PSLab: Add support of PSLab to sigrok

Google Summer of Code 2021 Proposal

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Code Sample/Contributions to PSLab

- Generate Config layout re-structure
- Work in Progress - I am currently working on adding support for PSLab device to sigrok, will have a PR soon

Project Details

Abstract

The sigrok project is a signal analysis software suite which supports various measurement devices such as oscilloscopes, logic analyzers, multimeters, etc. Since PSLab provides several such instruments, we plan to add it as a mixed signal device to libsigrok.

Advantages of Sigrok Implementation

- **Unifying the codebase**: Common Backend will help solve the feature lag issue and will reduce duplication of functions across PSLab Desktop and Android Application.
- **Additional features:** Sigrok provides many protocol decoders which we can use in our logic analyzer.

Implementation Details

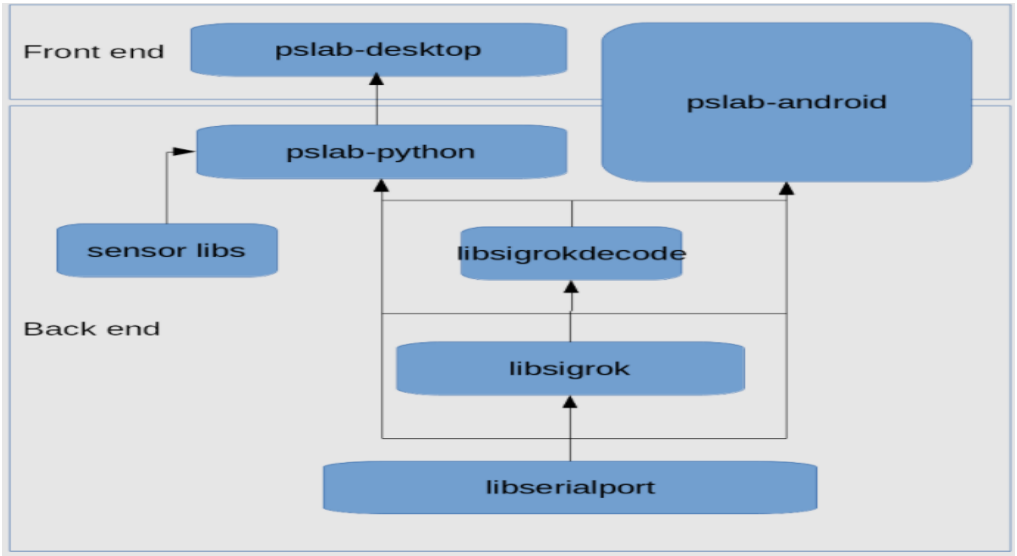
The project can be divided into following sub-parts:

1. **Add support for PSLab device to libsigrok.**
   Integrate all the functionalities provided by PSLab to the libsigrok Library. I plan to use sigrokcli for faster testing of implemented features.

2. **Implement pslab-python based on sigrok**
   Use pysigrok to handle communication with the device and provide functionality for the various instruments and other sensors. Extend support for various other external sensor libraries.

3. **Use the newly created backend for providing functionalities to android application.**
   Use sigrok-androidutils to handle communication for the android application. This will reduce the part handled directly in java code with the only backend part remaining would be the communication with device internal sensors.

Post integrating with sigrok the PSLab project structure would look like this (as discussed with Alex) :



Timeline

Following is the expected breakdown of the time that I will spend working on the different aspects of the Project.
I expect to complete the connection establishment and oscilloscope support to libsigrok before the start of Gsoc Period.

Start Date	End Date	Task
COMMUNITY BONDING		
17 May (Monday)	23 May (Sunday)	Add support for PowerSupply and Multimeter to libsigrok
24 May (Monday)	30 May (Sunday)	Add support for PowerSupply and Multimeter to libsigrok
31 May (Monday)	**6 June (Sunday)**	Test PowerSupply and Multimeter using sigrokcli
CODING PHASE-1		
7 June (Monday)	13 June (Sunday)	Add Support for LogicAnalyzer and Waveform Generator to libsigrok
14 June (Monday)	20 June (Sunday)	Add Support for LogicAnalyzer and Waveform Generator to libsigrok and test using sigrokcli
21 June (Monday)	27 June (Sunday)	Test Protocol Decoding using sigrokcli
28 June (Monday)	4 July (Sunday)	Review And Bug Fixes after community feedback
5 July (Monday)	**11 June (Sunday)**	Documentation for sigrok and get the development merged to sigrok libraries.
EVALUATIONS		
12 July (Monday)	**16 July (Friday)**	Write documentation for all implemented Features
CODING PHASE-2		
17 July (Saturday)	25 July (Sunday)	Implement instrument support in pslab-python using pysigrok
26 July (Monday)	1 August (Sunday)	Complete Implementation and Test instrument using pslab-desktop
2 August (Monday)	8 August (Sunday)	Review And Bug Fixes after community feedback

9 August (Monday)	**15 August (Sunday)**	Add external sensor libraries to pslab-python
FINAL EVALUATIONS		
16 August (Monday)	**23 August (Monday)**	Write documentation for all implemented Features
POST GSoC Period		
		Use sigrok-androidutils to implement instruments in android app

PS: The timeline above is the most conservative one and I hope to deliver the android app based on sigrok during the GSoC Period itself.

Major Contributions to Open Source

- Added MLKit Scanner to OFF android application and cleared it for F-droid launch
- Fixed csv export for OFF
- Used JSON taxonomies to provide multilingual support and add auto-suggestion functionality to numerous fields
- Re-worked UI design
- Numerous critical bugs fixed

Why me?

I am a sophomore doing bachelors in Computer Science and a budding developer looking for any and every to gain experience and get better. I am always excited to get onto new projects and am motivated to learn new stacks. Being an android developer for the past 1 year, I have worked on several successful projects and am very comfortable working in a team towards a common goal.

I found the core idea behind PSLab very tempting as I could have used a device like this in my high school years. My interest in PSLab grew as I interacted with the team and got to know more about the project and its future. I am very excited to work with the amazing group of people we have here and contribute to the community.

Previous GSoC Participation

This is my first time participating in GSoC.

Summer Commitments

I do not have any prior professional commitments this Summer. I do plan to learn new things and work on a personal project but PSLab will be my first priority. During the GSoC period, I will devote 40 hours a week to this project on average.

If I am applying for various organisations this year

No, I am just applying for PSLab this year.

Conclusion

Thank you for reading this proposal. I am very interested and excited to work on this project and become a member of the PSLab community. I hope this proposal will add some value to my GSoC candidacy. It is going to be a great learning experience working with PSLab.

Regards
Kartikay Sharma