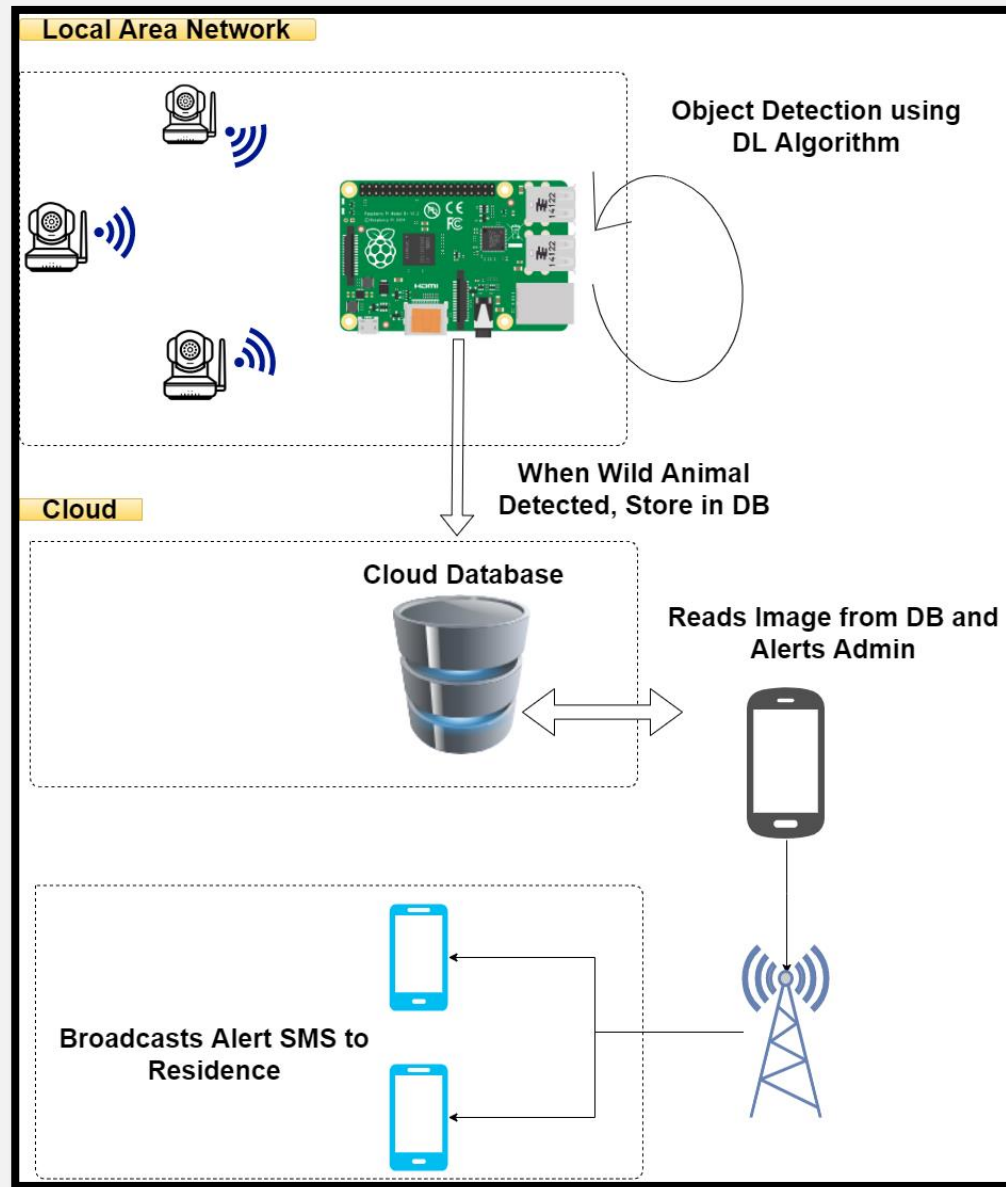
[3] "YOLO-LITE: a real-time object detection algorithm optimized for non-GPU computers.“ talks about the realtime object detection capability of multiple objects in single shot.





