

## **Project Roadmap**

### **Objective**

Design an LLM- powered platform, that utilizes to precisely detect each musical note across different music sheets, generates the recognized sheet music in MusicXML format, with the added functionality to validate and correct notes according to musical rules and grammar.

### **Example Input**

The user uploads a Music Sheet in any of these 3 formats- PNG, JPG/JPEG & PDF

### **Expected Output**

- Corrected Notes (If there is any error in uploaded music sheet) by LLM
  - An option to download the output in MusicXML format
  - Visualize colored notes, created by overlaying recognized notes on the original image with unique colors.
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### **1. Tech Stack**

- **Programming Language:** Python, reactJS
- **Libraries:**
  - **Computer Vision:** OpenCV, Pillow
  - **Pre-trained OMR Model:** Audiveris

- **MuseScore:** For OMR dataset generation and verification [Using musescore tool in Python]
  - **Machine Learning:** TensorFlow, PyTorch
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## 2. Data Source(s)

- Public Optical Music Recognition Datasets [https://apacha.github.io/OMR-Datasets/] and proprietorship dataset
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## 3. Image Preprocessing

- Preprocessed the sheet music image to enhance recognition accuracy by removing noise.
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## 4. LLM for Contextual Analysis, Validation and Correction

- Implemented gpt-4 to infer note relationships, measure types and contextual musical patterns.
- Integrated gpt-4 to ensure the output adheres to musical grammar.

Example Input to LLM:

Notes: C4, E4, G4, B4

Context: Common time signature

Output the corrected sequence if there are errors.

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## **5. MusicXML Conversion**

Generated MusicXML from the recognized notes.

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## **6. Applying Colors to Notes**

Defined a color palette for notes and overlaid it onto the original image: