

Philips IntelliVue Data Visualizer

User Guide

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1. Background

To visualize the medical data exported from Philips IntelliVue Series patient monitors, we developed the software — Philips IntelliVue Data (PID) Visualizer, which can plot wave data both dynamically and statically, also plot numeric data dynamically. The essential feature of PID Visualizer is that it can work with “RS232DataExport program” and “Parsing program” seamlessly. These three programs all run within the same running environment and use the uniform data interface, offering a complete solution to data export, parsing and visualization.

2. Environment

PID visualizer is developed by MFC and C/C++, the same with RS232DataExport and Parsing programs, so you do not need to do anything if you can run those two programs correctly in your computer, otherwise, you may need to set up the running environment for PID visualizer as follow.

You can install Microsoft Visual Studio 2010 software which will meet the running requirement for MFC and C/C++ program. If you do not like that “big guy” or need the development editor, please download and install either of the redistributable packages from Microsoft website for the program.

Microsoft Visual C++ 2010 Redistributable Package (x64)

<https://www.microsoft.com/en-us/download/details.aspx?id=14632>

Microsoft Visual C++ 2010 Redistributable Package (x86)

<https://www.microsoft.com/en-us/download/details.aspx?id=5555>

After that, the PID visualizer should be good to go.

3. Functions

Before running PID visualizer to plot, you need to make sure you have the parsed result data from our Parsing program. Once you get the parsed data, you can use the function

“animated plot” or “plot” to visualize them. In this 1.0 version, the saving of patient’s parsing result data needs to follow the **“three ones rule”: one folder can only contain one patient’s one day data**, as shown in figure 1.

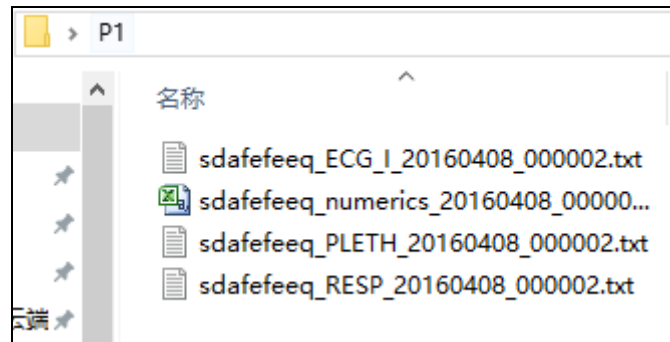


Figure 1: An example of one patient’s one day data (04/08/2016) in one folder (P1)

3.1 Animated plot

“Animated plot” can plot the wave and numeric data dynamically as the “Parsing” program outputs real-time parsing results. To use this function, you firstly need to assign the directory of patient’s data files. You will find the setting dialogue from “Options”->”Animated Plot Setting” in the menu (figure 2).

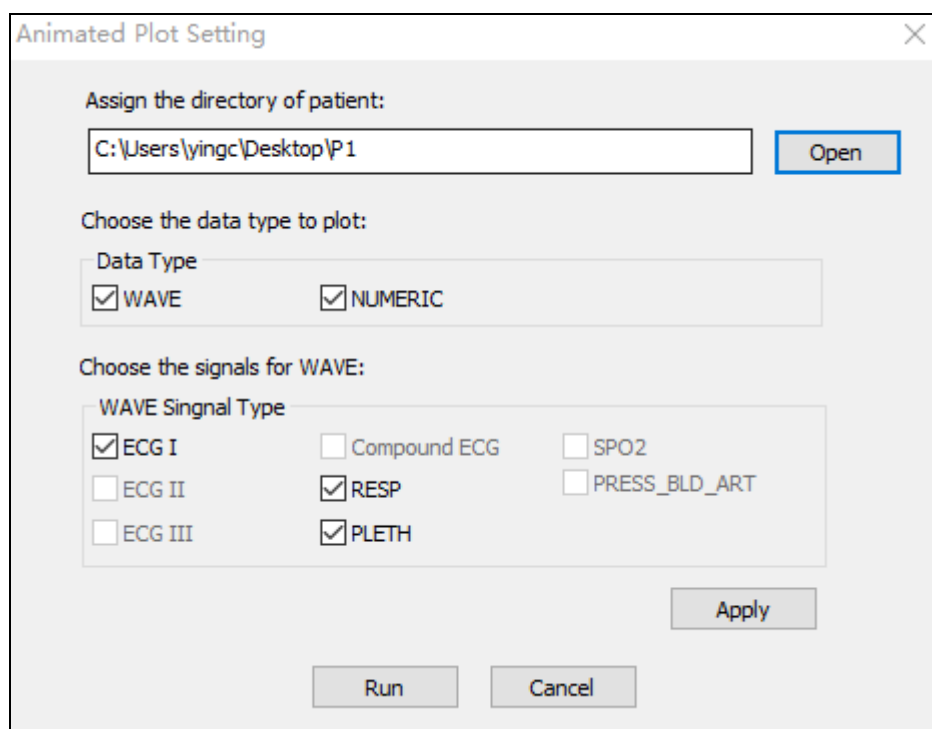


Figure 2: Animated Plot Setting dialogue.

