Pre-requisites

😈 Which year of study is appropriate for your topic?

Year 3 or 4.

😈 What background and programming languages are required for your topic?

Ability to write computer programs, in any language. Knowledge of univariate calculus, linear algebra, probability and statistics.

😈 What do you think is attractive/unique about your topic to students?

Have you wondered how your camera can put a box around every face it sees? Or how Google or Baidu search for images? Do you wish to enhance your photographs, but find that existing apps don't do what you want? This Visual Computing course will teach you the basics of all these, enabling you to do analyze images and manipulate them in interesting ways.

Learning content and Teaching

😈 What will be covered during "trial" lectures?

The introductory lectures will give an overview of the course, with videos and a short hands-on session. Three visual computing projects will be explained, and course expectations will be described.

😈 What will be covered during the "advanced" seminars?

These advanced seminars will go more in-depth into the relevant topics and tools: Python programming, review of linear algebra, probability and statistics, image processing, computer vision, machine learning. There will be hands-on assignments to reinforce the topics covered.

😈 What will be the nature of the project work? How do you intend to split students into project groups, each consisting of 3 or 4 students?

Students will choose one of three projects, work in groups of 4, and give an oral presentation at the end of the course. The projects will be about solving an interesting problem using visual computing techniques, and will require implementation and testing. Example: implement a program to read a car license from an image.

Do you have any recommendations for references (books) students can study to prepare for your topic before coming to NUS?

Programming will be done in Python, using suitable tools such as Anaconda, Scikit Learn, and OpenCV. If you don't know Python, it would be good to acquire basic proficiency beforehand. More importantly, refresh your knowledge of linear algebra, probability and statistics.

Besides their own personal laptops, what other equipment or software would students need for your topic?

Please download and install Anaconda with Python 3.7 for your OS:

https://www.anaconda.com/distribution/

This will install Python, a programming IDE, as well as Scikit Learn, Numpy, Scipy. After installing, start Spyder, and in the Console, type: *pip install opencv-python*

This will install OpenCV.

Assessment

What forms of assessment will there be?

There will be 3 or 4 short hand-written or programming assignments during the Advanced Seminars. The purpose is to reinforce the topics covered in lectures. Weightage towards the final grade will be 30% for Assignments, 70% for Final Project.