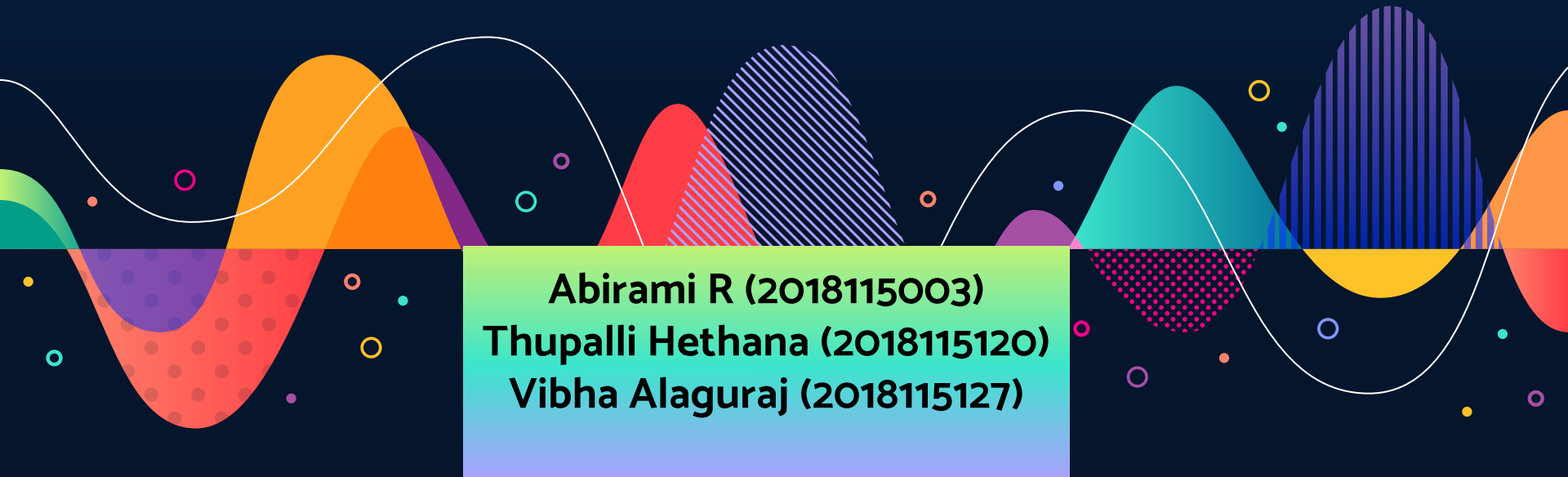


Creative and Innovative Project: Sounds of Music

You can learn music too!

The background features a dark blue field with several overlapping, colorful waveforms and geometric shapes. These include orange, red, purple, teal, and yellow shapes, some with patterns like dots or stripes. Small circles in various colors (pink, green, blue, yellow) are scattered throughout. A white line also traces a wave-like path across the image.

Abirami R (2018115003)
Thupalli Hethana (2018115120)
Vibha Alaguraj (2018115127)

