Food Recognition Software for a Web-App

Team - Alcove

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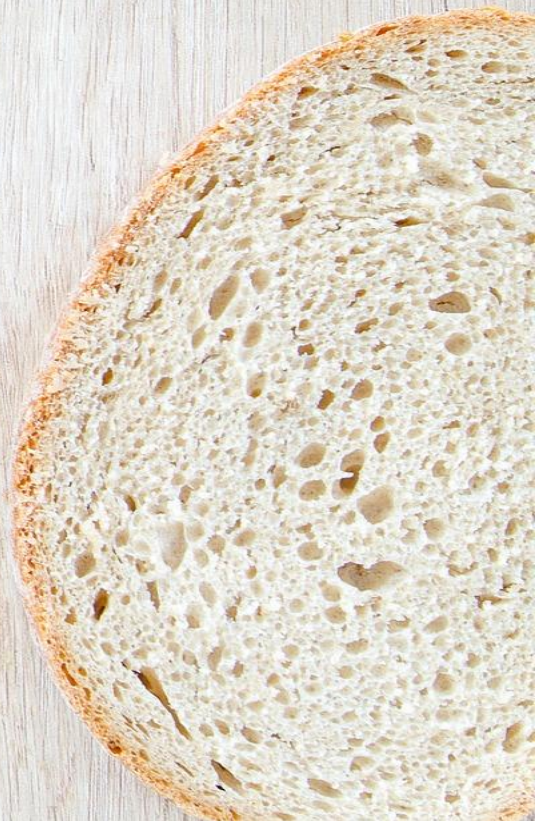
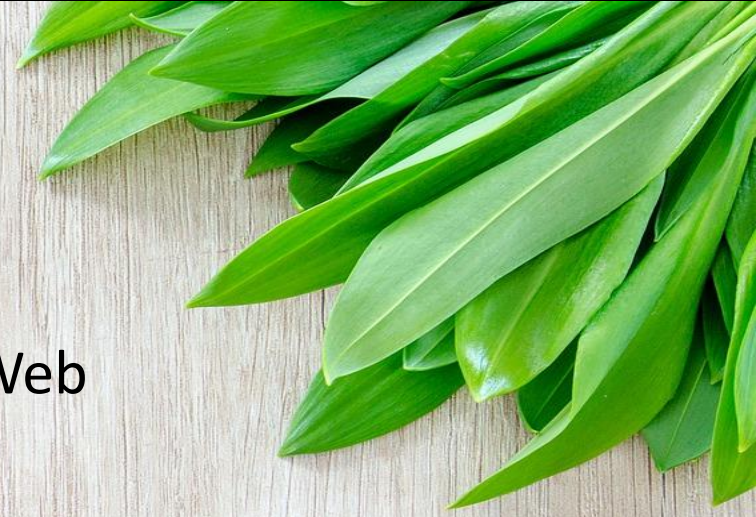


