MAJOR PROJECT : ICT-452

NEURONOVA

Transforming Mental Impulses Into Intelligent Actions

WHAT IF YOUR MIND COULD CONTROL YOUR WORLD?

- AUTOMATING GADGETS WITH MOST EASE AND SAFETY MEASURES.

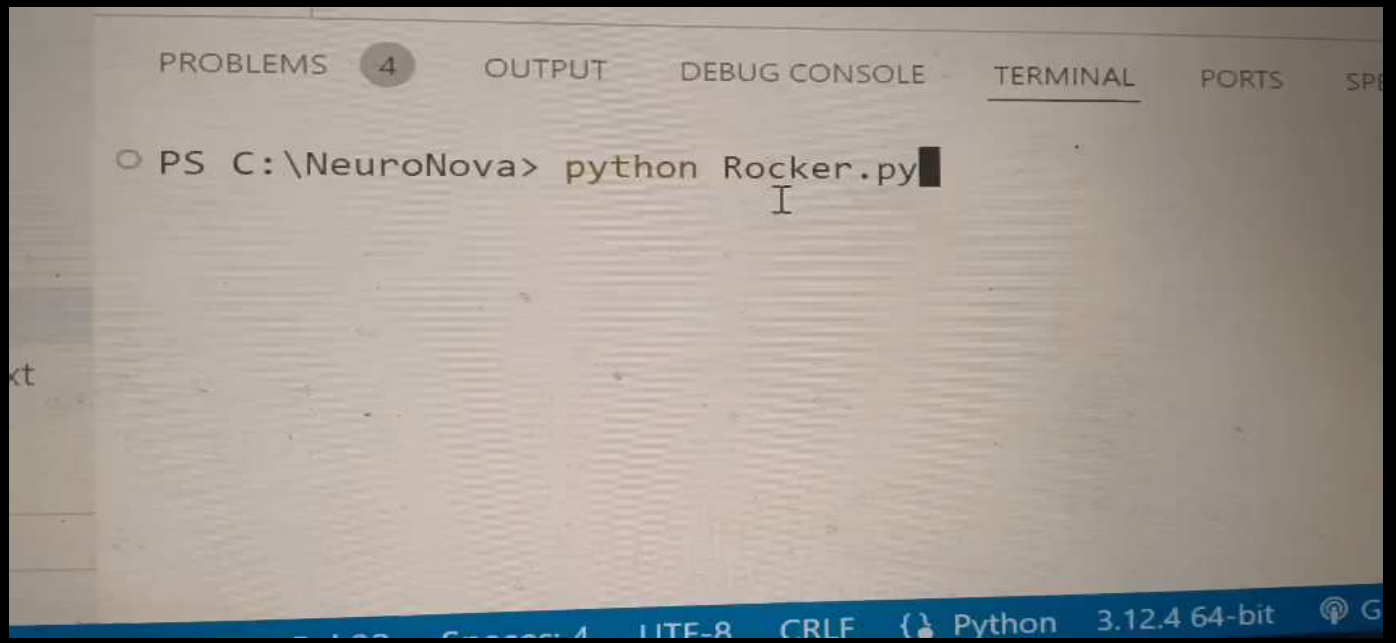
SMART HOME AUTOMATION

CURRENT VS INNOVATION EXAMPLE

Current

- Dark-> **Go and Turn on light manually.**

Innovation



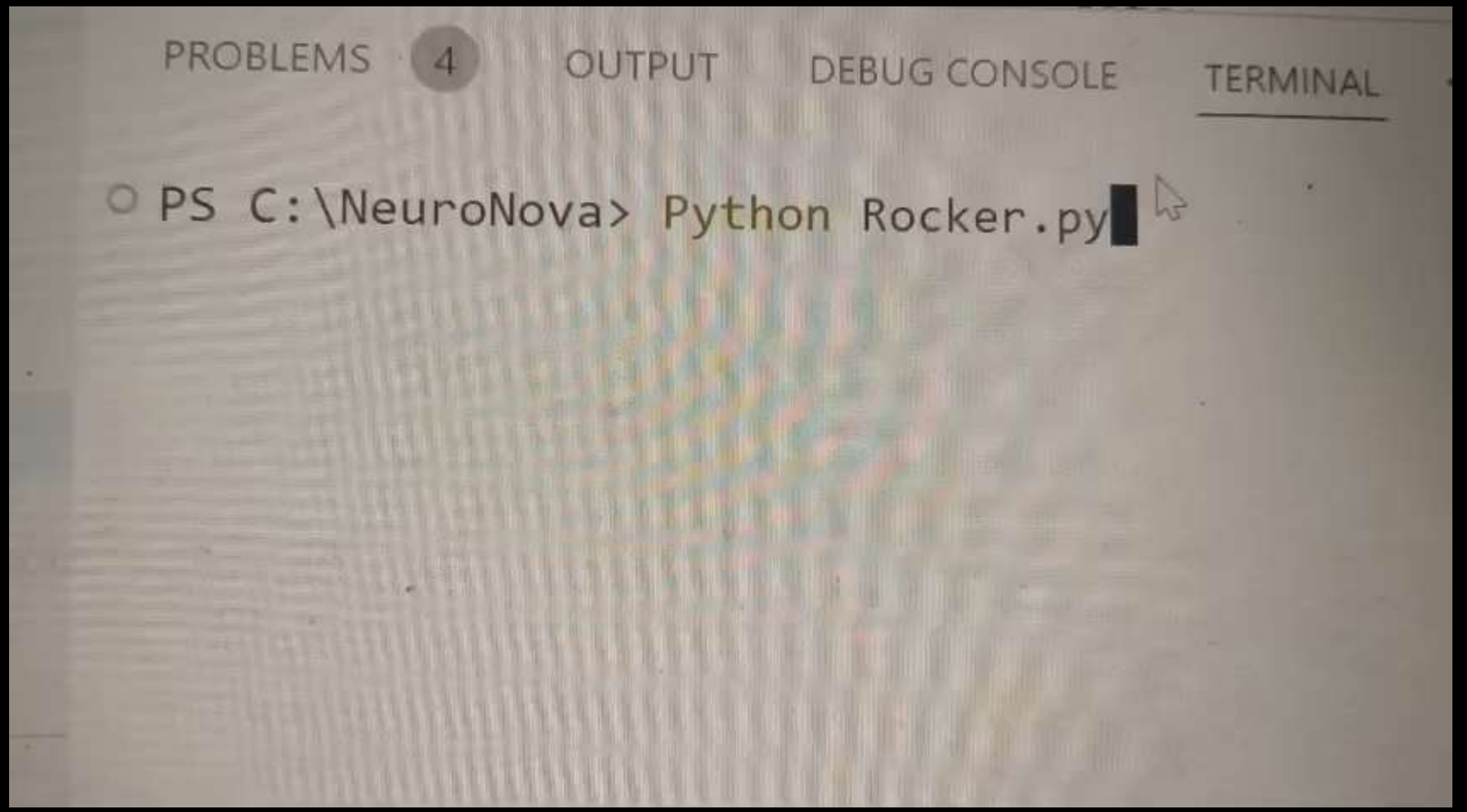
CURRENT VS INNOVATION EXAMPLE

Current

- Feeling bored ->

Turn Exciting on Music ->
Time Taking.....

Innovation



TRACING THE EVOLUTION OF BRAIN-COMPUTER INTERFACES (BCI)

🕒 Timeline :

2002 – Teplan, M. "Fundamentals of EEG Measurement"

- *Established the foundation for accurate EEG signal acquisition techniques.*

2009 – Mak & Wolpaw"Clinical Applications of BCIs"

- *Explored BCI's potential in medical rehabilitation; emphasized practical limitations.*