Problem Statement

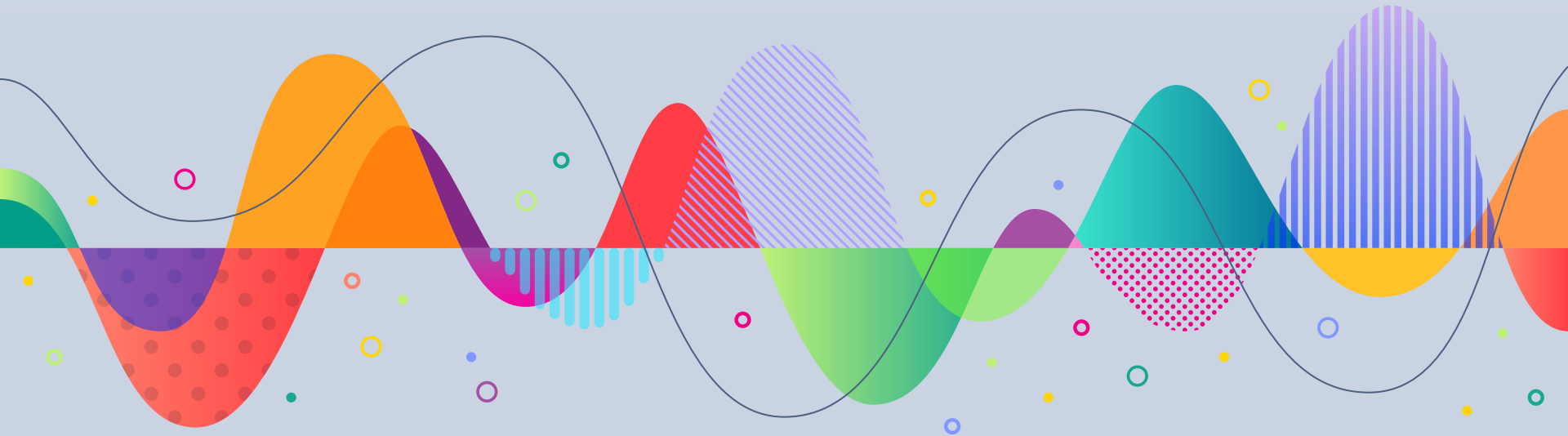


- ▷ For beginner music learners, understanding sheet music and learning to play notes will be tough task
- ▷ If they are learning individually, it is hard to distinguish if the notes played are correct

Proposed Solution:

- Create an mobile application that allows user to take a picture of sheet music
- Convert it into readable format
- Based on instrument, show visual representation of how to play note
- User then plays the note from their instrument, app will comparing the audio with note, and give feedback, if they are playing right or wrong

WORKFLOW:



Part 1

- User will take picture of sheet music
- Then we use image processing technique and change that into text representation
 - Remove lines
 - target image for instances of each music character type such as notes, flats, and sharps
- Text representation will continue next for teaching user
- Text will also be converted MIDI file
 - From MIDI file we will get the audio file in desired formats
 - We will use this again after teaching user





- Steps:
 - Image Filtering / Binary Conversion
 - Template Scaling
 - Character Classification
 - Classifier Thresholding
 - Note Identification and Sequencing

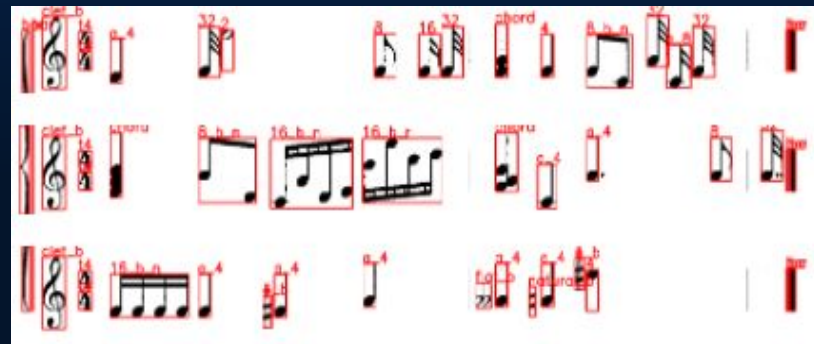




Image Processing Techniques

Text
Representation

```
( [ \meter<"4/4"> g e f d c/1 c d/4 f e g ],  
  [ \meter<"4/4"> c0/1 d/4 f# e g g e f# d c/1 ]  
)
```

