



Analysis of Anaerobic Digestion by MIR, NIR, UV/VIS online spectroscopy

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Project Summary

- Spectroscopy for measurement of Anaerobic Digestion.
- Online MIR spectroscopy.
- Laboratory analysis of samples and simultaneous spectrum measurements.
- Machine Learning to estimate concentrations from spectra.

Project Benefits

- Concentrations obtained much faster than laboratory analysis
- Measurements performed automatically
- Concentration values can be used for optimising plant operation.

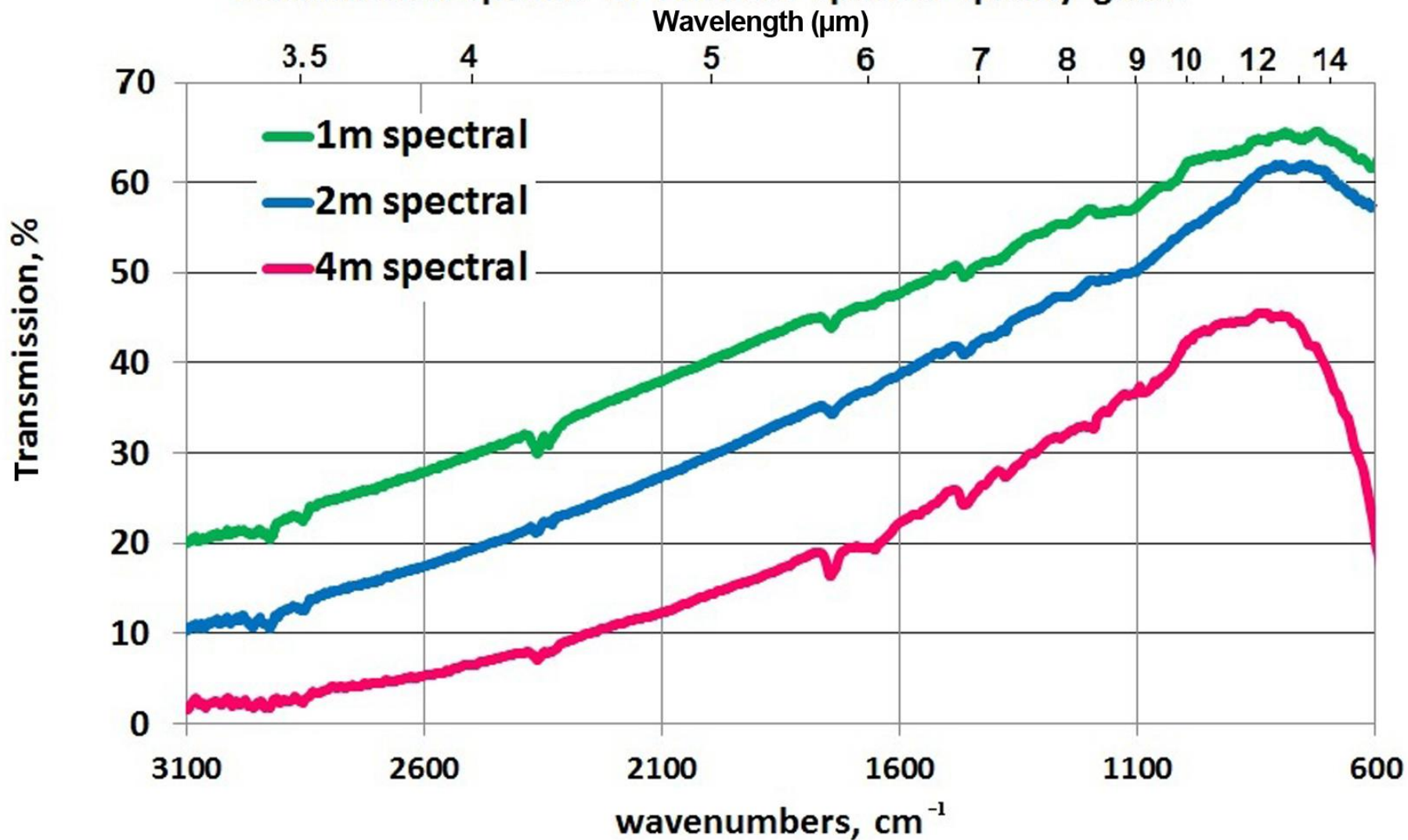