2014 – OpenBCI Platform Launch:**"Democratizing EEG"**

- 💡 *Opened the door to low-cost BCI experimentation using open hardware*

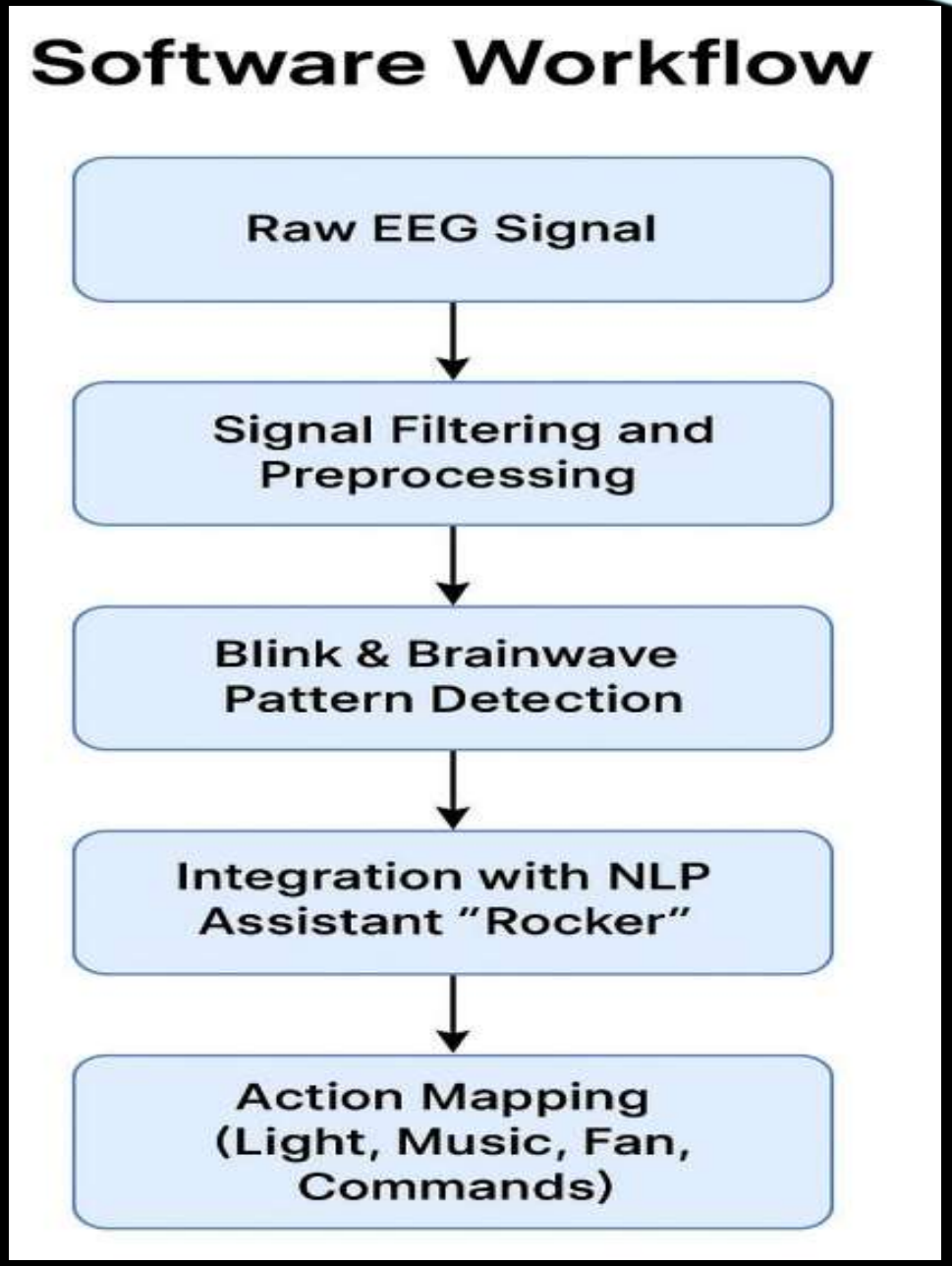
- **2019 – NeuroTechX EEG Notebooks"Real-time EEG Analysis in Python"**
  - ⚙ *Simplified signal preprocessing and made BCI integration developer-friendly.*