Convert to MIDI file



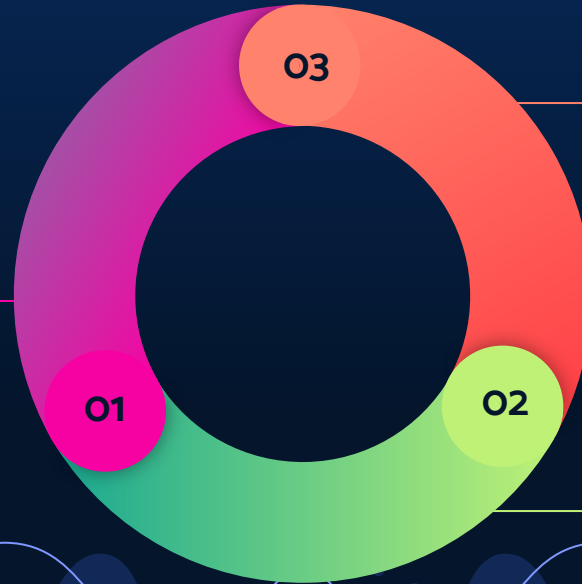
Convert to other audio fomats



The user will then select the instrument like guitar, piano

Part 2

Based on the readable format/
text format from
OCR, select note
and show a picture
on how to play
note



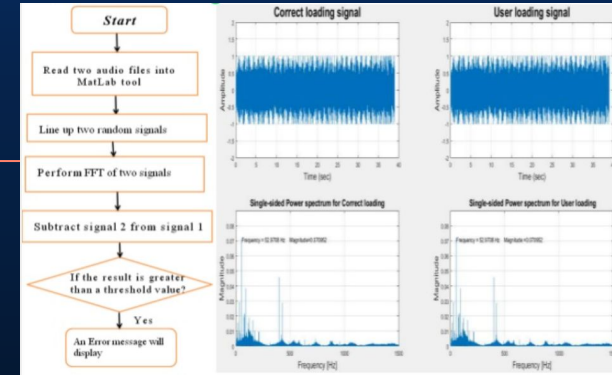
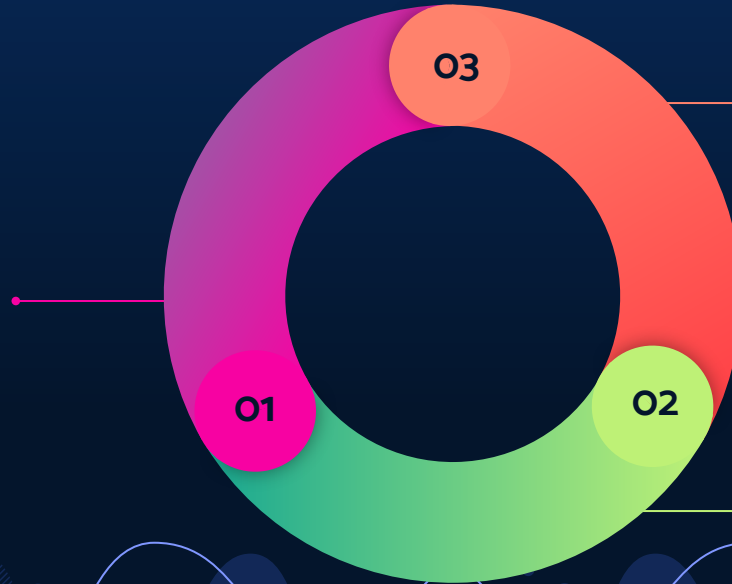
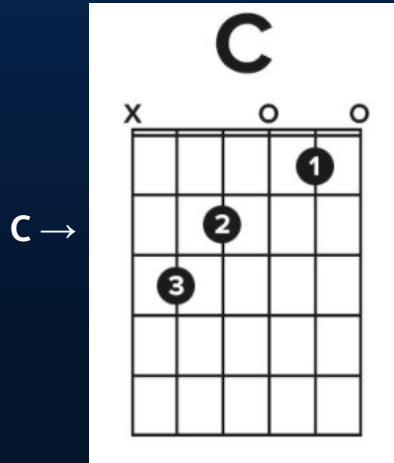
Based on the note,
compare live instrument
audio with audio saved for
that note, app will
compare and give
feedback

Correct: move to next note
Wrong: ask to play note
again (option to skip)

