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**CIS5898**

**Fourth Progress Report**

Since the last progress report, SeedID has made significant progress in enhancing both the functionality and user experience of the model. The training model has been optimized to achieve better prediction accuracy. This was done by adjusting the model architecture and parameters. I increased the number of epochs to allow more extensive training and fine-tuned the learning rate for more efficient convergence. In addition to utilizing the resnet50 model, I applied data augmentation techniques, such as rotations and flips, to enhance the model’s generalization and robustness. In order to support the process heavy training methods I had to leverage the GPU (as expected). However, I again encountered limitations with GPU usage in TensorFlow, as it only supported up to Python 3.7. To leverage GPU acceleration, I had to fall back to utilizing the PyTorch framework.

Comprehensive try/except blocks were added to handle errors within the critical functions. This helps to prevent program crashes and improves overall reliability. Logging was implemented in detail with a new class, named CSVLogHandler, which writes log entries to a local CSV file. It tracks events at different levels, such as INFO, WARNING, ERROR, and assigns each event its appropriate timestamp. This class includes three key functions:

1). initialize\_log\_file(): which sets up the CSV log file with headers if it doesn’t already exist

2). log\_to\_dataframe(): which appends a new log entry to the CSV file with the timestamp, level, and message.

3). Emit(): to handle a log event and send it to the cvs

The log entries appear as such:

A screen shot of a computer

Description automatically generated

A pile of yellow corn seeds

Description automatically generatedThe user interface was also enhanced by adding an embedded console for real-time logs, improving the application’s layout, and enhancing the color scheme for better readability and visual appeal. The new GUI now displays log messages directly in the interface via an alertbar, making it easier to monitor any issues that arise during training or prediction.

In summary, the recent updates have made the model more accurate, the application more resilient, and the user experience more seamless. With the submission of this report, I am also including the model (as requested). Though it is in a .pth file so I hope it uploads and is readable.

TODO items:

1). Expand seed classes

2). Get tier 2 seed images

3). Research/host the program online

4). Improve UI

5). Ensure everything is backed up on the cloud.

6). Create unit tests