



# Hacking the Hackathon using FastAI and IPEX

by Ankur Singh and Sai Rama Raju Penmatsa

# Meet the Team - (HighNet)



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- ML Team Lead at **Zoop.One**
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- Graduate Research Assistant at **SJSU**
- Ex-Software Engineer at **Accenture**



# Our Hackathon Experience



- Our First ever Hackathon
- 8 hrs of Experimenting
- Met some incredible people from Intel
- Will always be a special one

# Ripple Effects

## SJSU students win grand prize during Intel's 'hackathon'

By Brandon Twomey  
STAFF WRITER

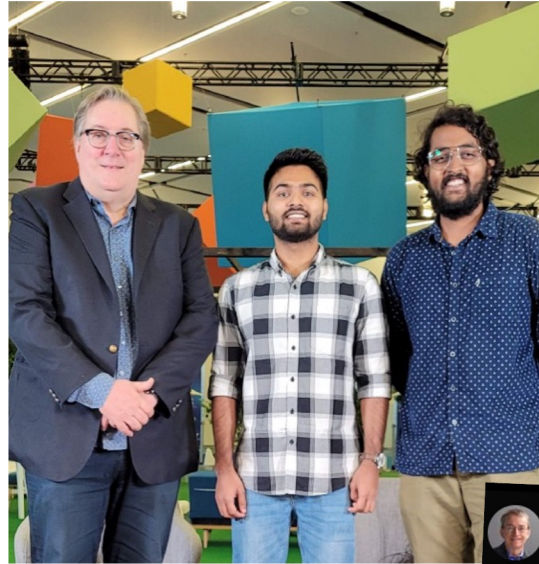
Two San Jose State students won grand prizes during Intel's AI For Social Good Hackathon event at the San Jose McEnery Convention Center in Downtown San Jose on Sept. 26.

The hackathon featured students who showcased their machine learning skills, were taught how to build full end-to-end products and had the opportunity to study MLOps pipelines using data ingestion to model their deployments.

MLOps is a machine learning engineering

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Innovation 2022 Participant Experience: My First Ever Hackathon



oneAPI  
DevSummit



**Ok.... So what and How  
did we do ??**



# Problem Statement

## From Business Lens

- Targeted pesticide attack on weeds.
- Train a DL model to separate weeds from plants.
- DL Model will be deployed on a drone. So it has to be computationally cheap, and it should have fast inference speed.

## From Deep Learning Lens

- Image classification - CNN model
- Two classes - Binary classification
- Loss - Binary Cross Entropy
- Metric - Accuracy Score



# Initial Approach

- No Exploratory Data Analysis
- Use fastai
- Basic data augmentation
- ResNet18
- Fine-tune head for 1 epoch, followed by 5 epochs



## New Approach

- Intel Extension for Pytorch is fast (1300 image ~ 6 seconds/epoch)
- Conduct as many experiments as possible.



