CENG 463 Homework 4 due on 21st November 2022 at 13.00

Polynomial Curve fitting to Crop Phenologies

Description:

We are going to fit polynomials (lines) functions to corn, cotton, and soybean data in the Bismil Plain. Discuss outputs and fit qualities. Each step requires a brief discussion as markdowns in your notebook files. Use HW4Data.csv as input. Fit curves to both corn and cotton crops each year. Plot your fittings: group plots for each question.

You may start with Lecture 5 or 6 Jupyter Notebooks or from the scratch

Tasks:

1. Fit curves to corn, cotton, and soybean's NDVI vs days. In 2013. Solve both manually and SKLearn, then compare errors. Determine suitable polynomial orders. Discuss your order of selection.
2. Estimate MSAVI from NDVI by using curve fitting in 2013 (MSAVI vs NDVI). Solve with SKLeaarn, then compare errors.
3. Compare 2014 NDVI and MSAVI values from 2013's NDVI curve data by using curve fitting.
4. Add discussion at each step and describe the limitations of polynomial curve fitting for this data set. Select appropriate quality metrics then analyze fitting quality. Discuss the suitability of estimation for each crop. Is there any difference between crop phenologies?

Notes:

You may group with another student, teams of 2 students are allowed. I expect equal or similar contributions.

Only your notebooks for your group will be submitted. Add your Student ID and your initials such as MT1223456789_SecondStudentInitialsSecondStudentID.ipynb, and put full names & IDs at the top of the file.

Add code comments and discuss your findings in the notebook. Markdowns and discussions should be in English.

Elegant code, useful comments, and extra efforts will be graded handsomely.

Good Luck

Dr. Mustafa Teke