**Overview of the Program for Square Wave Voltammetry Testing**

**Motivation**

Square Wave Voltammetry (SWV) is a powerful electrochemical technique used in biomarker and analyte detection. SWV technique generates significant amounts of data, leading to researchers spending significant amounts of time in data formatting and analysis. This manual process further limits the number of experiments that an individual researcher is able to perform due to the data analysis burden. The Ideation Automation program extracts relevant points in the SWV data, generates a summary of all the values found in any specific channel of interest, and automatically generate a labeled graph with peak values. This program can significantly increase the research productively of projects utilizing SWV.

**Programming Decisions**

1. **User-Centric Design**: The program is designed with enough flexibility to ensure it can parse and remove additional information often attached to output files from different systems. The manual entry of “headers” and “blank lines” allows the user to adjust how the program parses and remove information to meet the needs of their specific system.
2. **Data Handling and Processing**: The program automatically extracts the columns of interests and graphs the said data. The smoothing value allows for noise removal from the signal and the program can be used to determine both peaks and troughs in the data..
3. **Automation of Analysis**: A core decision in the program's development was the automation of peak detection and data summarization. This involves setting thresholds for peak detection, which is project dependent and needs to be determined using trial and error. The program is designed to create summary documents of every step in both excel format the figure format. This allows for the user to be able to report both values if needed
4. **Customizability and Flexibility**: Recognizing that SWV experiments can vary significantly, the program is designed to be customizable. Functions can easily be added to python class. The use of “PySimpleGUI” module further simplifies the customization as this module allows of easy addition of inputs.
5. **Efficient Workflow Integration**: The program's ability to automate the generation of figures and summary documents directly into the data folder aligns with the goal of productivity increase for researcher. The summary and the figure folders are saved in the same folder as the data, ensuring that data summaries are easy to locate and associate with raw data.
6. **Batch Files for Additional Automation**: Batch files “Automation\_SW.bat” automatically runs the python scripts so the applications can easily used without going through an Integrated Development Environment or the Command Line.

**Conclusion**

The development of the SWV automation application is designed to increase research and development productivity for individuals generating and analysing large amounts of data. The application should help reduce hours of data preparation with novel research.