Coursework: Participating in a AICrowd challenge
Crowdsourcing and AI

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The work done for the AI blitz challenge 8:

For this coursework, the received task was to participate in a AICrowd challenge and also observe how the participants behave. The chosen challenge was the 8 AI Blitz challenge: https://www.aicrowd.com/challenges/ai-blitz-8.
I chose to participate in the smoke elimination: https://www.aicrowd.com/challenges/ai-blitz-8/problems/f1-smoke-elimination.

At the beginning, i posted only the baseline as submissions to test the submission process and to see what score i need to improve on. The baseline just submits
I had been working on the code and looking around the web to have some ideas, and test some codes to see how it might improve the AI.
I had some problems with installing some libraries, and had some memory problems as the program took a lot of memory.
I had some RAM problems due to the large number of images in smoke elimination. I have used Colab and my machine to test some part of program, like training the model, in order to make it train faster than Colab.
Colab is quite useful to run parts of the code in different cells, which avoids to run all the code multiple times, if some part of the code has some errors, and just fixing the cell who had errors.

I tried to work on smoke elimination, but also tried to do the speed detection, as I had been having troubles with the smoke elimination challenge, and I wanted to at least manage to improve a challenge. In the end, both challenges were improved compared to the baseline submission.

For the smoke elimination, I thought of using a GAN(Generative Adversarial Network) in order to transform the images containing some smoke into images without any smoke, with the generator

part doing a synthetic image, trying to match closely the clear image, because it seemed appropriate for use to solve this smoke elimination problem.
It might gain a better score than the given baseline, since the baseline does not change the test images, it returns them unchanged. The baseline score is a MSE of 56.560.

The main idea was to train an AI to transform an image with smoke into a clear image, by learning to associate a smoke image to the same image without the smoke, and trying to generate a clear image from an image with smoke.
I took the code from that site: https://machinelearningmastery.com/how-to-develop-a-pix2pix-gan-for-image-to-image-translation/ for the smoke elimination, and it did work, unfortunately the training part takes a very long time, especially with the use of the CPU, thankfully the program saved a model after 10 epochs, which gave me the possibility to test the various models, and to find one that would posses a better score.
Also I took a small part of the training data, about 2000, as the full training data took a lot of memory, slowed extremely the computer and then inputted an error, saying that I needed to upgraded my RAM.

In fact, on the 22th of May, the training loop had been going on for about more 48 hours, and it was not yet finished. Thankfully a combination of using my computer for training, and of using Colab online for predicting the test set, allowed me to try the models made after each 10 epochs of training.
After testing a few models, the model made after 40 epochs finally begins to improve the score a little bit, and it seems that the stabilises around 70 epochs.

This result showed that the model did seem to require more training epoch to better perform the task of a similar image without any smoke from an image obscured by smoke. After testing a few more models, it seems the score is improving very slowly, due to the lack of training date.
A possible way for score improvement is to load more training data and add it into the model, which would make the loading of data heavier for the RAM, and might make the training part even longer.

After using more of the training data, a quarter of the data, (10000), and after only one epoch, the result was much better with a MSE of 36.882, indicating that an increase of the data might help improve the score, but not always, as one model who had 5 epoch and has the same quantity of training data, worsened the score compared to the baseline score, increasing the value of the MSE.

Also the training and the testing part were much quicker, as I managed to use the GPU instead of the CPU, by following a guide showing what I needed to installed allowing the recognition and the use of GPU. The guide: https://www.tensorflow.org/install/gpu.

For the speed detection challenge, https://www.aicrowd.com/challenges/ai-blitz-8/problems/f1-speed-recognition, at first, i tried to grayscale the images which did not improve the score, but worsened it.

Then i tested some different models to see if it would impact the performance of the training and might help improve the score.
The squeezenet1_1 gave some very bad results for the speed recognition, whereas the resnet18 improved the score a lot.
It showed how some models could solve more efficiently some problems compared to others models, whereas with another problem, the same model might do poorly.
The resnet34 improved a little bit the score, but the major downside was that it took a lot of time to train/compute it, due to the complexity of the model.
So the choice of the models depended on the improving the score while having an acceptable training time,.

I looked most of the time for information online, while trying some parts of code and trying to understand how it works, in order to see if I could use it to improve the program and have a better score.

For curiosity, i tried, submitted and modified the baseline for each challenges.
For F1 team classification and F1 car rotation, i also changed the model like in F1 speed recognition, using the resenet18 model.
For F1 car detection, i increased the iterations and decrease the base learning rate. My best submission used an iteration of 5000 and a base learning rate of 0.00005.

All my submissions: https://www.aicrowd.com/challenges/ai-blitz-8/submissions?q%5Bparticipant_name_equals%5D=MichaelMosimann.

Observations on the participants of the AIcrowd.

For smoke elimination, on the beginning days of the challenge, there was already some submissions, some were to test the baseline code, others already made some good results improving upon the baseline score, a MSE of 56.560.
The winner for the smoke elimination problem was Denis_tsaregorodtsev with a MSE score of 12.328.
Looking at the insight tab, it reveals some daily submissions, with the minimum of 1 submission, during the lifespan of the smoke elimination challenge.

At the beginning and during the challenge, there was not much discussion between participants in the discussion tabs of the AI Blitz challenges. It was mostly bug reports, like about submission limits.

It seemed that the participants weren't discussing with each others during the challenge, as only one has giving some help to possibly improve the score on the 14th of May. The hint was to sort by index, since the resulting file wasn't sorted, and after testing it, i saw that it had indeed improved the score of the file.
The user is called Victorkras2008, and here is the page: https://discourse.aicrowd.com/t/you-can-improve-your-results-if/5627. For this challenge, Victorkras2008 has been the most active in the discussions.

Looking at the leaderboard, it's interesting to note that the people holding the top places, hold the first place on most of all the challenges in the blitz, and in the case they didn't hold the first place, they remained in the top of the leaderboard.
This information seems to show that the AI Blitz challenge and AICrowd manage to attract some good AI programmers, as some of the participants were really good at improving the score, and that some already managed to get the top score on the day the challenge began, on the 4th of May.
With these observations, it leads me to think that most participants are more in a competitive state than a helpful mindset, trying to win the reward or have the best score.

The insight page shows that the curve of submissions during the challenge, and reveals there was at least some daily submissions. An interesting fact is that some participants submitted even after the challenge ended, maybe to test themselves or for the enjoyment of creating Ais.

I checked the AIcrowd discord to see if the participants used this to help each other. For this challenge, the AIBlitz room was used to complain about the baseline(the F1 Team Classification)

giving a perfect score for the first challenge, and it seemed the participants didn't also help each other for this Blitz challenge on Discord, although the discussions in the some of the other chat rooms show that some participants do chat with each others, and help each other on the other challenges proposed on AIcrowd.
The other challenges might be more active, and more interesting for the others participants, as they may yield different rewards and challenges to work on.

The participants of AIcrowd can use the https://discourse.aicrowd.com/ page or discord to chat, https://discord.com/invite/5Q7Tfww3tk, either with the other participants or staff members. There was about 1411 members on Discord, last time I checked the Discord, the number might have gone up since then.

On the 16th of May 2021, there was 123 participants and 12 teams. On the 19th of May, there was 144 participants and 13 teams. On the 20th of May, at 10:49 am, there was 150 participants and 14 teams, and no new discussion and notebooks in the blitz page. On the 21st of May, at 10:25 am, the number of participants was 152. On the 22nd of May, there was 154 participants.
On the 24th of May, they were 158 participants in this blitz challenge.
Even after the challenge ended, a few people joined the challenge and on the 16th of June, there was 168 participants. On the 19th of June, there was 170 participants.

Some challengers made some notebooks about their codes, only after the challenge has ended, expect for one user who posted his notebook, a few days before the challenge ended. Most of them are about the smoke elimination problem and one notebook is for the speed recognition.

On the 28th of May, AIcrowd sent a mail announcing the winners of the AI blitz 8 of both categories, which were leaderboard topper and community contributor. The winner of leaderboard topper was Denis_tsaregorodtsev and the winning team was Mercedes_AMG_Petronas_F1_team.
For the community contributors, the winners were derinformatiker and devesh_darshan.
Derinformatiker made a topic on the discussion tab of the challenge to indicate that his solutions are on Github.

The AICrowd members were planning a new AI blitz challenge 9 about natural language processing, and they also had a survey about the AI blitz 8 challenge, to help improve future AI blitz challenges.

Around the 8-9th of June, the new AI blitz has been launched, and as of the 16th of June, there is 162 participants and 16 teams, more than the start of the AI blitz 8, which shows that this new challenge, about natural language processing, might be more interesting for these participants and more people. On the 19th of June, there was 175 participants and 17 teams, more than the previous blitz.

There is also a few notebooks from participants eager to help the other participants, for the blitz challenge 9, more than the previous blitz.

A big thank you for this page: https://machinelearningmastery.com/how-to-develop-a-pix2pix-gan-for-image-to-image-translation/.

Colab for smoke elimination: https://colab.research.google.com/drive/1Ng0iGJMIAr6RKKgg4SojRYk4EsweozAv#scrollTo=vKvmjIFzuqBd.

Github for the AI blitz challenge :https://github.com/MichM31/AICrowdBlitz8.