# PROPOSED SYSTEM DESIGN

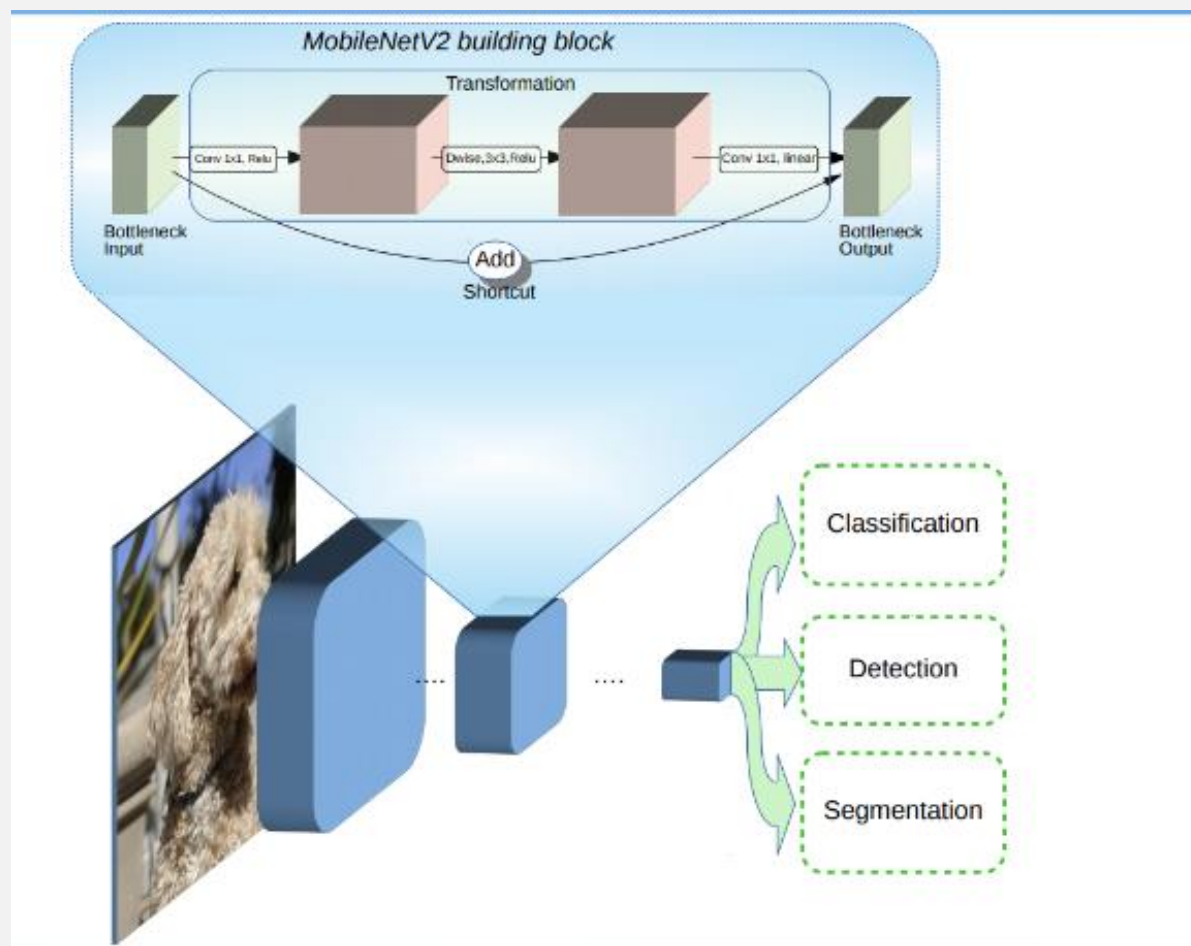
## Architecture





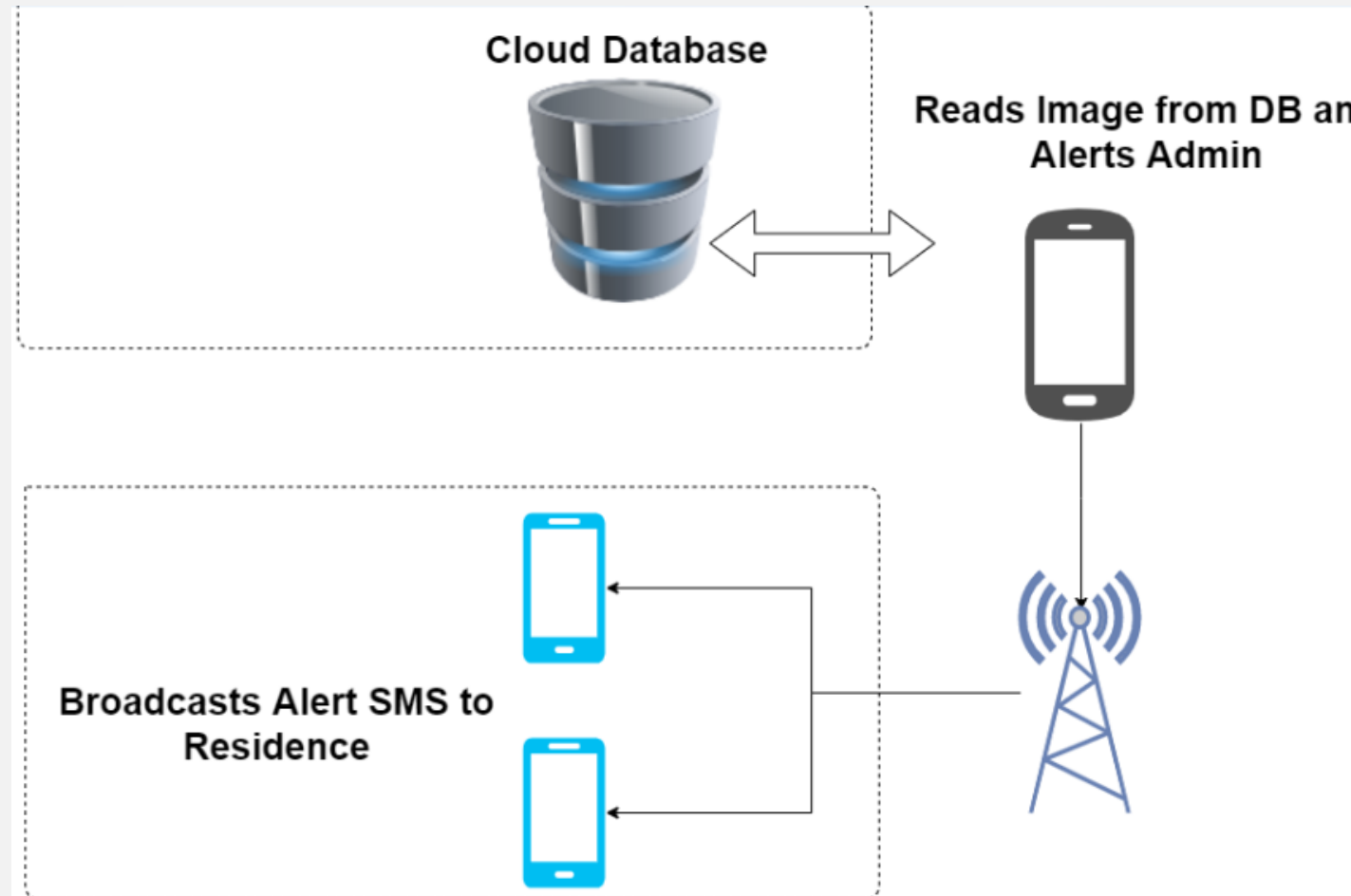
