



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.**

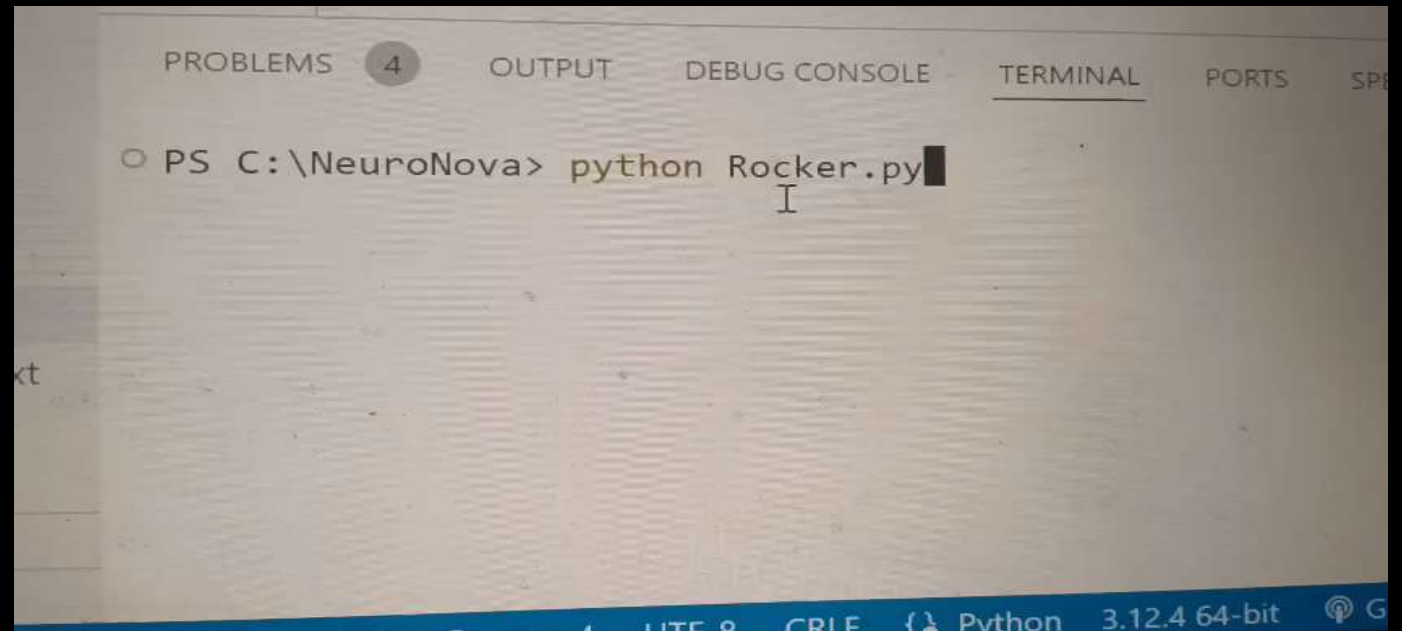
**SMART HOME AUTOMATION**

# CURRENT VS INNOVATION EXAMPLE

## Current

- Dark-> Go and Turn on light manually.

## Innovation



A screenshot of a terminal window within a code editor. The terminal has tabs at the top: PROBLEMS (with a count of 4), OUTPUT, DEBUG CONSOLE, TERMINAL (which is active), PORTS, and SPE. The command prompt shows 'PS C:\NeuroNova> python Rocker.py' with a cursor at the end. The status bar at the bottom indicates the file encoding is UTF-8, the line ending is CRLF, and the interpreter is Python 3.12.4 64-bit.