SYSTEM OVERVIEW

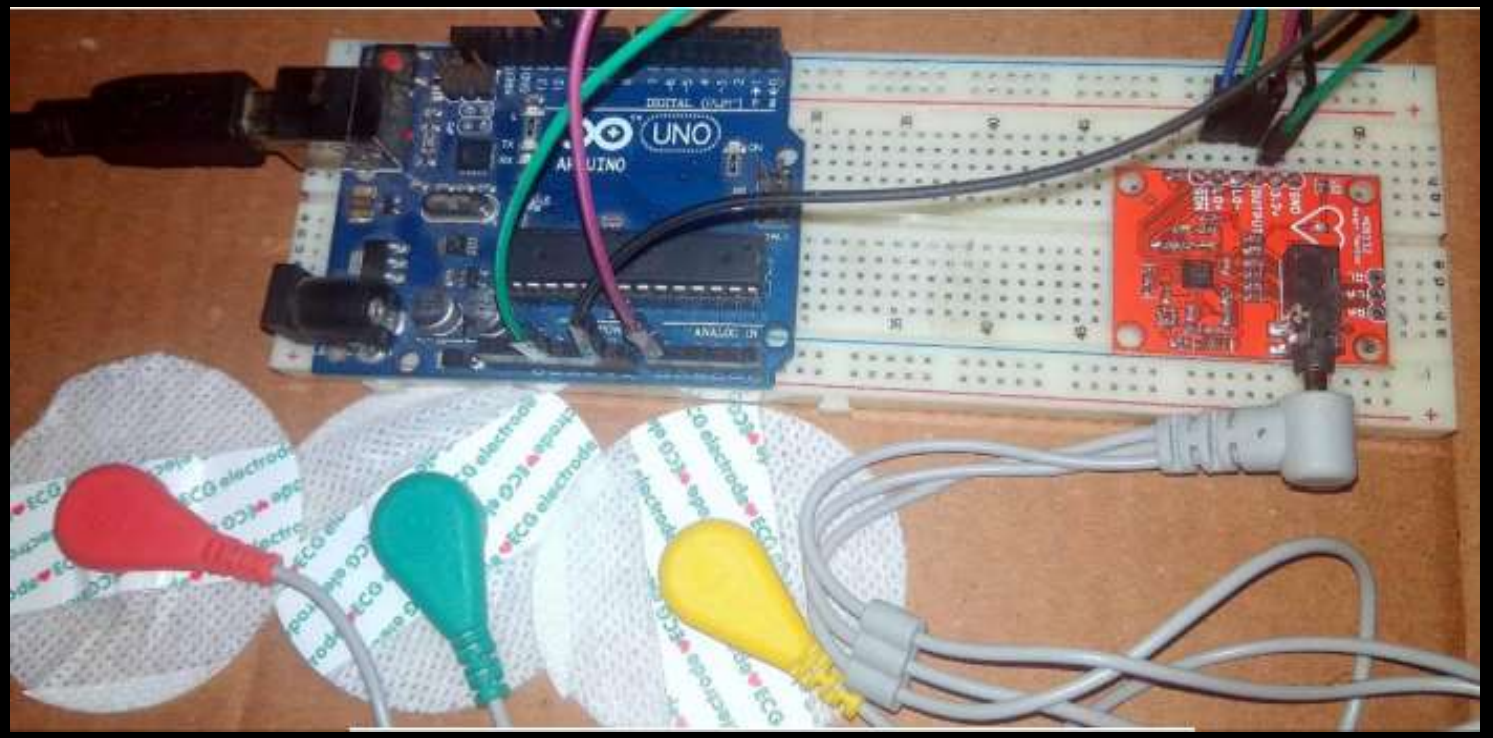
EEG SIGNAL → **Arduino**

↓

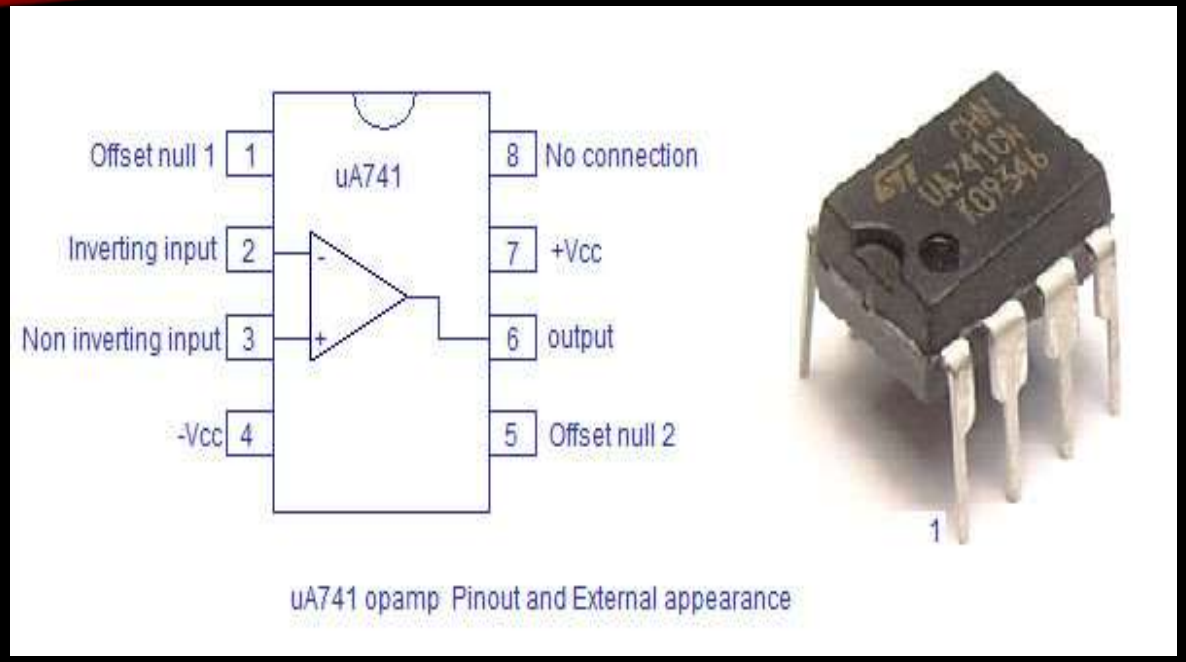
Devices ← **Rocker NLP**

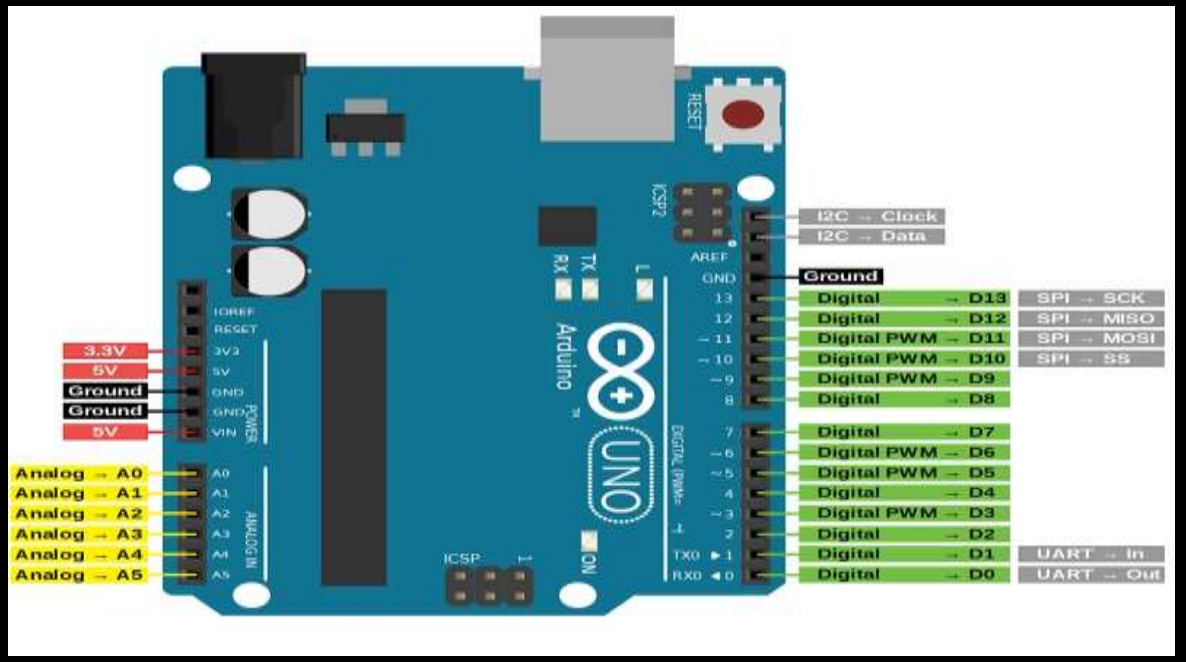


HARDWARE CIRCUIT

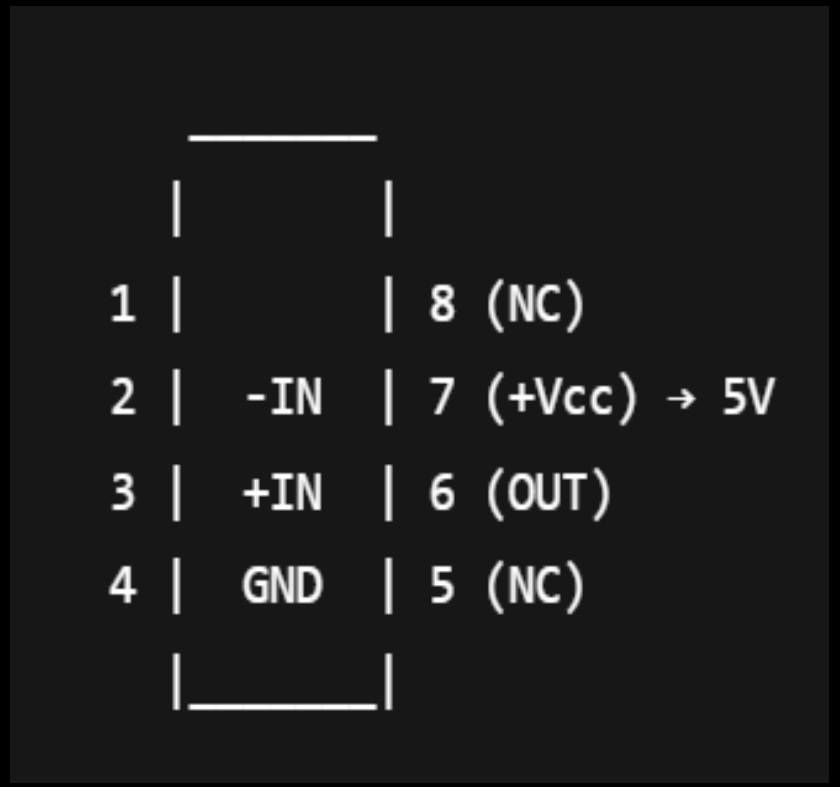