Ask the user to play that
note in their instrument

Once user selects
instrument: (GUITAR)

Part 2 (with Example)



Implementation/Technologies to Use:

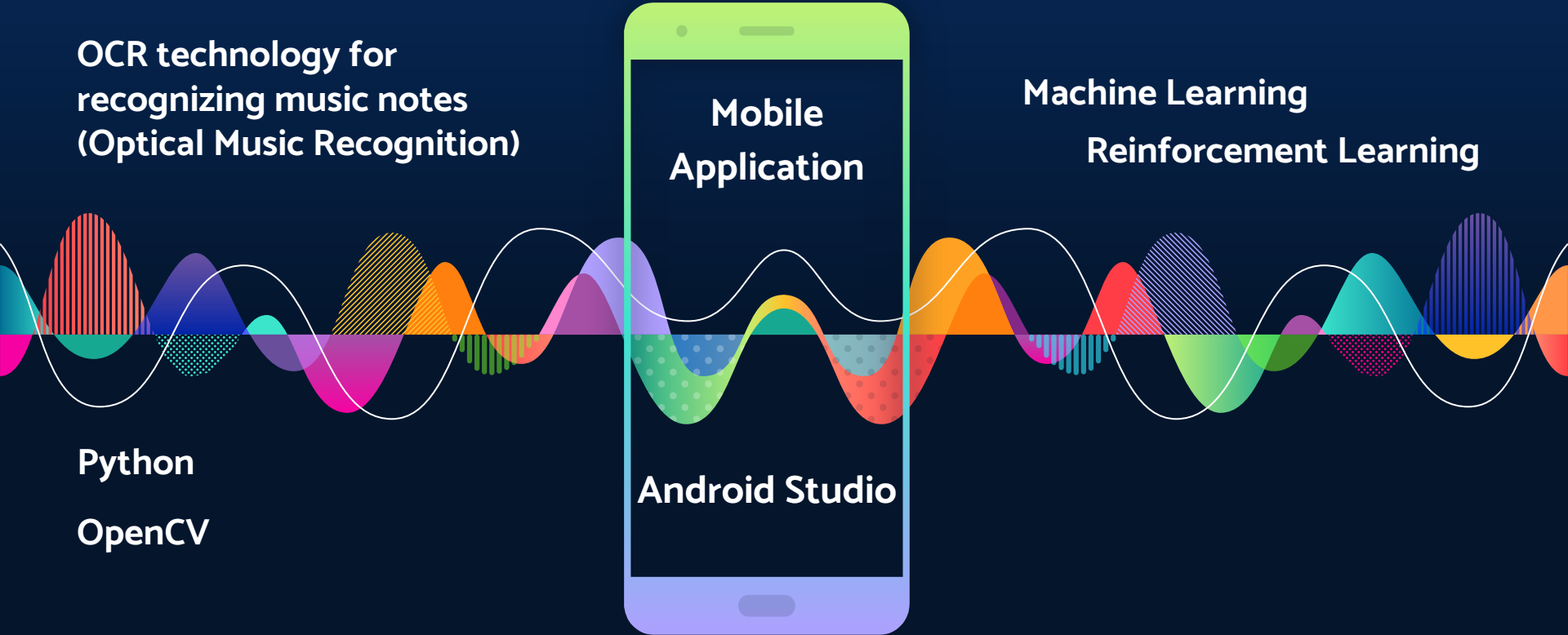
OCR technology for
recognizing music notes
(Optical Music Recognition)

Machine Learning
Reinforcement Learning

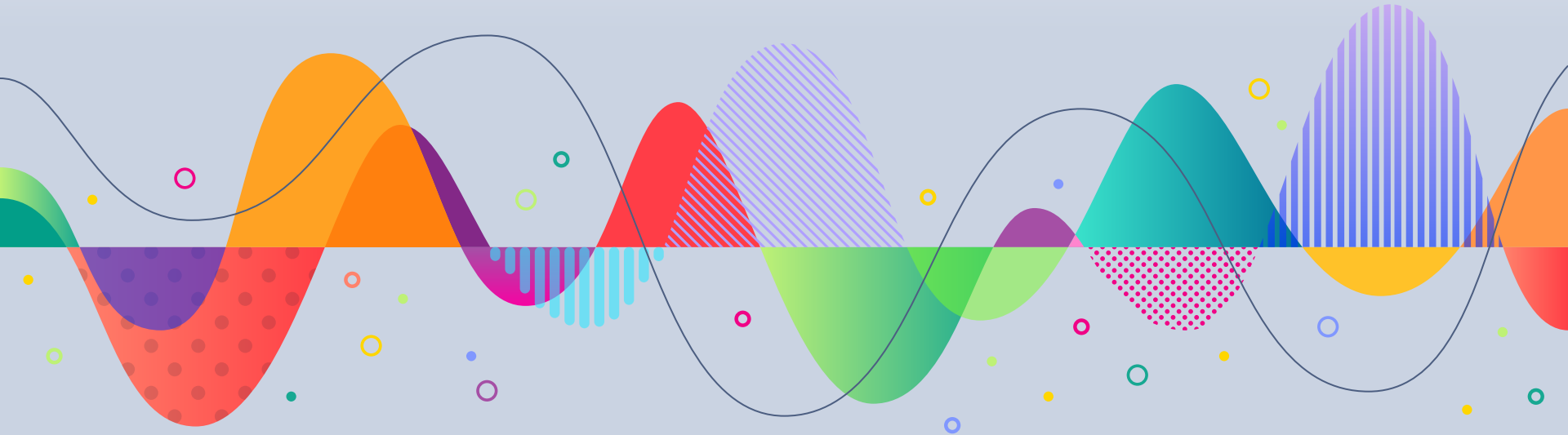
Python
OpenCV

Mobile
Application

Android Studio



GOALS



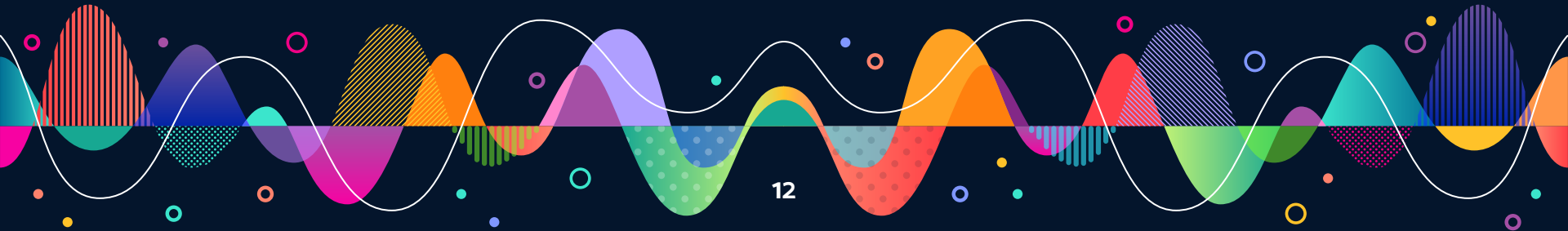
SUSTAINABILITY GOALS

- **Goal #3: Mental Health and Well-Being**

- There are many articles and research paper that suggest learning to play an instrument helps improve mental health and cognitive skills
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6368928/>

- **Goal #4: Quality Education**

- Helps beginners learn music notes and give feedback without need for a tutor to learn how to play instrument
- Users can learn in their own pace





Creative Aspect and Innovative Aspect

- Here we are helping the students learn how to play an instrument without having any tutor.
- We will provide images for how to play the notes in different instruments.
- Students will be able to learn very easily based on the visual representations.
- This way of learning improves the performance of the student(it compares with the original note and gets the feedback based on reinforcement learning).

THANK YOU FOR LISTENING!

