

Module 2: Sorting images with fast.ai (part 2)

John Keefe: Let's continue with our helicopter maps and see if we can sort them into maps to where the helicopters are hovering and maps where they are not hovering.

OK, we're back in our Google Colab notebook looking at these helicopter maps. We've loaded in our data here. We're already to go. Now we're going to actually use that data to train our model. And remember, we're using the resonant 34 model as a base and then we're going to add our data to it. And that's happening right here. You can see in this line, here's the resonant 34 model and here's the data. And we're combining those two things into what's called a CNN. And that stands for convolutional neural network. And it's a learner. It's going to learn how to apply this data and this model to train it to recognize the difference between circling and not circling, which are two labels.

All of that will go into this learn variable, which will be able to use as we go forward. So, here is that moment. We're just going to put that all in there and you'll see it's downloading the resonant 34 model from the Internet because it didn't have that. So, it's now got the resonant 34 model, the data all together into this learn variable. And this is the moment of truth. We're actually going to use this line here to say, 'train this model.' Go ahead and go through eight cycles of training. And each of those cycles takes a few seconds, so I'm going to let this run and we'll speed up the video here, so you don't have to wait for it all to complete.

OK. So, our training is done and our error rate is down to about 11 percent. That means that 89% of the time it's getting it right, it's able to look at a helicopter map and correctly choose whether or not it's circling or not circling. Now, your numbers are going to be different. It's going to depend on what random separation the computer did for your data set. If you're getting error rates that are just really high, go ahead and just restart the entire notebook.

You can't just go ahead and train it again. The best thing to do is to reset the runtime using that runtime map, which is the runtime menu, which is up here, and just reset the run times and then you can try it again. But let's see how we're doing here in our little example. I can actually plot the cases where the computer got it most wrong and just sort of see how it's doing. It definitely had some mistakes here. And you can see that here; it thought it was circling and it wasn't. And here it's definitely circling, and it had guessed that it wasn't circling. So, there's still some work to be done for sure.

We can actually figure out some ways to improve this. Something that's kind of cool is if you go up in here and you add this heat map equals true, you can actually see where the computer is looking to determine whether or not it's circling. You can see basically what it sees. And here actually, interestingly, it definitely is zeroing in on the circling part, but it still guessed that it wasn't circling. See, here's prediction and actual. So, it guessed it wasn't circling. So that's not good. Same over here. But still, we have a pretty good percentage otherwise. These are just the worst examples that it had. Even here, it did determine that it was circling, but it wasn't super confident about it. So, let's go ahead and see.

Oh, there's one other thing we can look at here. You can look and see sort of how badly it's doing or where it's doing. So, this is the actual on the y axis. This is the predicted guess by the computer on the x axis. So, most of the time it predicted circling and it was actually circling or predicted not circling and it was actually not circling. And there are four cases

where it made some mistakes. So that's actually kind of helpful. This looks pretty good, actually. You want this to be a lot stronger, obviously, than these.

Let's try a fresh image that we haven't seen before, the computer hasn't seen before. So we'll load in this fresh image. Let's take a look at it. There is the fresh image. I would say that's circling. What does the computer say it is? So, here's our prediction. We can do learn, not predict, on that image, images, image here. We open that image and it'll feed you get three different variables here. So, we're going to first run this and do the prediction and let's see what their prediction is. Circling! Yes, it correctly guessed this was circling. So that worked, OK.

If we have a model that we really like, we're going to want to save it. We'll learn how to do that in the next video.