# METHODOLOGY

Architecture : MobileNet



# METHODOLOGY

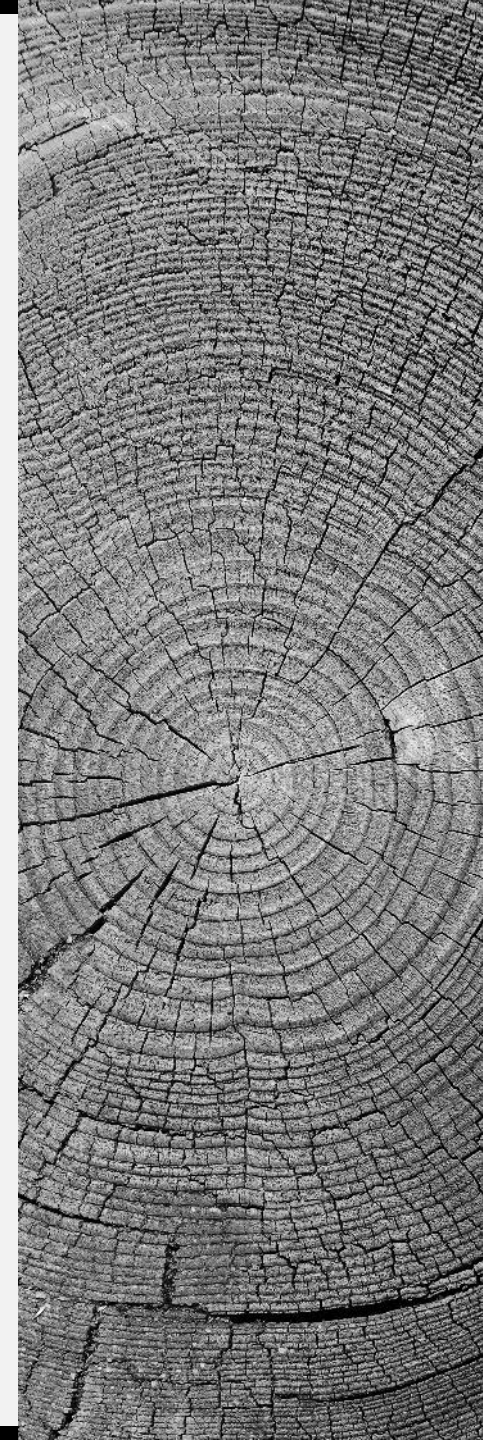
## Architecture : Automated SMS Alert System