After assigning the directory with patient data, the program will identify the “Data Type”

and “WAVE Signal Type” the directory has automatically. You can only choose what the directory has, and others are disabled. After clicking “Apply”, the list of wave data type in the main controller will update according to your choice (figure 3). You can also “Run” it directly without clicking “Apply” if you are sure about your choice.



Figure 3: The list of WAVE data type in the main controller will update according to your choice.. After running “animated plot”, you will see the plots of wave and numeric data move as the time goes on. If you choose a data type in the left list, you will find the corresponded “animated plot” in the right window, as shown in figure 4.

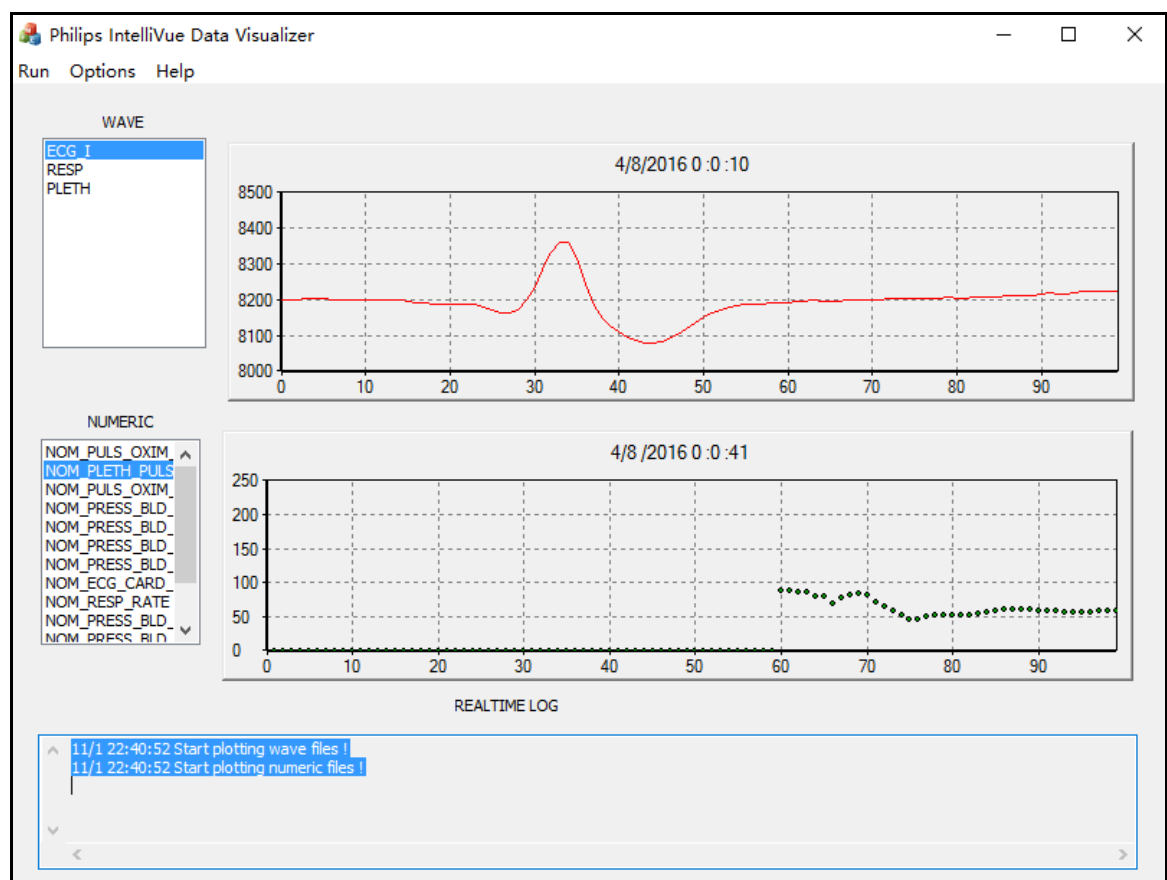


Figure 4: The main controller for “Animated Plot”

On the title position of plot window, the time generating current data is shown. The

real-time log window is also shown below the plot window. You can “Pause”, “Stop” or “Exit” the program when you want to (Figure 5).