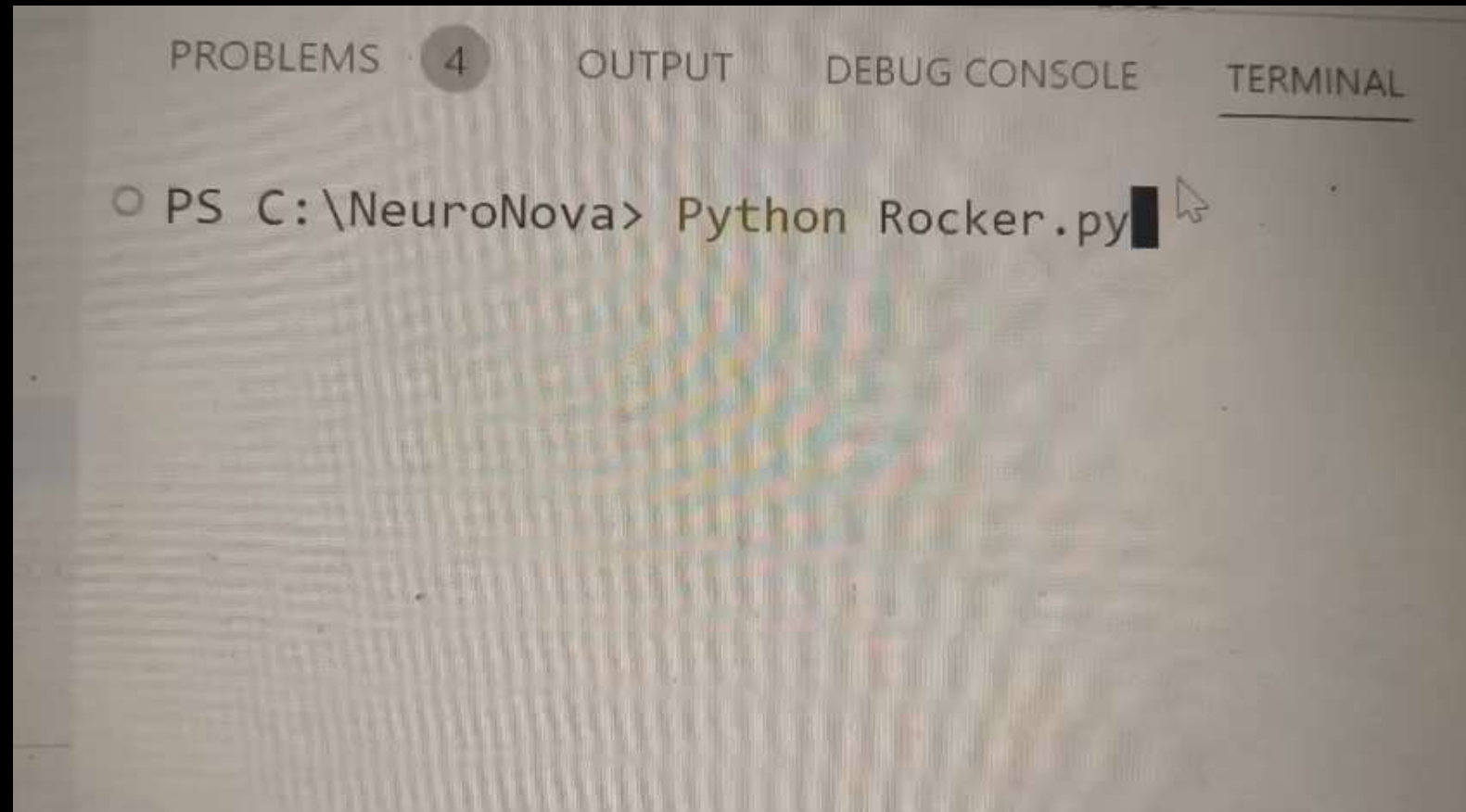
```
PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL PORTS SPE
PS C:\NeuroNova> python Rocker.py
Python 3.12.4 64-bit
```

# CURRENT VS INNOVATION EXAMPLE

## Current

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

## Innovation



A screenshot of a code editor's terminal window. The terminal has tabs at the top: 'PROBLEMS' (with a count of 4), 'OUTPUT', 'DEBUG CONSOLE', and 'TERMINAL' (which is selected). The terminal text shows a command prompt 'PS C:\NeuroNova>' followed by the command 'Python Rocker.py' and a cursor. Below the command, there is a large, colorful, abstract pattern resembling a neural network or a complex data visualization.

```
PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL
PS C:\NeuroNova> Python Rocker.py
```