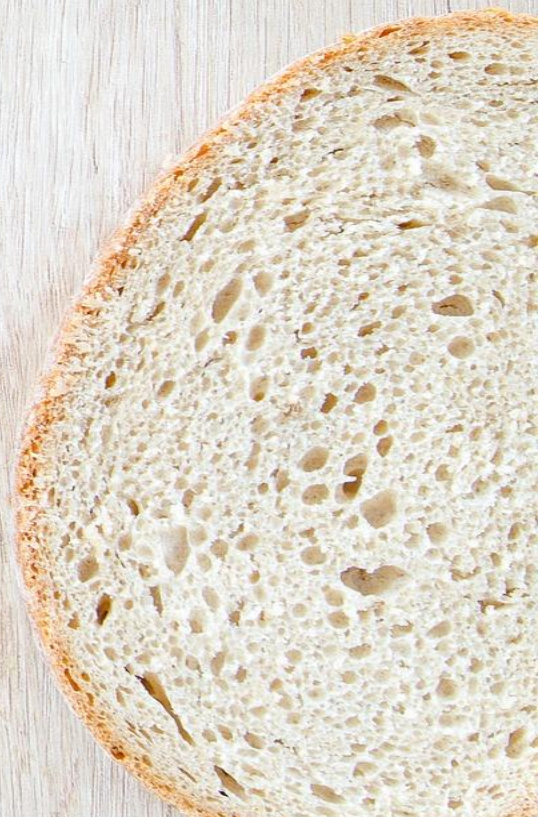
Introduction

- We are going to implement a Food recognition software into a Web app

- **Food-101 dataset** - This is challenging dataset consisting of **101,000** images of **101** different food classes. On purpose, the training images were not cleaned, and thus still contain some amount of **noise**. This comes mostly in the form of **intense colors** and sometimes **wrong label.**

- We are using this dataset because it contains normal food images taken by a **mobile phone** rather than **beautifully showcased food**, this is the main requirement for our app





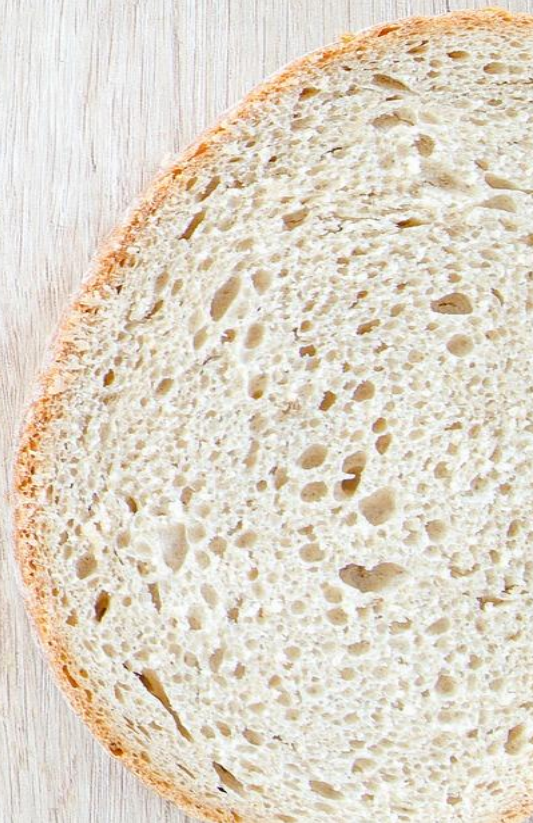
Motivation

- Consumers **waste** approximately **41 million metric tonnes** of food per year [1].

- A proposed solution to this problem is a **Free-Food Finding app** developed by students at Middle Tennessee State University, which enables normal people to donate food which would otherwise go to waste.

- But what makes a user to like and use an app regularly ?
  - An should be **User Friendly**
  - It should take **Less Effort**

- To Make this app **effortless and user friendly** we are creating a **neural network** that can **Identify food type**. And the user will not have to fill the form for that.



Aims

- This app requires manual input of information about the donated food, which makes the donation process tedious. In order to reduce the amount of work required to donate food, we propose the use of a Neural Network (NN) to automatically classify pictures of donated food.

- This reduces the work required to donate food on the app, by automatically classifying images of donated food, and recommending potential labels to the donor.

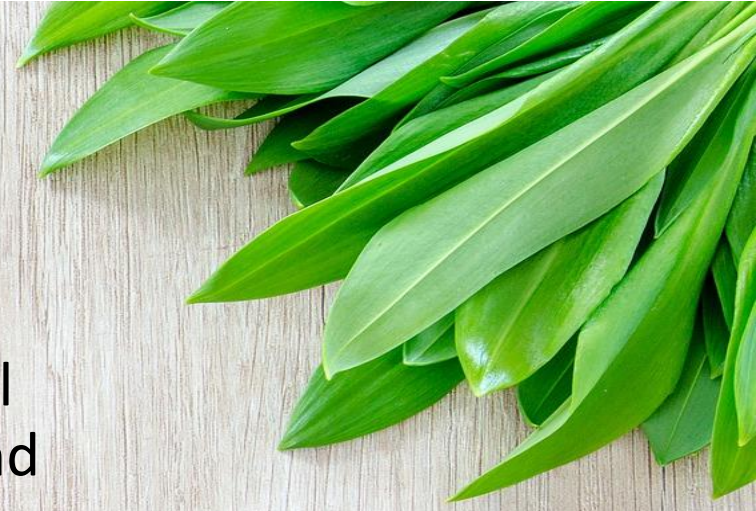
- Predicting the correct food type 100% of the time is of course ideal, but we are looking for reasonable result to predict most of our food with in top 10 prediction.