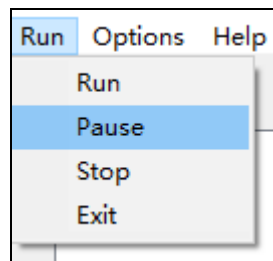


Figure 5: The menu of "Animated Plot" control

For the numeric data, the list will update automatically when the program finds “new” data type in the numeric data file (.csv). The numeric data is also plotted as markers (dots) instead of smooth curve, and each dot represents one data value at that time point.

3.2 Plot

If you need to plot the wave data during a period of time, choose “Plot” function. You will find the “Plot Setting” dialogue from “Options”->”Plot Setting” in the menu (figure 6)

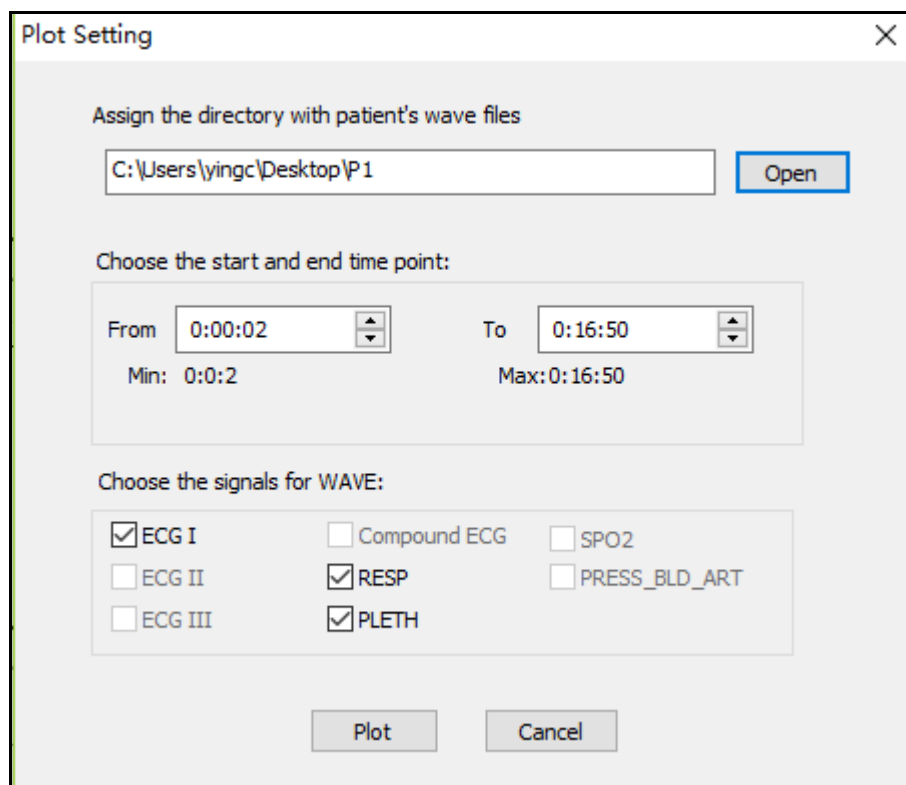


Figure 6: Plot Setting Dialogue

Similar to “Animated Plot Setting”, the program will also identify the wave data type automatically after assigning the directory with patient data. Notice that there is no numeric data for “Plot”. Then, you need to set the plot period by choosing “start” and “end” time point. The “start” time point has a lower bound shown by “Min”, and the “end” time pint has an upper bound shown by “Max”. Both the lower bound and upper bound of the time period are obtained from the files within the patient’s data directory, which can also update automatically when the data directory changes.

Now you can choose **at most three different types wave data one time to plot**. If you want to plot more than three types of wave data, you can set at most three of them as a set to plot.

