An isometric illustration of a smart grid system. It features a central power substation with multiple transformers and busbars. Orange lines representing power lines radiate from the substation to various components: wind turbines on the left, solar panel arrays at the top, and several residential or commercial buildings at the bottom right. Several electrical pylons are also shown along the power lines. The entire scene is set against a light blue background with a subtle gradient.

Experiments on Unipolar, Polar and Bipolar Line Encoding Schemes

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Introduction



1

During Transmission of data from source to destination the transmitting signals may undergo attenuation and distortion.

2

Need to match the properties of transmitted signal as per the communication media for which digital data can be converted into digital signals.

3

Various Uni-polar, Polar and Bi-polar line encoding techniques are used for digital data to digital signal conversion.

Objectives



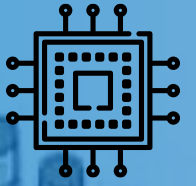
1

Implementation of various Line encoding techniques through a Virtual lab experience.

2

Providing a simple and optimized interface so that it can be used by people who are just starting to venture out in the field of signal encoding

Technological Resources Used



Visual Representation



Project Stack



Deployment Strategy



Methodology



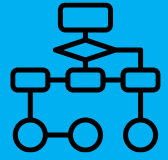
Line Encoding Experiments

RZ-Unipolar
NRZ-L
NRZ-I
Manchester
Differential Manchester

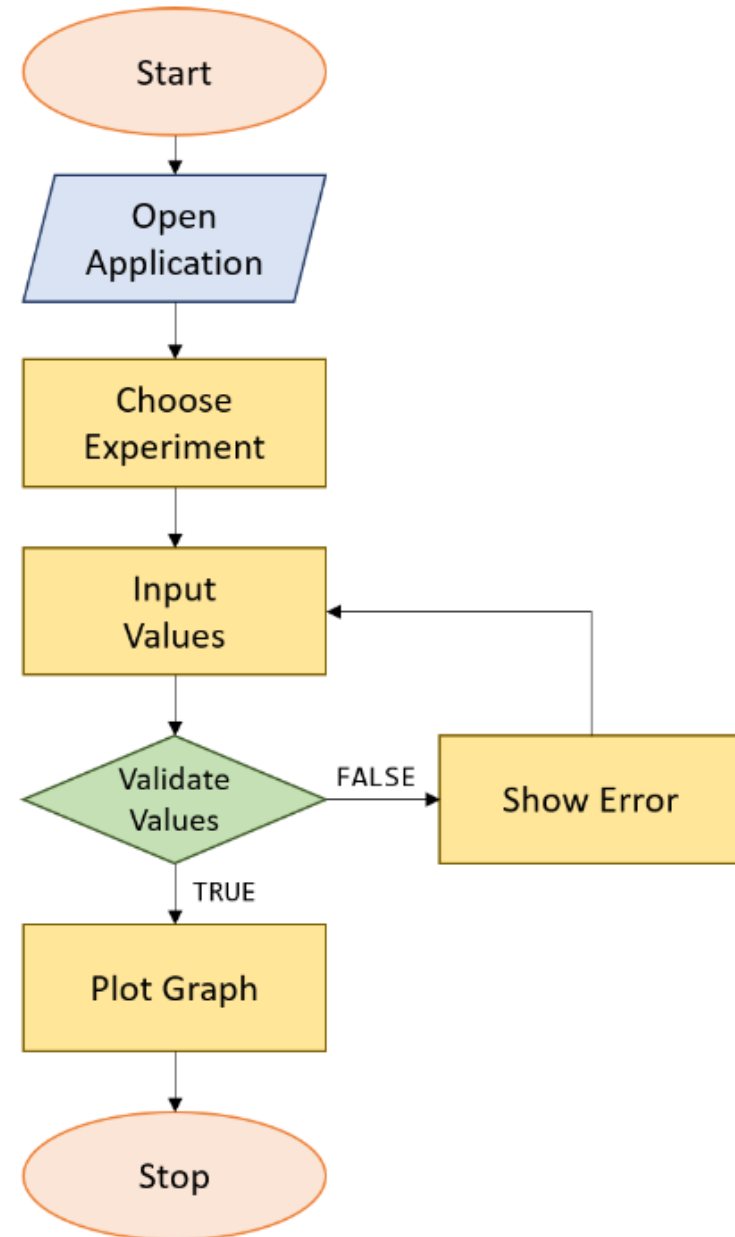
AMI
Pseudoternary

[VIEW THE PAPER](#)

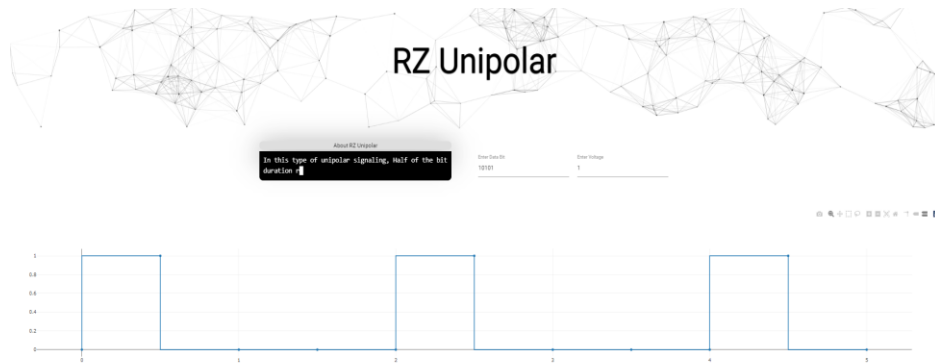
When the user **starts the application**, they are presented with a **central dashboard** with various **experiments listed** that are available to perform. Here they can **choose whichever encoding scheme** they would like to experiment with and the application will take them to a **dedicated space** where the experiments **for that specific encoding** can be carried out.