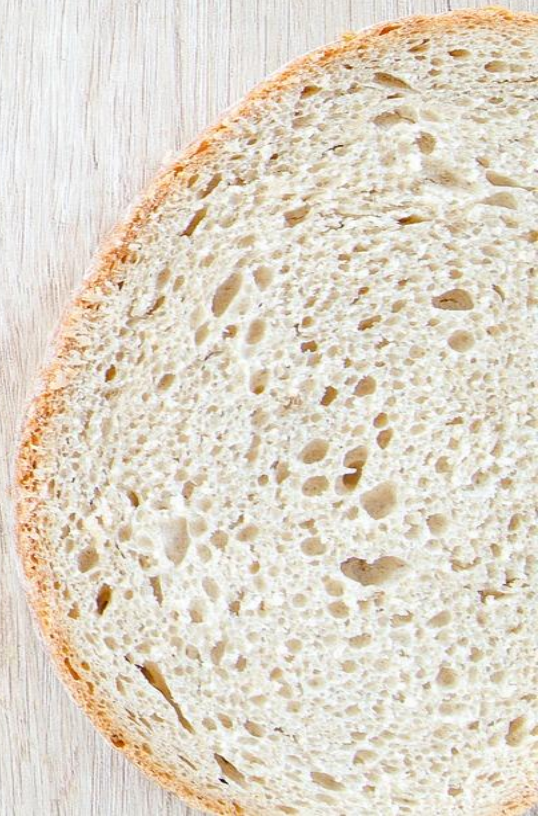
Aims Achieved

- We were able to create a Software which recognizes almost all food item with in top 10 and most of the food item in top 5 and almost half of the food item in top 10.

- We were able to implement this model into a web app that accepts and image and returns the food type.

- Predicting the correct food type 100% of the time is of course ideal, but we were looking for reasonable result to predict most of our food and we were able to achieve that.

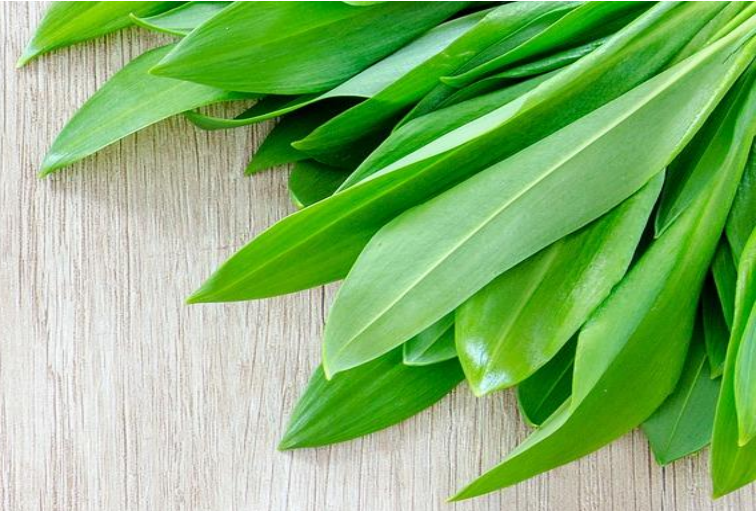


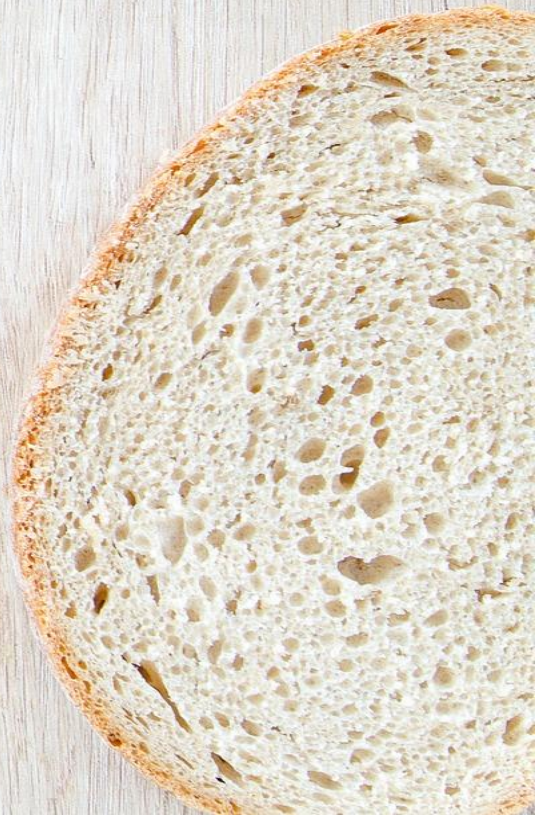


James

Research and Demo Creation

- Research Gathering for Project
- Introduction and Background sections in paper
- Data set Comparison
- Milestone
- Assisted in Demo Creation