# 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”

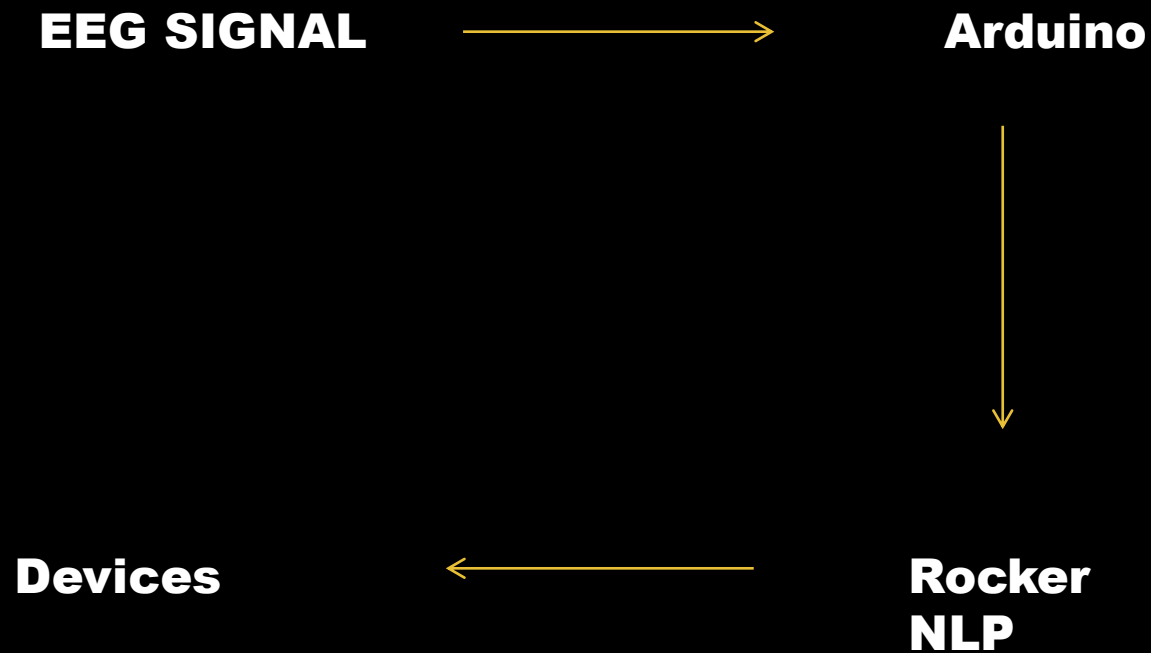
- 💡 Opened the door to low-cost BCI experimentation using open hardware