Flow of the Project

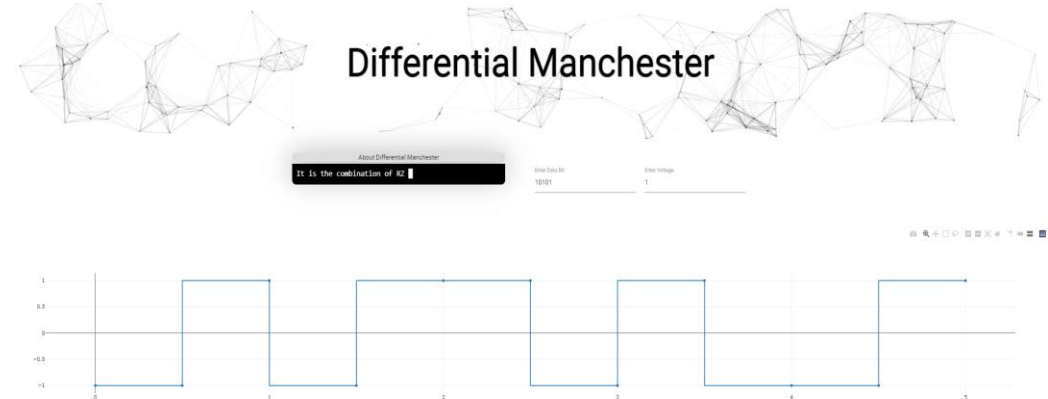


Results Achieved



- **Performance improvements and cross platform compatibility** allowing anyone with an internet connection to perform experiments online using a virtual lab experience.
- It removes the **hassle of installing dependencies** and configuring a **development environment** making the platform **accessible to everyone**.
- It offers advanced features like **live updates** and **in-browser voltage control**

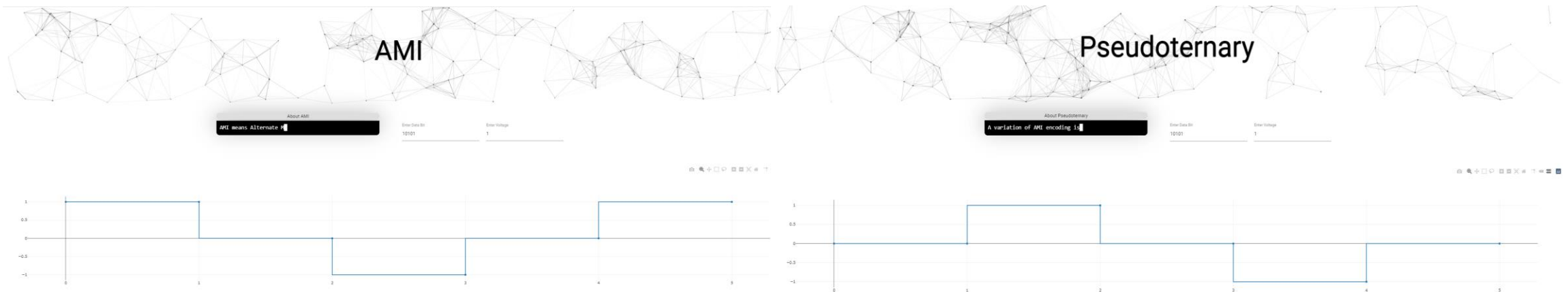
Results Achieved

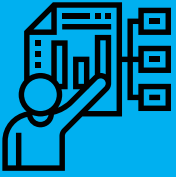


Results Achieved



Bipolar Encoding Schemes





Conclusion

This project showcases an advanced **mechanism for line encoding experimentation**

It brings **features** like *cross-platform compatibility, live-updates, dynamic voltage control, modern plotting libraries* with granular control of generated graphs and the ability to *save results* for future use.

These advanced **features are presented in a simplistic manner** to make them simple and accessible by everyone.

These advanced **features are presented in a simplistic manner** to make them simple and accessible by everyone.



References

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[http://iosrjen.org/Papers/vol5_issue2%20\(part-4\)/D5242023.pdf](http://iosrjen.org/Papers/vol5_issue2%20(part-4)/D5242023.pdf)

An isometric illustration of a smart grid system. It features a central power substation with multiple transformers and busbars. To the left, a wind turbine is connected to the grid. To the right, a large industrial facility with three smokestacks is connected. The grid is represented by a network of yellow lines connecting various components, including smaller substations, solar panel arrays, and residential buildings. The entire scene is set against a light blue background with a subtle grid pattern.

Thank You