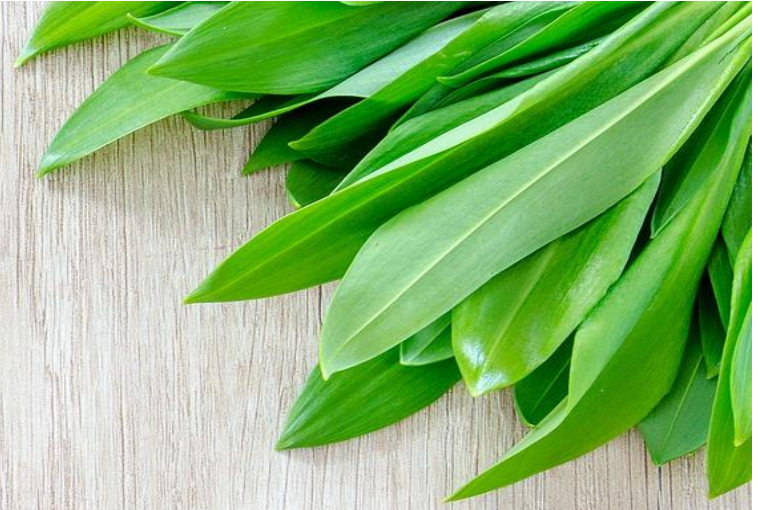


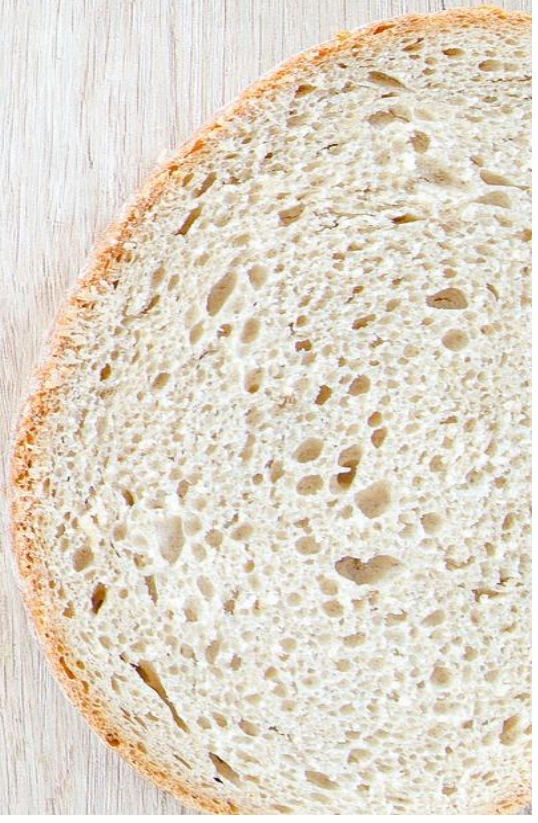


Elijah

Project Paper Documentation

- Mathematical Execution of Paper
- Research Gathering for Project
- Milestone

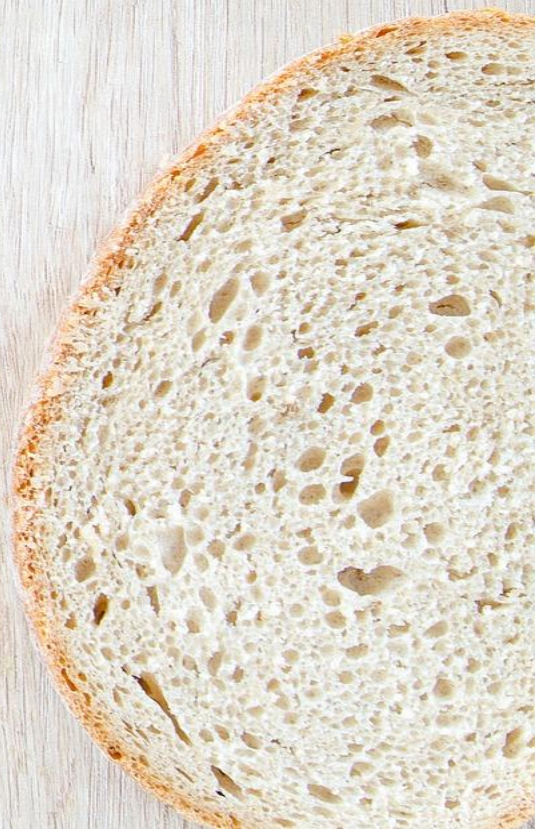




Luis

Methods

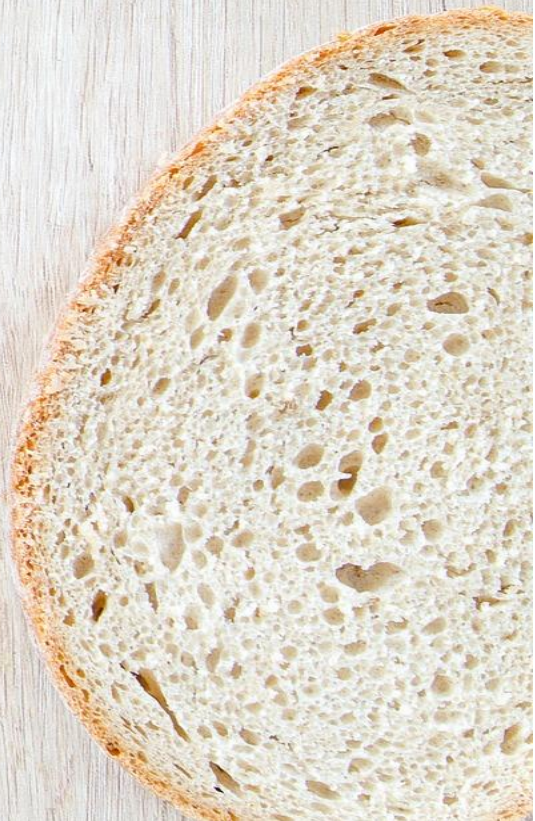
- Use MobileNet for small dataset.
- Implemented MobileNet With entire dataset.
- Implemented Interactive classification.
- We wrote the Model architecture part in the paper for 50 and 25 classes.



