

Report Date: 09/23/2022

To: ematson@purdue.edu, ahsmith@purdue.edu, and lee3450@purdue.edu

From: TOP GUN

- Heejun Park (parkie0517@gmail.com)
- Taeyun Kim (wwexodbs@naver.com)
- Hanbi Kim (hanbikim20@g.cbnu.ac.kr)
- Seokhyeon Heo (gj4535@gmail.com)
- Jeongho Ha (hjh4212@naver.com)

## Summary

Just like last week, our team members continued to study deep learning. Our team also discussed a detailed topic and decided to predict the sugar level of the apple using both machine learning and deep learning. In addition, Kyung and Jeff had a presentation about what they studied last week, and the sugar meter is on its way to be delivered soon.

## What TOP GUN completed this week:

- Kyung had a presentation on two papers related to our project, which are Machine Learning Based Classification of Apple Sweetness with multispectral Sensor, and Image. Recognition Using Artificial Intelligence.
- Then our team had a meeting for sharing thoughts on the two papers (Machine Learning Based Classification of Apple Sweetness with multispectral Sensor and Image Recognition Using Artificial Intelligence).
- Seokhyeon Heo had a presentation about online lecture #4 (CNN, Filter, Kernel, Stride, Padding, Pooling, Dropout, Convolution).
- Found a sugar meter on Amazon and submitted an equipment request mail to Dr.Matson.

- Hanbi Kim had a presentation about InFlearn online lectures #5 and #6 (CIFAR10, Weight Initialization, Xavier Glorot, and He Initialization, Feature Scaling, Batch Normalization, Data Augmentation).
- Hanbi Kim and Taeyun Kim created a draft and PPT slides for the upcoming elevator pitch.
- Jeffry wrote a summary for two papers related to our project, which is Machine Learning Based Classification of Apple Sweetness with Multispectral Sensor, Apple quality identification and classification by image processing based on convolutional neural networks.
- Heejun Park had a presentation about InFlearn lecture #7 (Pretrained Model, Keras Generator).

### **Things to do by next week**

- Prepare for an elevator pitch.
- - Start writing the introduction of the paper.
- - Start building Machine Learning and Deep Learning models for the topic.
- - Collect images and sugar levels of apples as datasets.

### **Problems or challenges:**

- Everyone in our team went to Prof. Hirst's Orchard with our TA Minji, and Dr. Matson to see the apple tree. Our team found out the difficulties of flying drones over the trees and taking the image of each apple. It was difficult to take a picture of an apple on the tree because apples do not grow just in one part. Also, it was difficult to detect the apples in the image since most of the apples were covered by the leaves. So, our team decided to not use the drone to take a picture for our project.

## References

Nhut-Thanh Tran, Quoc-Thang Phan, Chanh-Nghiem Nguyen, and Masayuki Fukuzawa. (2021). Machine Learning-Based Classification of Apple Sweetness with Multispectral Sensor. Presented at 21st SNPD Winter 2021, Ho Chi Minh City, Vietnam. [Online]. Available: [\[https://ieeexplore.ieee.org/document/9403506\]](https://ieeexplore.ieee.org/document/9403506)(<https://ieeexplore.ieee.org/document/9403506>)

Manish Kumar, Siddharth Sharma, Divy Chaudhary, and S. Prakash. (2021). Image Recognition Using Artificial Intelligence. Presented at 2021 International Conference on Advance Computing and Innovative Technologies in Engineering(ICACITE), Greater Noida, India. [Online]. Available: [\[https://ieeexplore.ieee.org/document/9404606\]](https://ieeexplore.ieee.org/document/9404606)(<https://ieeexplore.ieee.org/document/9404606>)

CHU-HUI Lee, and Jhih-Chen Jhou. (2021). \*\*A Non-Invasive Method to Classify the Sweetness Levels of Apples. Presented at 2021 5th International Conference on Artificial Intelligence and Virtual Reality(AIVR), Kumamoto, Japan. [Online]. Available:\*\* [\[https://dl.acm.org/doi/pdf/10.1145/3480433.3480453\]](https://dl.acm.org/doi/pdf/10.1145/3480433.3480453)(<https://dl.acm.org/doi/pdf/10.1145/3480433.3480453>)

Seonjong Kim. (2022). \*\*Analysis of Apple Colors and Sugar Contents Using Linear Regression.\*\* presented at The Journal of the Convergence on Culture Technology. Dept. of Applied IT Eng., Pusan National Univ., Korea. [Online]. Available: \*\*\*\*[\[https://koreascience.kr/article/JAKO202208148789847.pdf\]](https://koreascience.kr/article/JAKO202208148789847.pdf)(<https://koreascience.kr/article/JAKO202208148789847.pdf>)