Machine Learning and Pianos is a project about teaching a piano to play music on its own. The piano is set up in such a way that, after a customer has played for a few minutes, the piano is able to keep playing similarly to how the customer was playing. The piano is also able to adapt the customer’s piano playing so that it sounds similar to the music of great players such as Chopin or Bach.

Everything starts at the piano. When the customer starts making music, the piano outputs MIDI data that represents all the notes that are being played. This data is sent to a raspberry pi that then processes the data to spit out a MIDI file, and a JSON file representing the song the customer was playing. Both of these files are then uploaded to an Azure Blob store. We can then take the MIDI files and run them through a Tensor Flow machine learning algorithm to train a new model to play using those files as examples. Or, we can take the JSON file and feed it to one of the existing models, such as the Chopin model. This will then output a MIDI file that will be the piano’s interpretation of the customer’s music as if played in Chopin’s style.

This project can be used for many different things. For one, it could be used as an installation piece to delight passerbys. Somebody can come up to the piano, play for a bit, and then hear what the piano creates from that. It could also be used to aid in the music composition process. If a customer is trying to create a new song but they hit a writer’s block, they could feed our models some of their ideas, and see how the piano can play off of those. Or it could idea a customer such as a singer who wants to add a backing track for their vocals, so they could play a simple melody for the piano, and then use the song the machine learning model outputs as their backing track.