### • 2019 – NeuroTechX EEG Notebooks “Real-time EEG Analysis in Python”

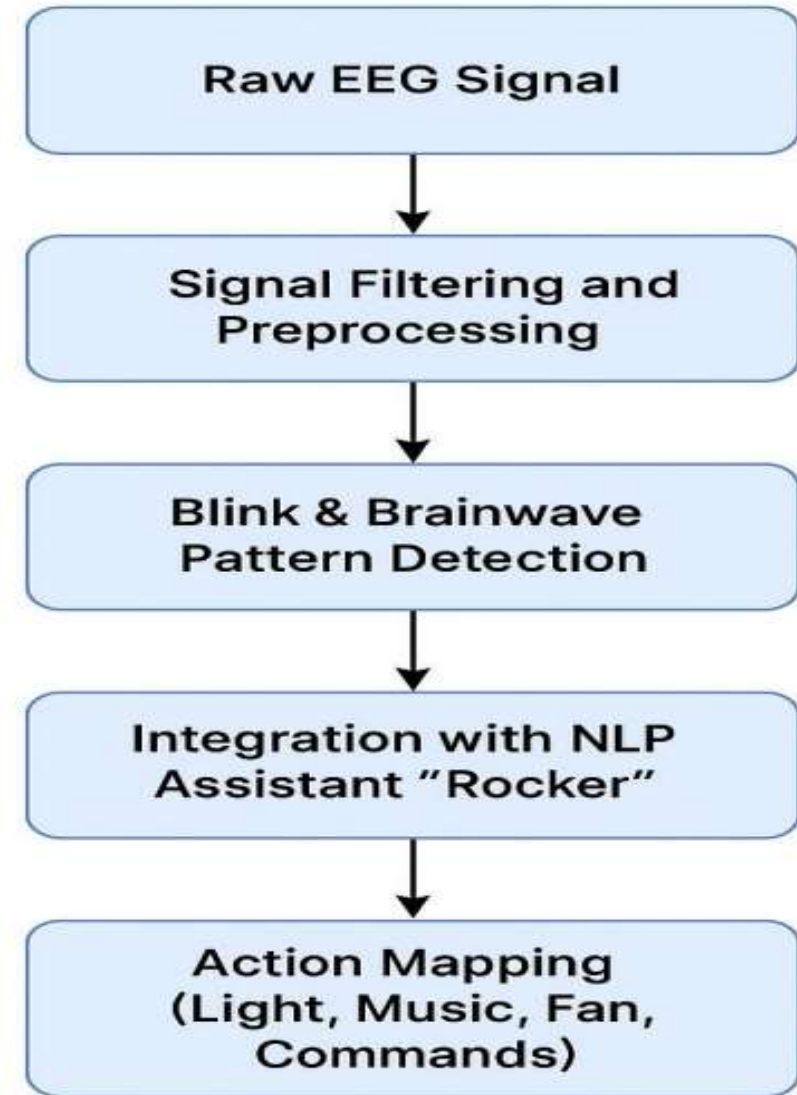
- ⚙️ □ Simplified signal preprocessing and made BCI integration developer-friendly.



