Optimizing Gaussian Processes

Honours Research Project

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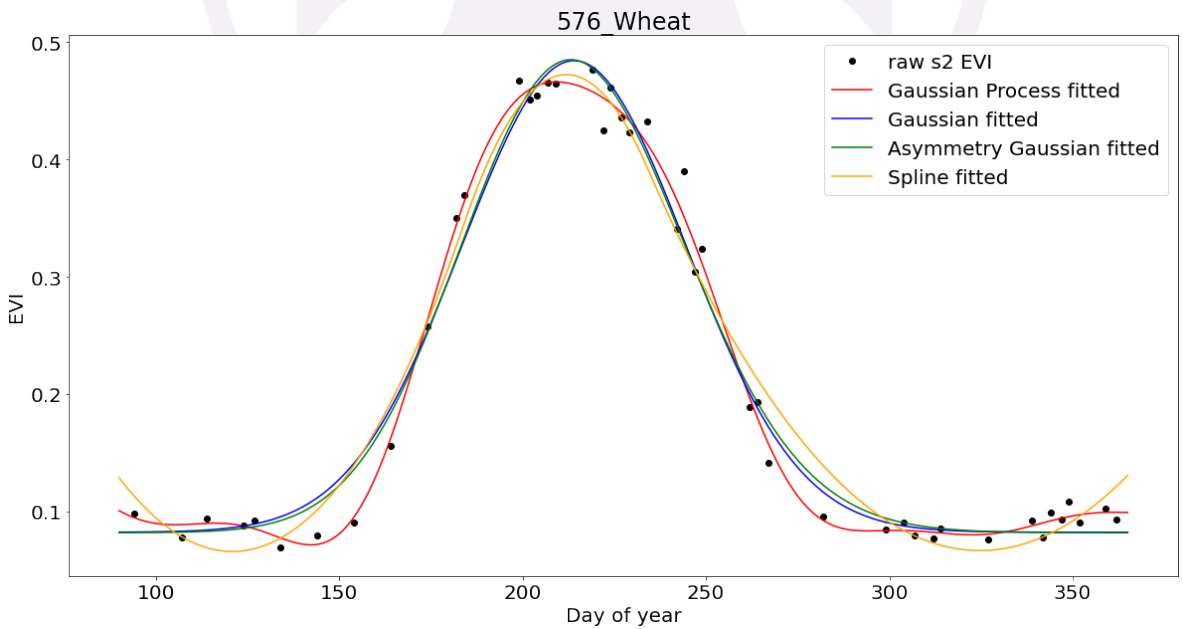
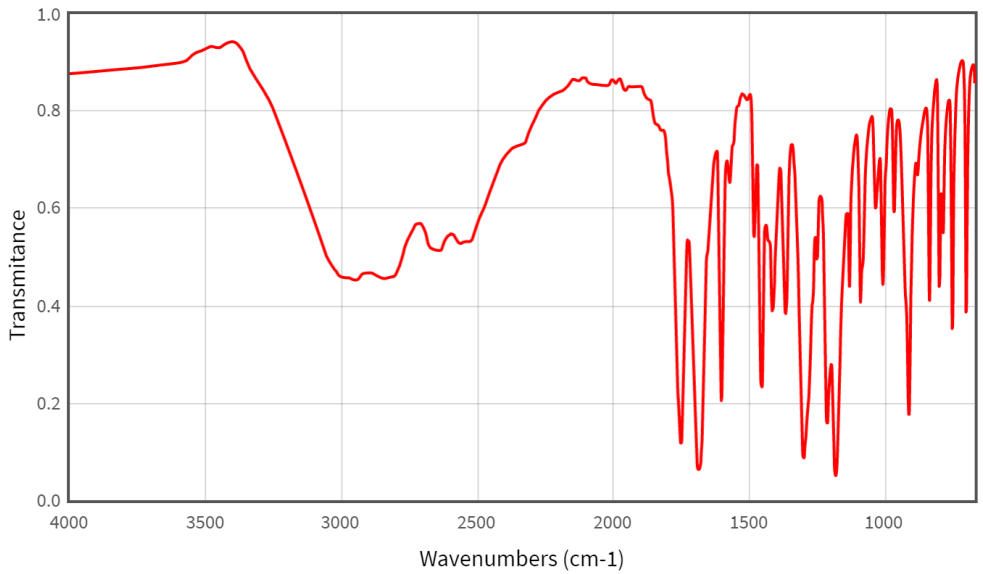
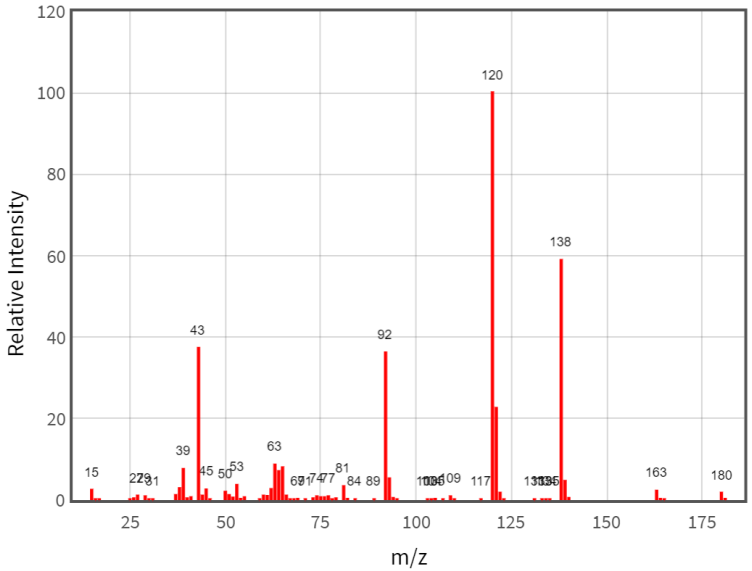
Problem Setting and Motivation

- This project focuses on the problem of time series prediction.
- Given a data set of n observations $\mathcal{D} = \{(x_i, y_i)\}_{i=1}^{n}$, where each input $x_i \in \mathbb{R}_{>0}$ is a time value and $y_i \in \mathbb{R}$ is a output or experimental observation that acts a function of time, the goal of time series prediction is to try and best predict a value $y_\star$ at time $x_\star$.
- The idea of studying time series prediction came from a research group from the Gatton campus, lead by Andries Potgieter, analysing crop growth from previous seasons to forecast when certain phenological stages will take place in the current harvest.



Infrared Spectroscopy and Mass Spectrum Data





- **Project Goal:** Develop a deep learning model to accurately predict functional groups based off Infrared (IR) and Mass Spectrometry (MS) data[1]. Main focus will be on Multi-layer Perceptrons (MLPs).

[1] **NIST**.