# Musical Intelligence: Progress Update

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November 10, 2019

## 1. Project Goal

The goal of this project is to develop a program capable of listening to simple melodies and extracting the musical notes being played. If possible, this program could be extended to recognize the instrument(s) and the beat of the song. For more information, see the project description report.

## 2. Project Progress

The project has not progressed tremendously over the past few weeks due to lack of time to work on it. Nonetheless, the program is now capable of recognizing single notes from a real piano, and can effectively reconstruct simple melodies that it hears, which is an important advancement.

## 3. Progress Report

A simple Naïve Bayes classifier was trained to recognize individual notes ranging from C2 to B6 on an ES8 piano. The labelling was done using MIDI files and the actual notes were recognized from the corresponding WAV file. The data is taken in chunks of 7000 ticks (~2.26 ms) and the classifier is trained on its Fourier transform. The accuracy both on training and testing is 100%.

A program which reconstructs a WAV file by first finding the notes, and then recreating the corresponding WAV file, is almost completed. Once done we will be able to test whether the program is really capable of recognizing any simple melodies, featuring 1 note at a time.

There are no exact metrics to date to evaluate the real performance of the model; so far it is done by ear and by manual inspection. This is because it is not relevant if the model recognizes a note a few milliseconds early or late; so long as it is the correct one and appears roughly at the correct time, it is considered correct.

## 4. Next Steps

Once the evaluating program will be completed, it will remain to extend the model to learn to recognize multiple notes, if time permits. From there, we will have to realistically conclude the goals of the project.

## 5. Project Presentation

At the fair, the program will be presented. Original and reconstructed melodies will be compared (with headphones). The poster will explain the inner workings of the program, the challenges that have been overcome, and those that yet lie ahead…