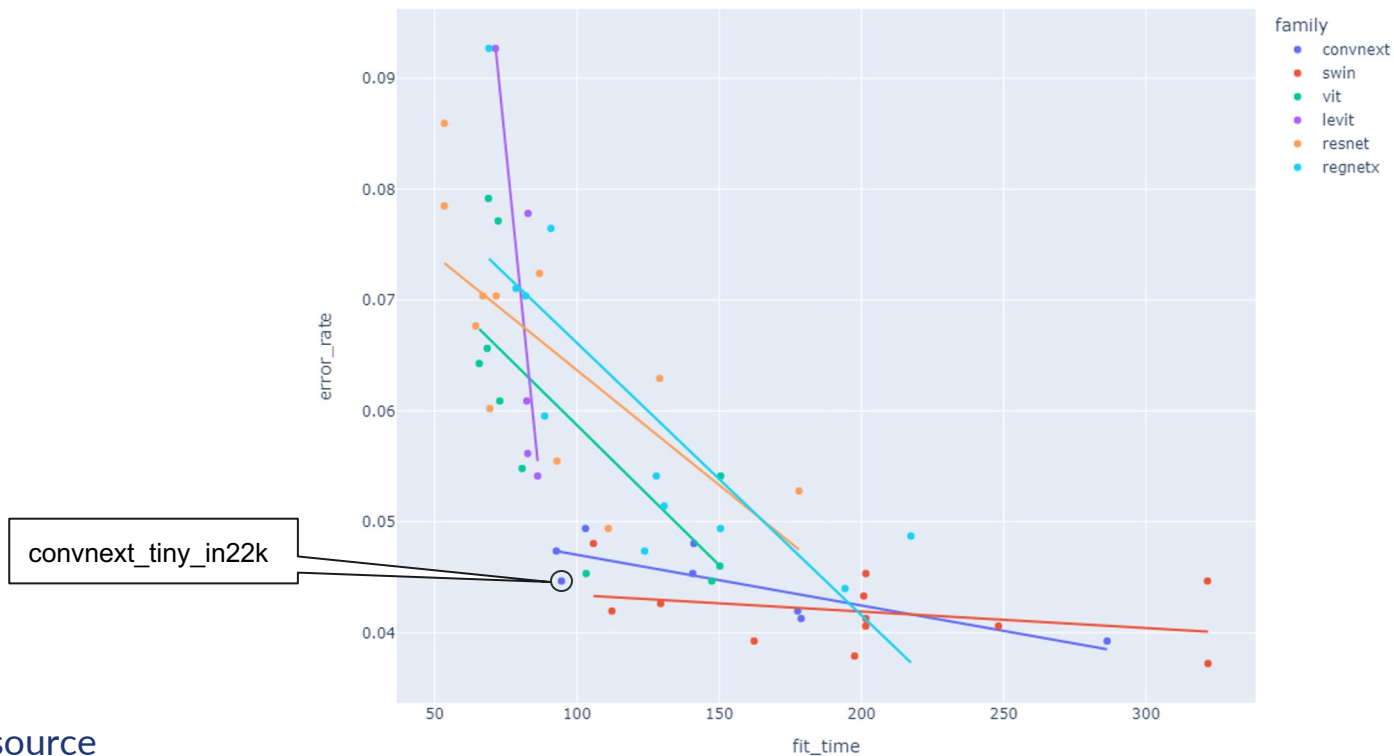


# New Approach - 1

## Different CNN architectures

- Jeremy Howard's notebook : [The best vision models for fine-tuning](#)
- We tried ConvNext, LeViT, ViT, etc.

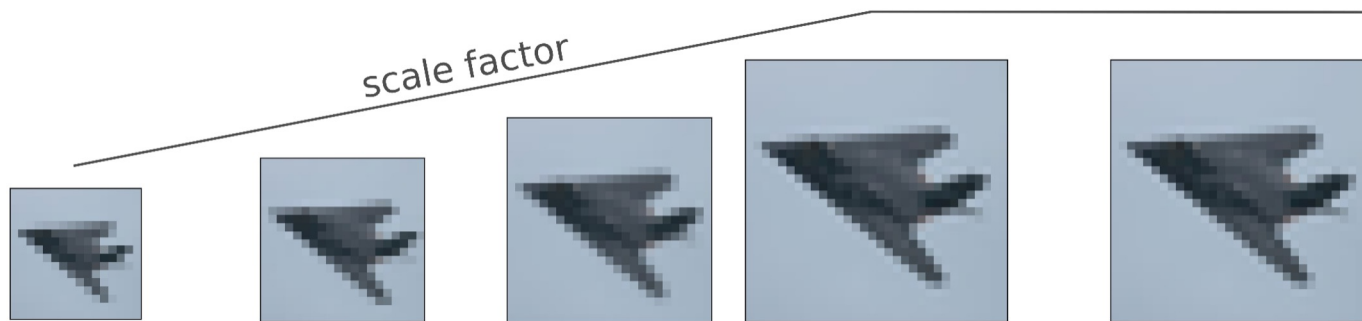
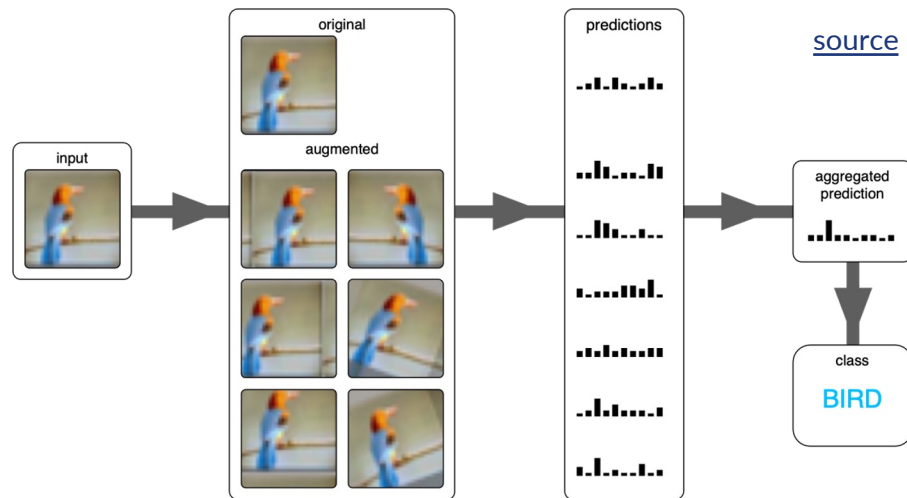
# Best CNN models for fine-tuning



## New Approach - 2

### Other techniques

- Test Time Augmentation (TTA)
- Progressive Resizing



Pre-Training

Fine-Tuning



# Deployment

- Used Intel Computer Vision Reference Kit ([website](#))
- Register trained model to MLFlow Server

Solution Notebook : <https://www.kaggle.com/code/ankursingh12/ai-for-social-good-intel-22>

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Questions ?

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# Thank You

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