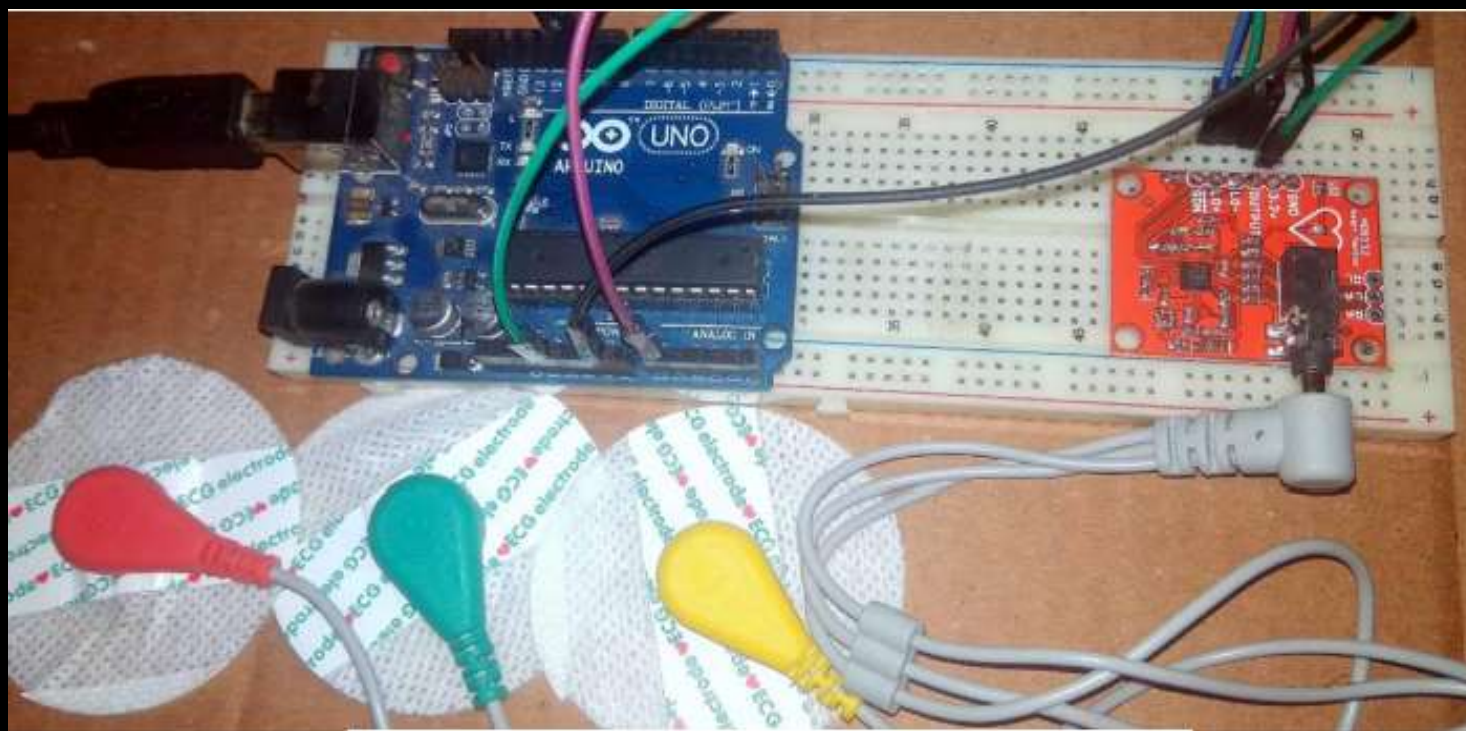
# SYSTEM OVERVIEW



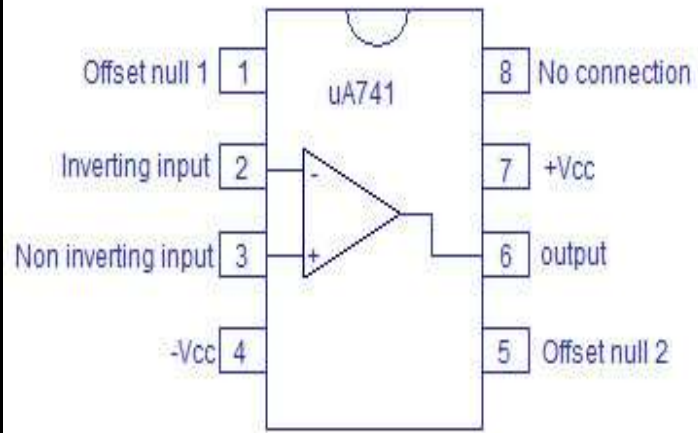
## Software Workflow



