Python and GUI Implementation for Internal Optimization and Increased Usability of *in vivo* Glucose Sensing System

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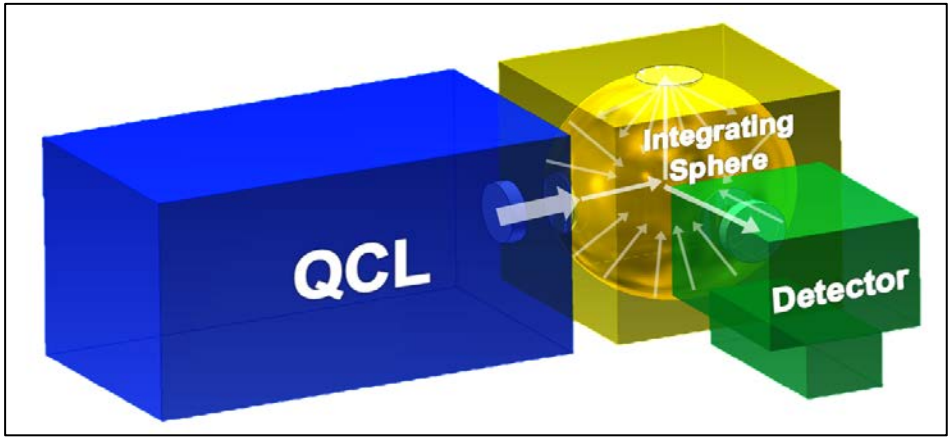
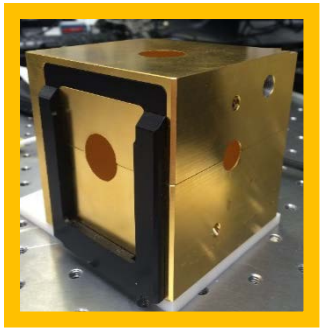
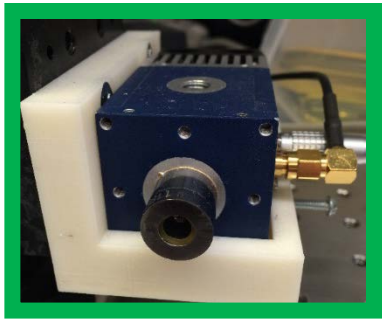


QCL → Integrating Sphere → Detector → Spectral Analysis





- GUI started up and populated with data
- Number of spectral runs are taken
- Various statistical analyses applied:
  - Wavelet transform
  - Savitzky-Golay Filtering with Differentiation
  - Machine Learning Prediction Algorithm
- Final predicted glucose concentration obtained

GUI – CLINICAL AND SOLUTIONS

File Edit

1. Store Data:

Select the Folder to Store Data: Browse ...

2. Signal Processing:

Number of Runs:
START Frequency:
STOP Frequency:
Number of Scans:

3. Basic Information:

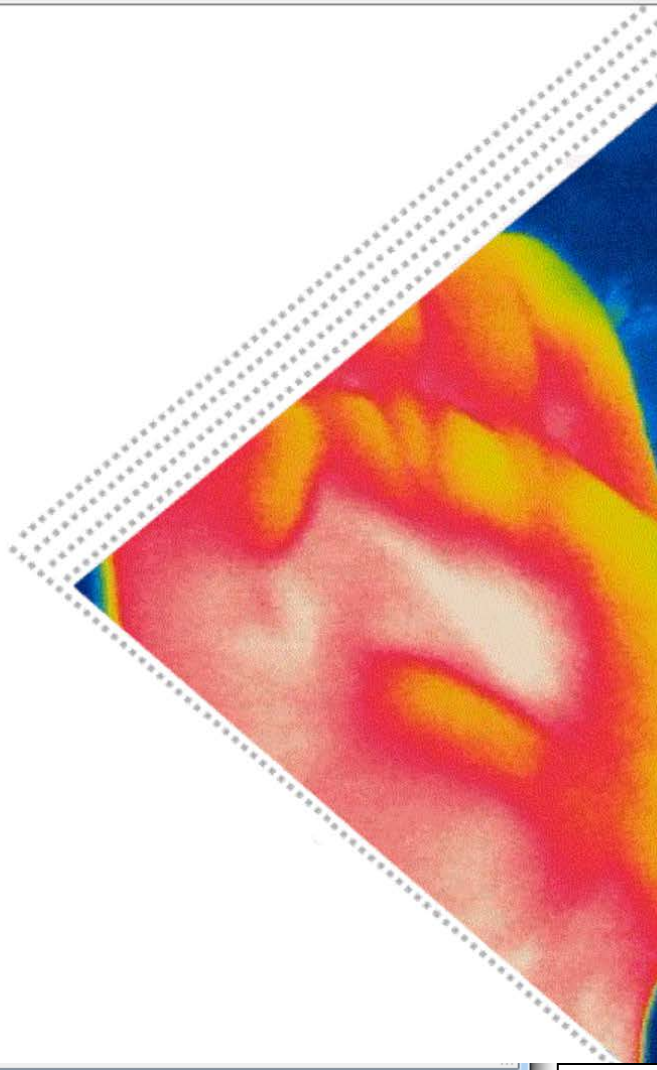
Name:
Concentration: mg/L
Date: 2015-07-20