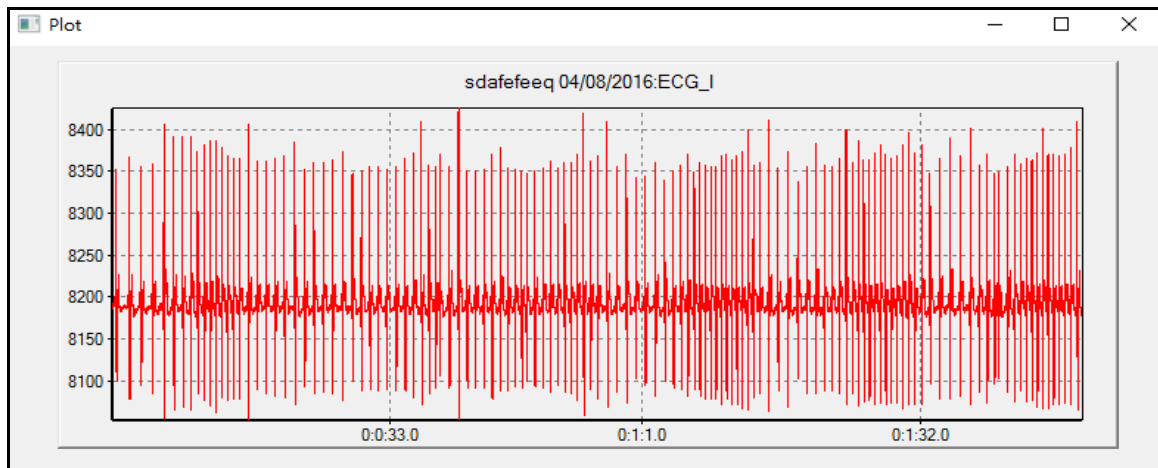


Figure 7: Plot one type of wave data: ECG_I from 0:0:2 to 0:2:2

Figure 7 shows the case of plotting one type of wave data. The x-axis shows the time line, with the scale of millisecond and format of “HH:MM:SS.SSS. You can also **drag on the plot to zoom in/ out**, then you may see more details.

For the case of plotting two or three types of wave data, you will get one dialogue containing two or three sub windows. All sub windows share the same x-axis (time line), but have independent y-axis and “drag control”, which means you can zoom in/out one sub window without disturbing the others. Figure 8 is an example of the case for plotting three types of wave data.

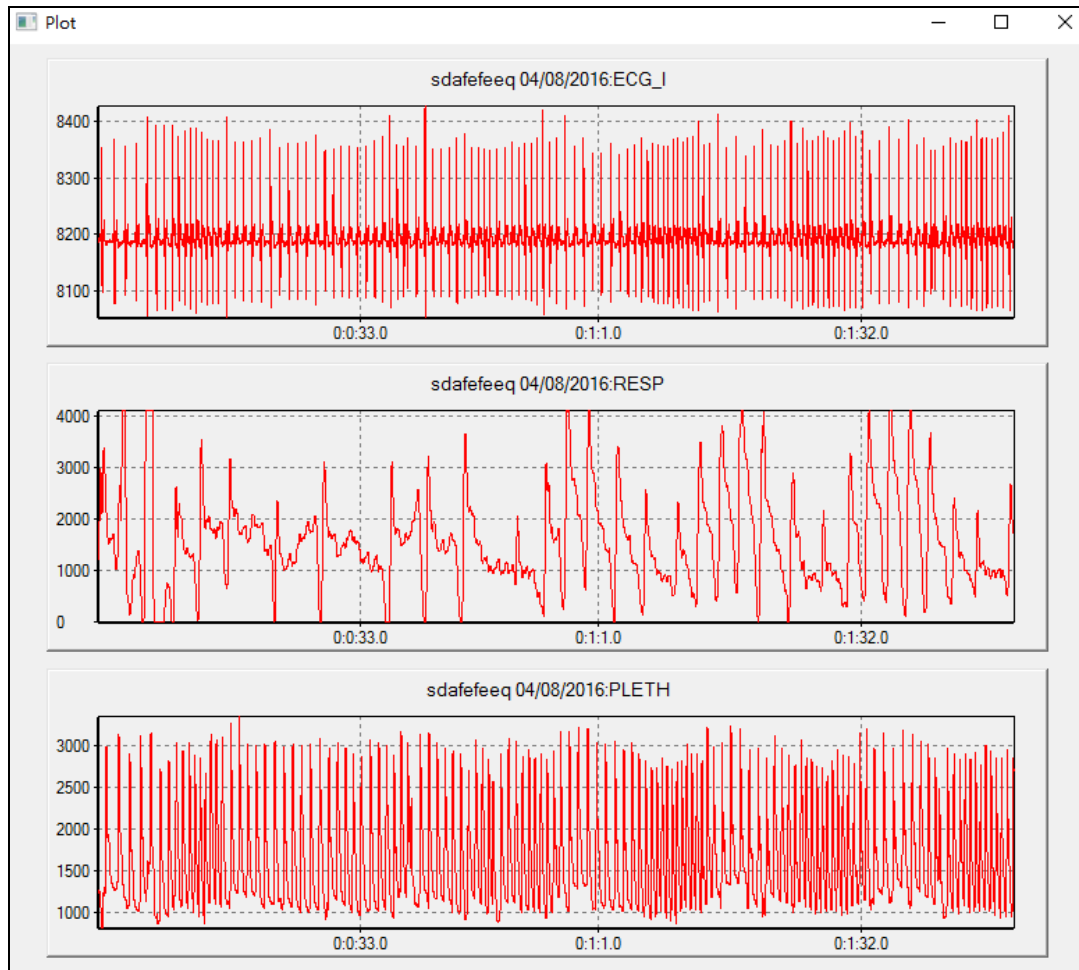


Figure 8: Plot three types of wave data: ECG_I, RESP and PLETH

4. Future Work

In our future work, more data types will be added to PID visualizer. In addition, we will try to break the “three ones rule”, for instance, plot patient’s data of more than one day.