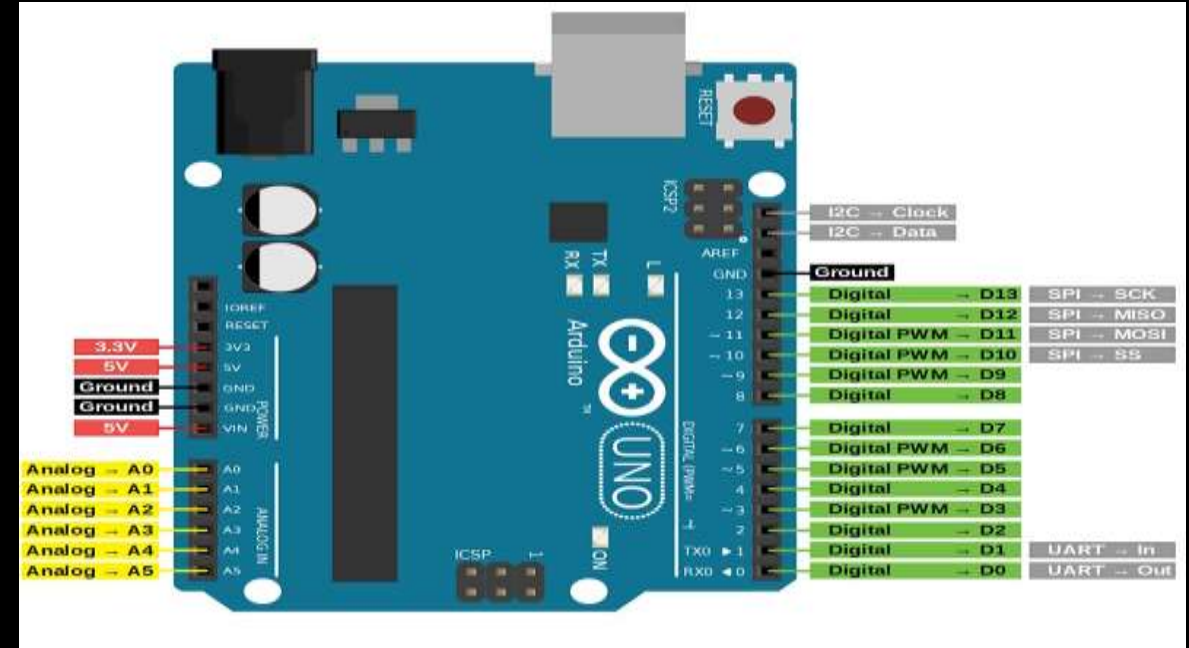
# HARDWARE CIRCUIT



# HARDWARE COMPONENTS



uA741 opamp Pinout and External appearance

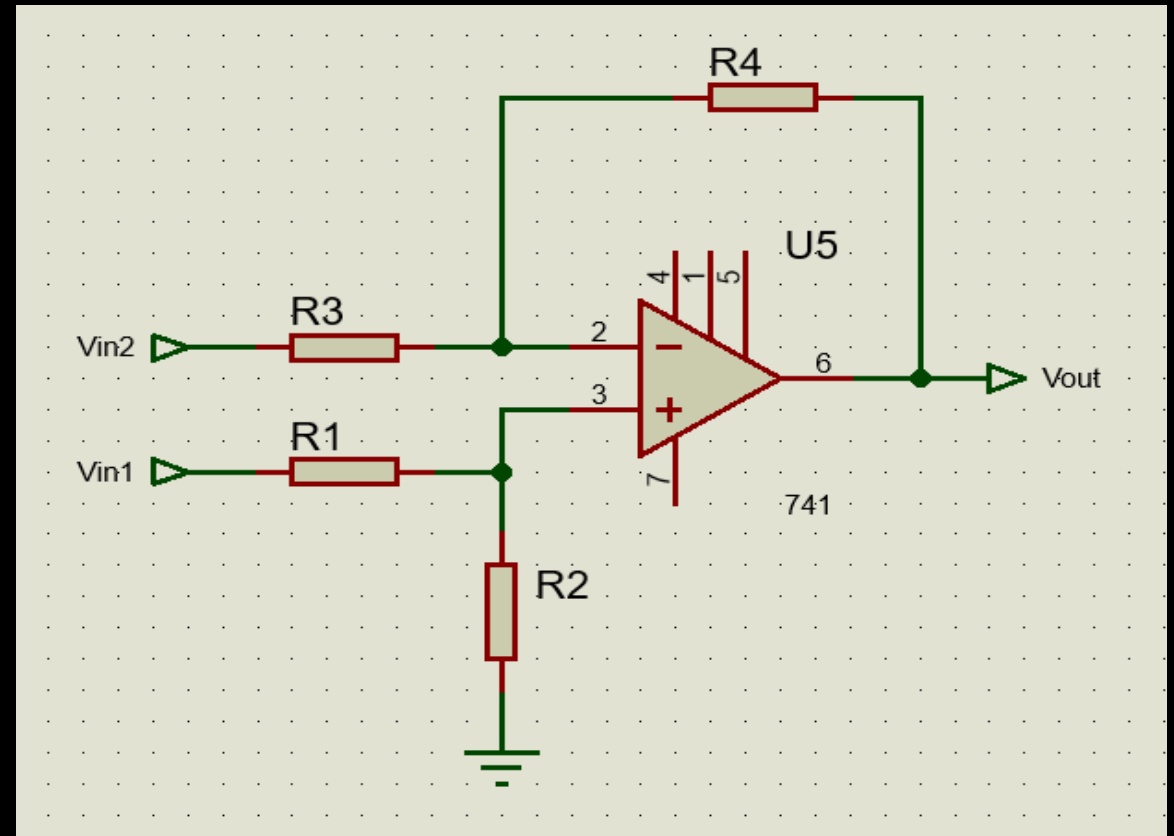