4. Real-Time Calculation:

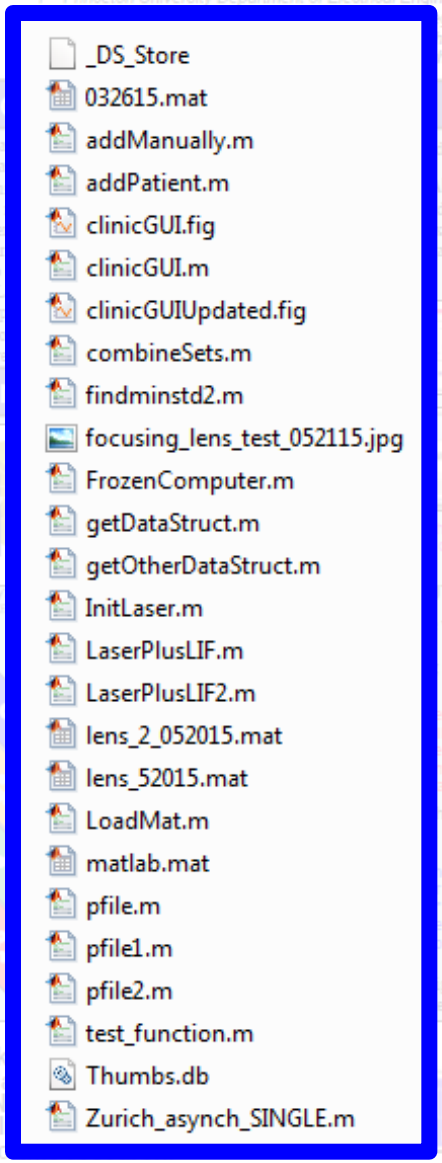
☐ Remove Outlier?
Final Number of Runs:
☐ Display Plot?

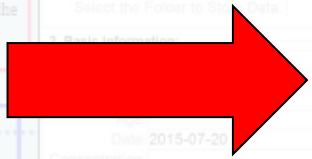
5. Run:

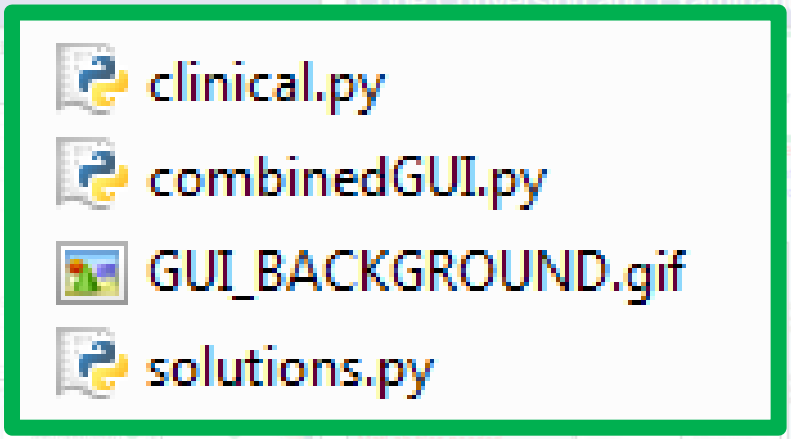
Load Data | BEGIN SENSING



Converting MatLab to Python







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Introduction

- Diabetes afflicts 9.3% of the entire United States population, remains "the 7th leading cause of death", by to 2014 statistics
- Diabetics must monitor their blood glucose levels to ensure they stay healthy and administer insulin if needed
- Goal is to enhance mid-infrared Quantum Cascade Laser based non-invasive glucose sensor to provide an alternative to obtaining direct blood samples multiple times per day to measure glucose levels.

Setup and Method

GUI Design

The GUI itself was designed to feature two different modes: one for use with clinical trials and one for use in the lab.

CLINICAL TRIALS VERSION

- More simplified design
- Data stored in text files for later analysis regarding the patient

IN-LAB, "SOLUTIONS" VERSION

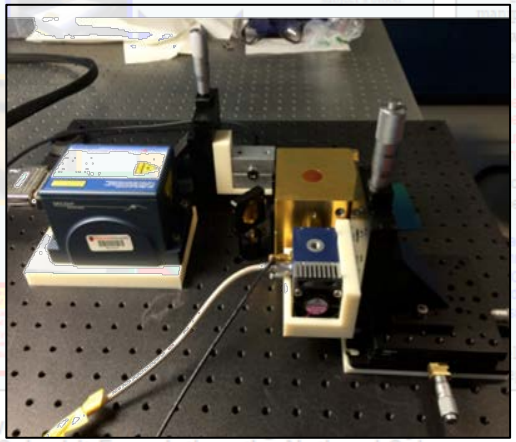
- Designed for more variable

Code Conversion and Examination

Python files needed after conversion

MatLab files needed prior to conversion

SEE ME AT POSTER #15



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