Steven

Creating and Evaluating our Model

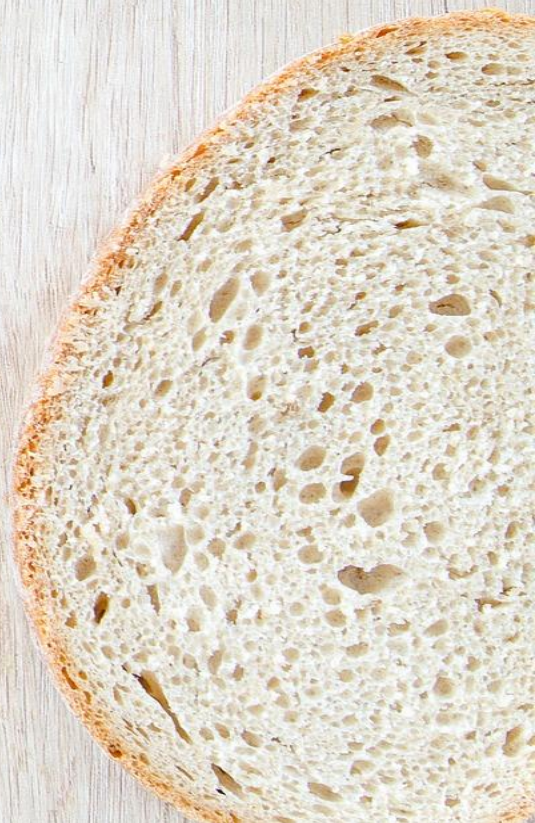
- Decided model (NasNetMobile)
- Implemented K-fold cross-validation
- Configured lazy data loading
  - Dataset augmentation
  - K-fold support
- Figure generation
- Reviewed paper



Heena

Model visualization , Web app creation, Documentation and Management

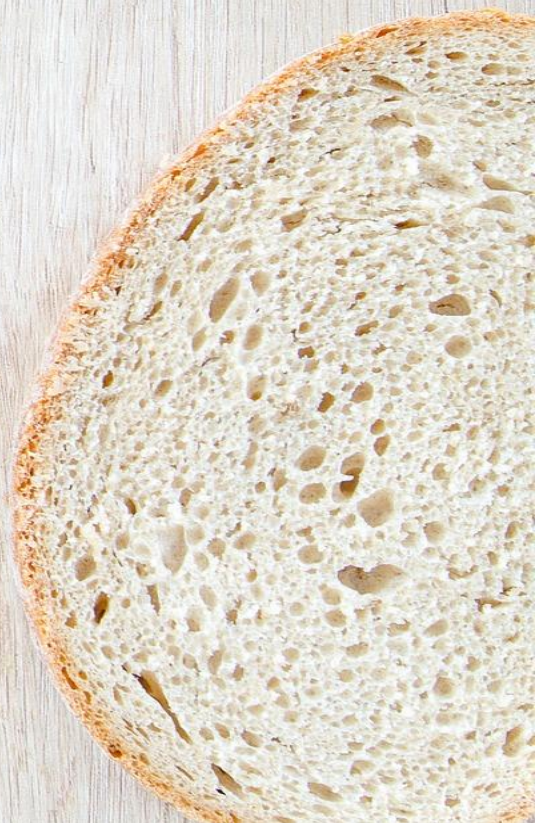
- Implemented **Top5 and Top10** accuracies
- Generated **visualization**.
- Created the app using Flask, vanilla JavaScript, HTML and CSS.
- Deployed our model to the web-app.
- Wrote **Methods** and **Result** section of our paper
- I have created the **Readme** page and the **demo**
- Created **Project Proposal** reviewed and updated **Milestones**
- Co-ordinated team meetings and Initiated work and strategies



Mason

Project presentation and Documentation

- Presentation
  - Condensed results into a slide, as well as creating individual contribution slides.
- Milestone Writing
- Assisted in Project Proposal



Matthew

Discussion

- Failed Miserably at contributing to network design
- Researched network design
  - NASNet – Designing a search space so the complexity of the architecture is independent of the depth of the network and size of the input images [0]
  - Convolution Cells – This approach used convolution networks composed of 'cells' with identical structures but with different weights.
    - ➢ This is much faster than searching the entire network architectures.
    - ➢ The cell is more likely to generalize to other problems – good for our project.
  - The original NASNet was trained on a smaller image data-set, then using the best convolution cells trained on a larger image data-set on ImageNet.
  - Our network used the weights that were pre-trained on this ImageNet.
- I now understand there is a set of weights that could achieve 100% accuracy on this task and that I will not be the one to find these weights.

References

- [0] B. Zoph, V. Vasudevan, J. Shlens, and Q. V. Le, “Learning transferablearchitectures for scalable image recognition,” 2017