# CIRCUIT DIAGRAM

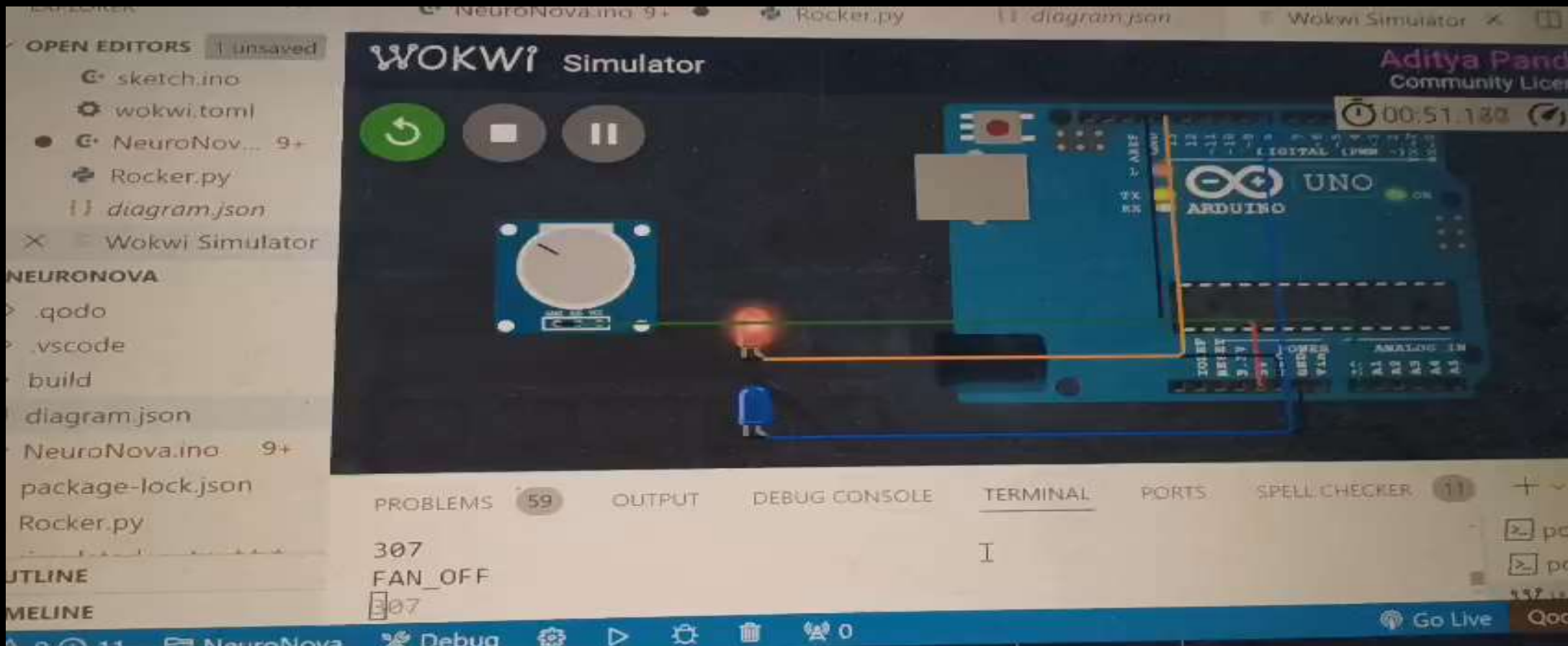
1		8 (NC)
2	-IN	7 (+Vcc) → 5V
3	+IN	6 (OUT)
4	GND	5 (NC)

