

To,
IITD-AIA Foundation of Smart Manufacturing

Subject: Weekly Progress Report for Week 4

Dear sir,

Following is the required progress report to the best of my knowledge considering relevant topics and project objectives covered.

What happened last week - W3:

- Built the first primitive draft of the deep learning model.
- Optimized constraints and algorithms.
- Tuned hyperparameters.
- Achieved the desired accuracy.
- Explored Flask framework.
- Started with deployment (partially, very initial stages)

What's happening this week - W4:

- Deployment of the built application
- Using various deployment platforms and services
- Heroku, Netlify, Google Cloud Platform (GCP), Vercel
- Finally finishing the project

[PCB Fault Detection - INTP2022-ML-3 \(PCB-fault-detection.herokuapp.com\)](https://pcb-fault-detection.herokuapp.com)

The deployed Web-Application for detecting PCB Defects, given any input image

[PCB Fault Detection by Keivalya Pandya | INTP22-ML-3 IITD-AIA-FSM 2022 - YouTube](#)

The demonstration/tutorial of the working of the application

Weekly Progress:

June 20:

(Monday) As windows do not support a few of the libraries that I want to implement in my project, I decided to remotely access the computer from my institute (Birla Vishvakarma Mahavidyalaya) which has Ubuntu 20.04 OS.

- Implemented the code which just needs to be deployed onto the localhost of another Linux system.
- Documented most of the code, for better readability.

June 21:

(Tuesday) I finished with the localhost deployment of my Flask Application.

- Deployment into localhost using Flask Application Framework and FAST APIs.

Got appreciated by my mentor for my great work and the pace of my progress!! THAT WAS LITERALLY THE BEST PART!

June 22:

(Wednesday) I tried to deploy my flask application to the web however could not succeed.

- Turns out, that deploying my application to the web is pretty difficult with Heroku.
- Heroku asks for a particular file structure which is tough to replicate in our application.

Issues faced in using Heroku are highlighted below

- Heroku -

They have a limit of 500 MB, even if my app's size after compression is 453.1 MB (which kind of crossed their soft limit or warning for smooth conduct of the app - 300MB) when run, it expands to over ~1001.3 MB. I tried several ways in which I could expand this limit, even if temporarily, but turns out, there is no way to do that.

June 23:

(Thursday) Using Google Cloud Platform (GCP)

- I started with deployment in Google Cloud, a new project and deployment into its bucket.
- Google Cloud asked for credit card details, which apparently showed invalid even after entering the correct one.
- The free trial didn't work at all. Even the credit transfer failed.
- Advantages of GCP:

Getting really good results. Just lacking the required free credits to deploy. Otherwise, system build, model testing, hyperparameter tuning and ease of making any changes further, are incredibly impressive. I think this platform is really promising for deployment, as well as will provide great scalability.

June 24:

(Friday) Added real-time fault detection capabilities to the project.

- Deployment of the FAST API application is getting difficult now.
- Turns out my app has a significant number of dependencies and that will make it very difficult for my app to be replicated to any server or a cloud platform.
- That said, what I learned is, real-time detection of defects.
- This will convert my model into a real-time image-capturing machine.

Made transition of my model from being static over the web, to detecting defects in real-time.

June 25:

(Saturday) Deployed a local streaming host, as a real-time PCB Defect Detection on Web Camera, the setup will easily capture video streaming and taking that as an input it shall generate the output. Also, Improved the model by accepting only the defects that show over 70% confidence.

Moreover, faced several issues in deployment with Netlify and Vercel.

- Netlify -

I have specified in every deployment environment, that I will need Python 3.8.10 for this app to work well. However, seems like Netlify doesn't provide 3.8.10, without which, some of my dependencies will not really work or instantly crash.

- Vercel -

With my previous experience in deployment with this system, I gave it a shot, however, they do not have a very structured Linux background, that is, their Linux version is outdated and doesn't have `_lasm` library pre-installed, which is a primary requirement for CMake. In order to upgrade that, one has to `sudo` install the required package in its terminal, which here, is impossible to access.

June 26:

(Sunday) Finally finished with the deployment of the model too.

I have particularly used Herokuapp in order to deploy the model. Some internal environment parameter tuning helped me deploy such a heavy model to the web.

[PCB Fault Detection - INTP2022-ML-3 - Swagger UI \(pcb-fault-detection.herokuapp.com\)](https://pcb-fault-detection.herokuapp.com)

This is the deployed application.

[\(1766\) PCB Fault Detection by Keivalya Pandya | INTP22-ML-3 IITD-AIA-FSM 2022 - YouTube](#)

The demonstration/Tutorial to use the app can be found here.