Previous System



Previous System

- Built with Nicolet™ iS™5 Spectrometer
- 3m of PIR Fibre
- 6m round trip

Transmission Spectra of PIR fibre spectral quality grade



Source: Polycrystalline IR-Fiber Cables art photonics – Broad Spectra Optical Fiber Solutions from UV to Mid-IR. (n.d.). Retrieved October 30, 2014, from <http://www.artphotonics.de/products/special-fibers-and-fiber-cables/polycrystalline-ir-fiber-cables/>



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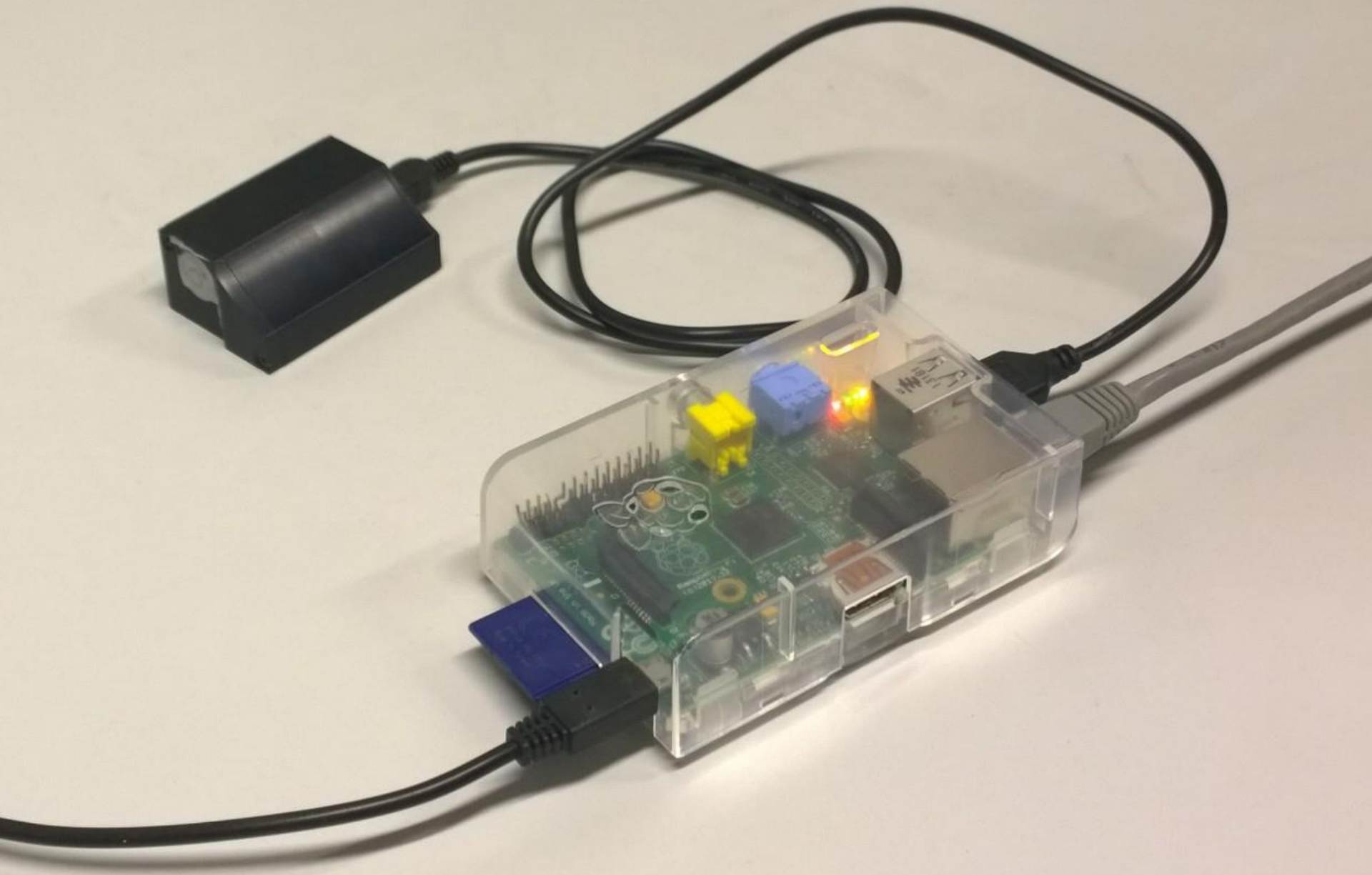
Fibre Coupled Spectrometer