IC 741

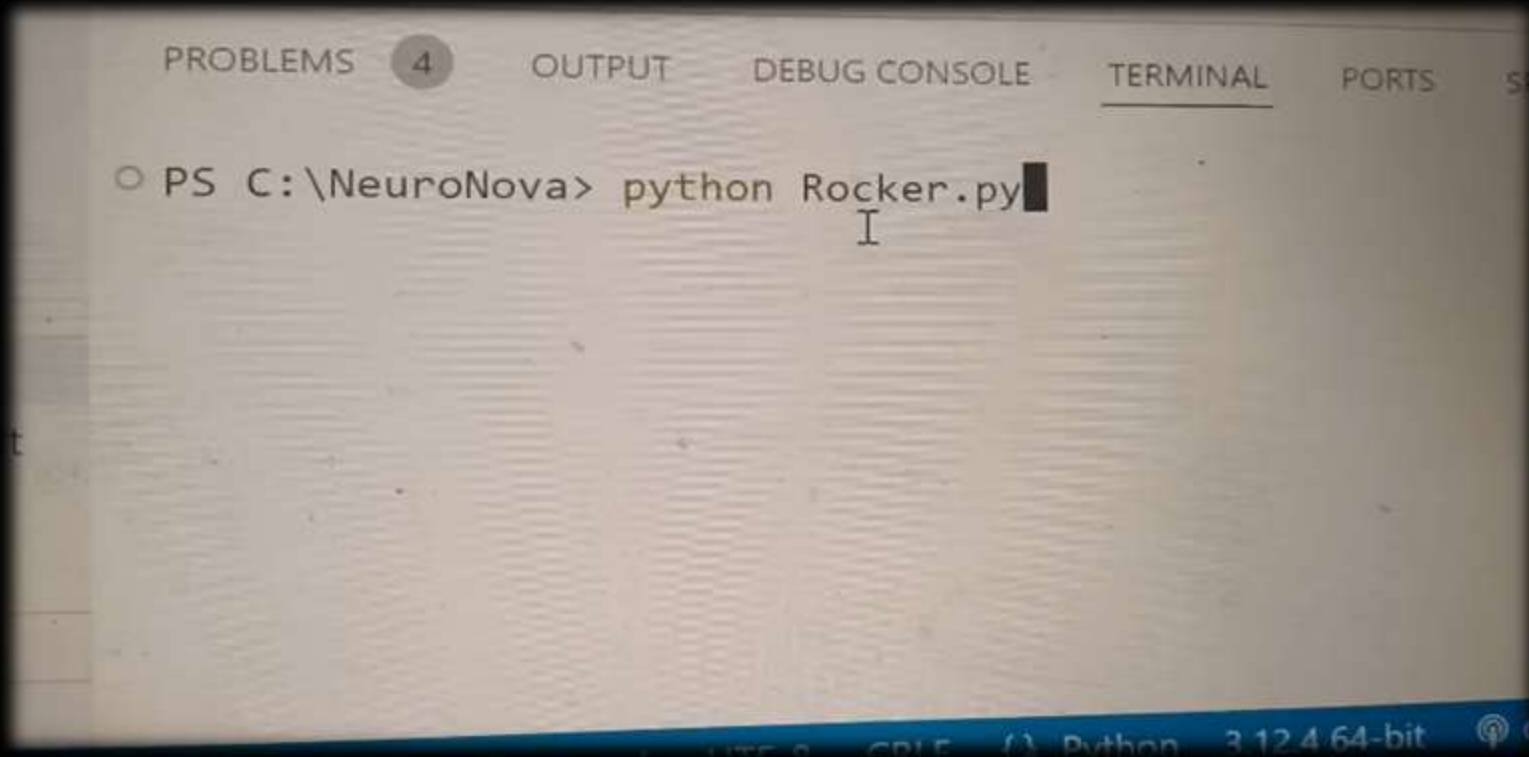


Amplifier Circuit

# WOKWI SIMULATION (WOKWI+VSCODE)



# MEET NLP ROKER



```
PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL PORTS SP  
PS C:\NeuroNova> python Roker.py
```

## 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!!**