HARDWARE COMPONENTS





CIRCUIT DIAGRAM



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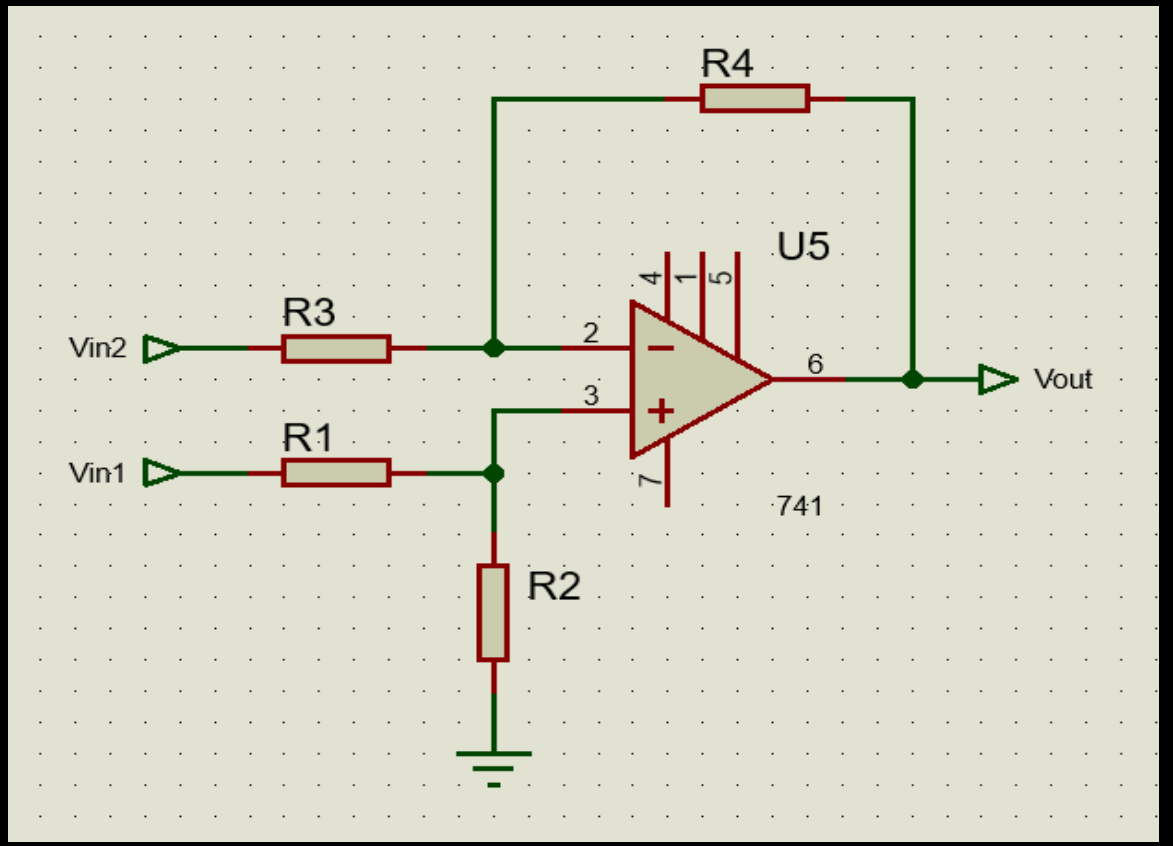
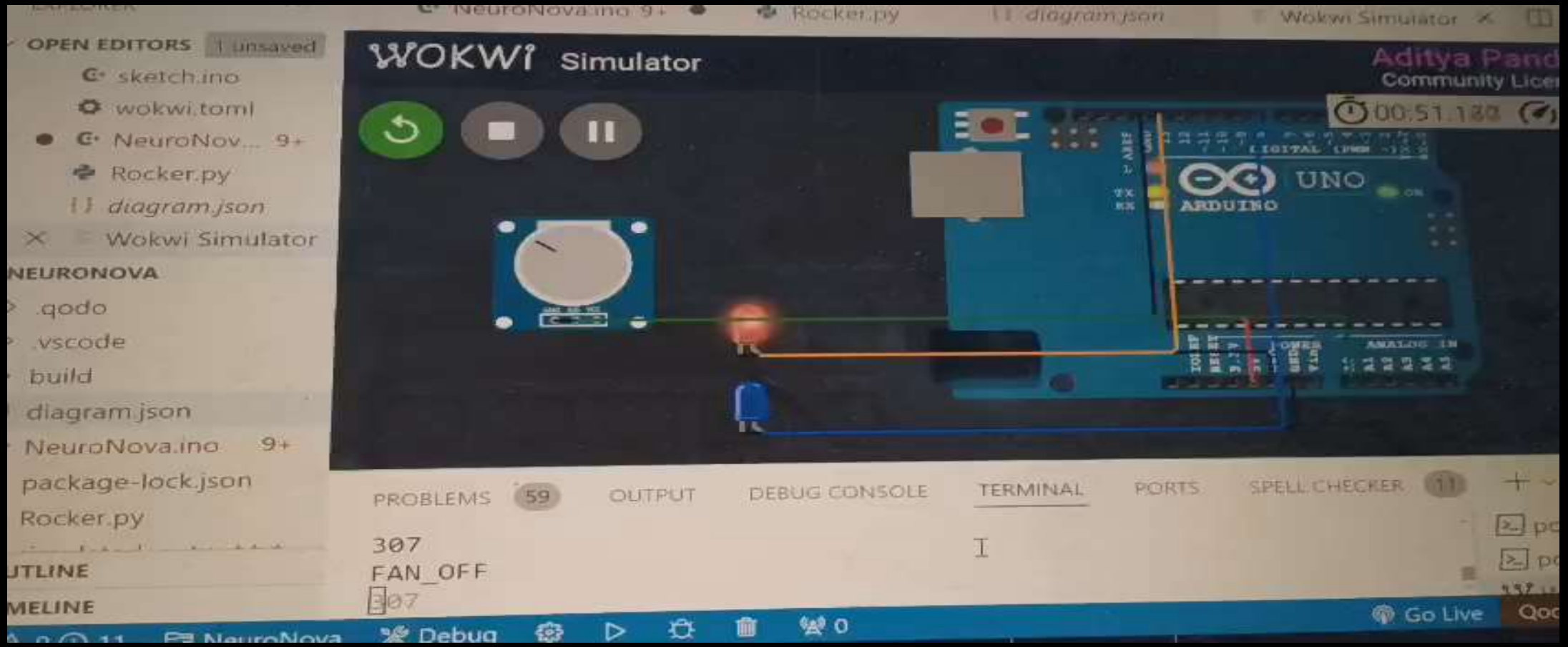
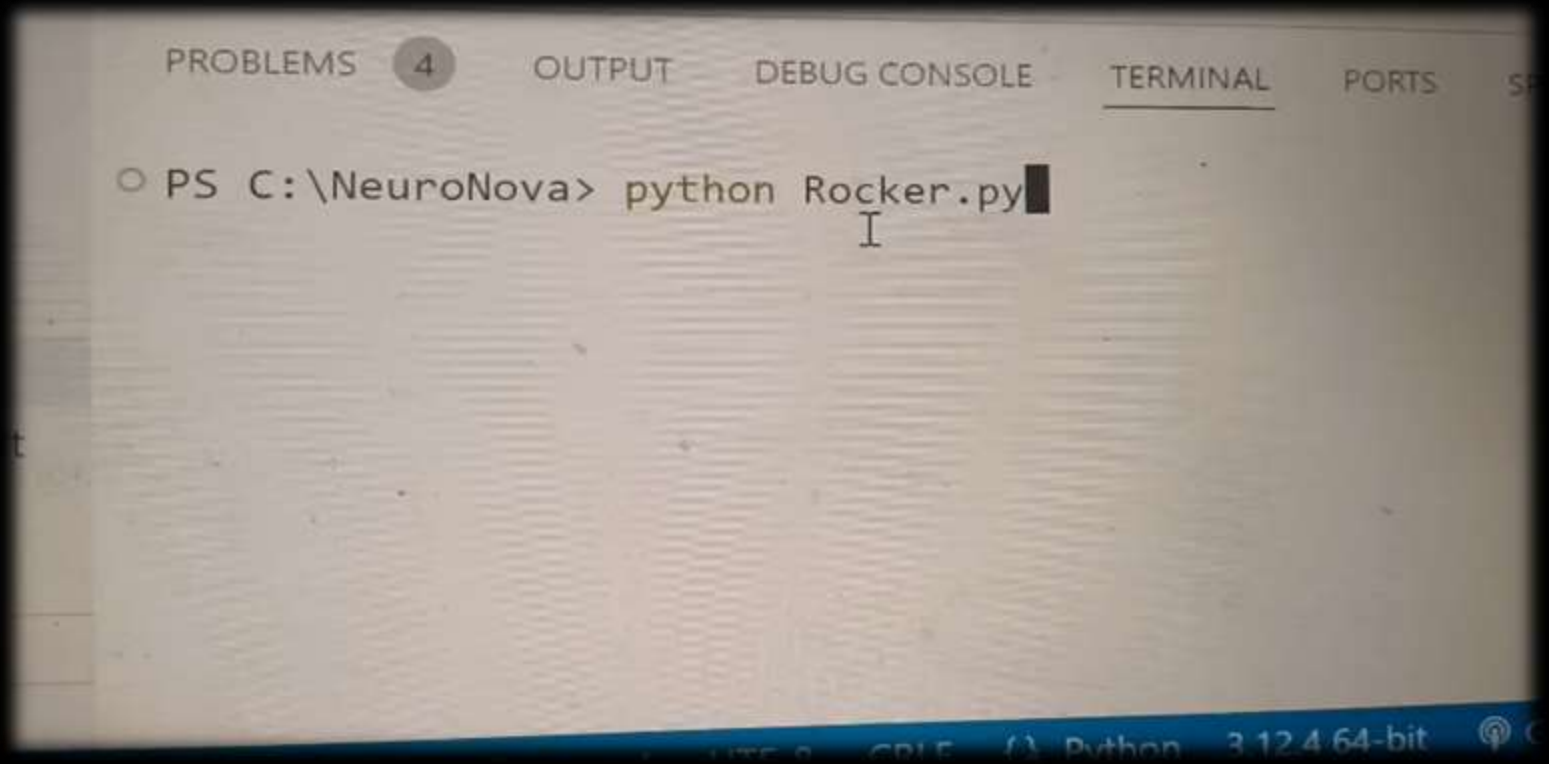


Amplifier Circuit

WOKWI SIMULATION(WOKWI+VSCODE)



MEET NLP ROKER



Python Code

Reads Data Values from text file: simulated_output.txt

Searches for keywords like “BLINK2”, “MULTIBLINK” etc and perform respective actions.

Imported files like: pyttsx3, speech_recognition.

RESULTS & ANALYSIS

- Basic emotional states (e.g., stress, calm) inferred using open EEG datasets for calibration. Integrated minimal machine learning model for **adaptive thresholding**.
- Executed **voice command interpretation** within 0.6 seconds using lightweight NLP.

Threshold value : 4200 based on Kaggle dataset.

```
FAN_OFF
534
FAN_OFF
587
FAN_OFF
606
FAN_ON
606
MULTIBLINK
FAN_ON
799
FAN_ON
799
BLINK2
```

→ **ROCKER** → Actions


THANK
YOU!!