# IMPLEMENTATION

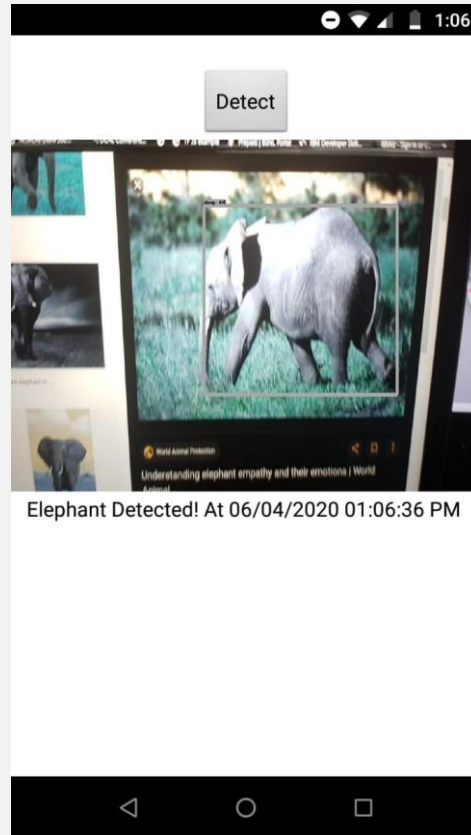
- The MobileNet SSD Lite model was used for the prototype. Apart from just detection, it also performs segmentation. A Raspberry Pi 4 board was used (4 GB RAM with no hardware accelerators). Instead of a PiCam, a mobile phone's live feed was used as the input.
- Once the elephant is detected, the image is sent to the cloud database over the internet. A special TinyDB database was deployed on google cloud for this application.
- The android app can then check the database for any changes and pull the necessary images and display them to the phone. It also send out SMS to the subscribed users.





# RESULT

A working prototype implementation of the above concept was built. Decentralized onboard processing was able to detect elephants in the video feed and export the detected frame to the cloud, from where the Android application was able to pull it and alert the concerned officials. Custom DL models can also be used (to be explored) and more powerful boards such as Google Coral and Jetson Nano can vastly increase the inference rate and multi-channel support.



# CONCLUSION

Real time object detection is possible on low computationally powered devices are possible and custom DL models can also be used (to be explored) and more powerful boards such as Google Coral and Jetson Nano can vastly increase the inference rate and multi-channel support. This technology can be used to save both human and animals.



# REFERENCES

[1] Dai, Qiyue, Rhonda Young, and Steven Vander Giessen. *Evaluation of an active wildlife-sensing and driver warning system at Trapper's Point*. No. FHWA-WY-09/03F. Wyoming. Dept. of Transportation, 2009.

[2] Howard, Andrew G., et al. "Mobilenets: Efficient convolutional neural networks for mobile vision applications." *arXiv preprint arXiv:1704.04861* (2017).

[3] Huang, Rachel, Jonathan Pedoeem, and Cuixian Chen. "YOLO-LITE: a real-time object detection algorithm optimized for non-GPU computers." *2018 IEEE International Conference on Big Data (Big Data)*. IEEE, 2018.





**DEMO**



**THANK YOU**