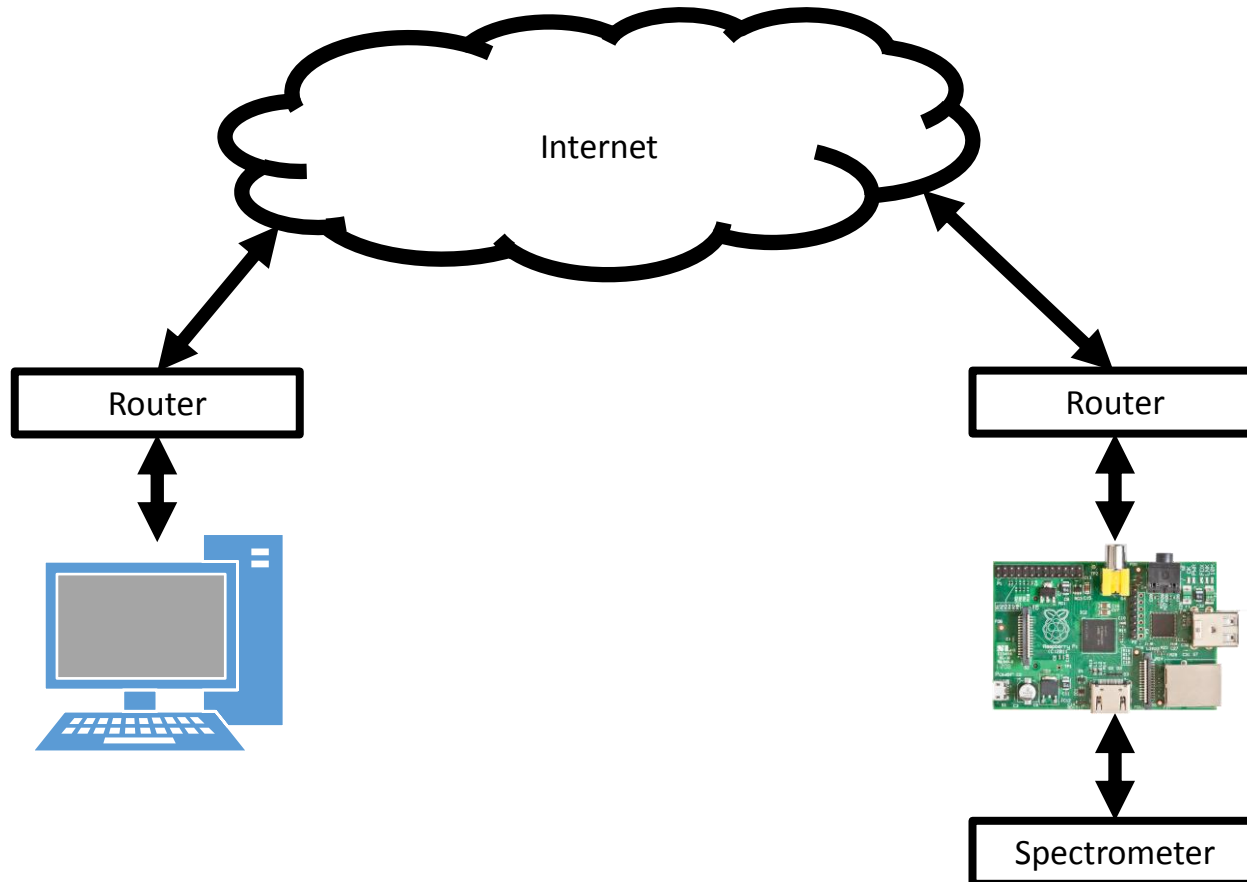
New Sensor System

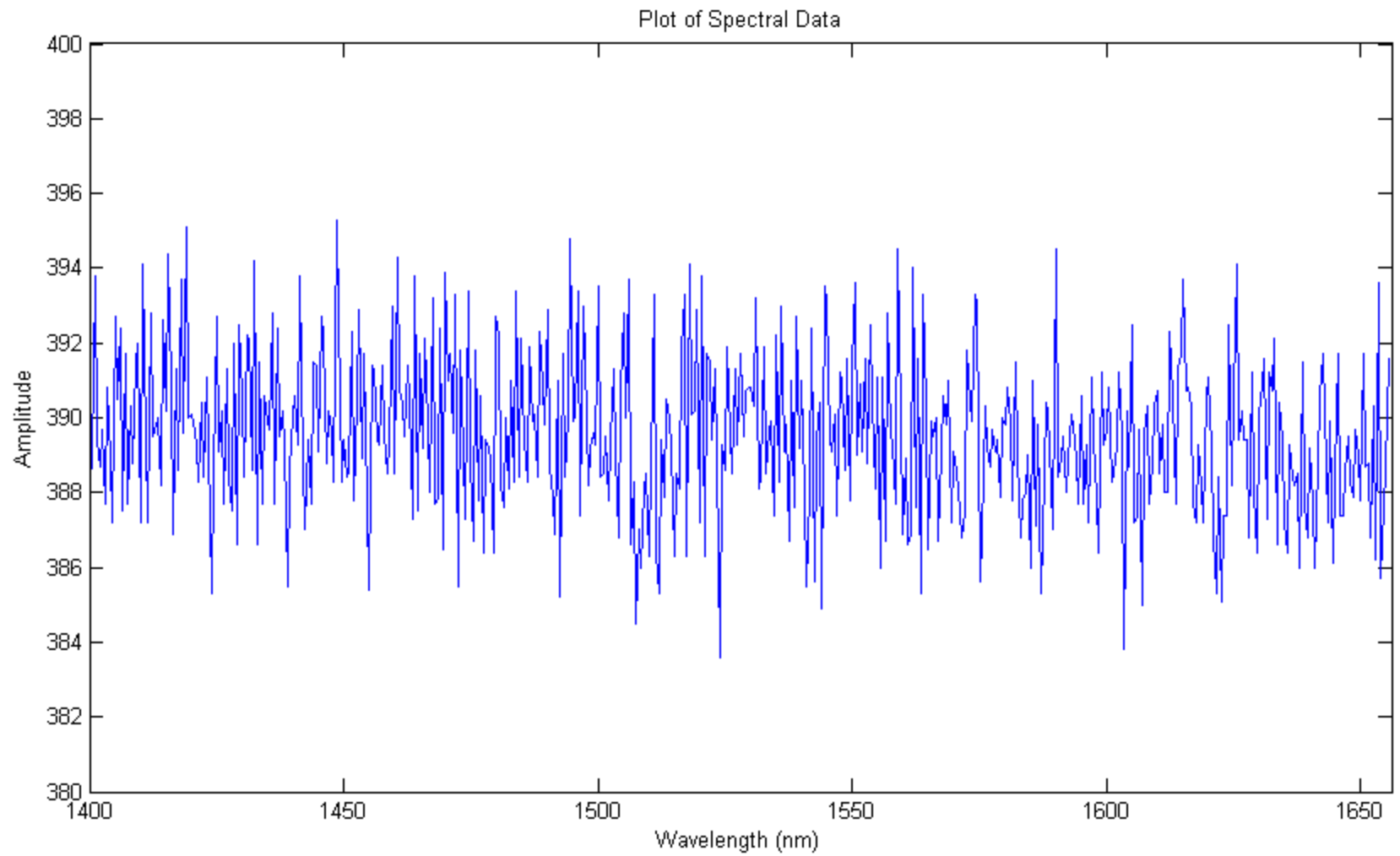
- 120mm x 170mm x 170mm package
- USB & Power connectors
- 2 x optical SMA connectors

Raspberry Pi & NIR Spectrometer



Intended Layout





Upcoming Work

- Take substrate sample from digester
- Create spiked sample
- Lab analysis
- Spectral measurements
- Machine learning
- Test
- Analyse results



Thanks for listening



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