

MSc(CS) Dissertation Public Seminar

Title: Estimating the Curve of Spine Using IMUs with Machine Learning

Speaker: Mak Ting Hin

Date & Time: November 11 2020, Wednesday, 02:00pm

Zoom Meeting Link: <https://hku.zoom.us/j/96959330302>

Meeting ID: 969 5933 0302

Password: 940613

Abstract:

Measurement of a human spine usually requires X-ray scanning which can be time consuming and not easily accessible. It might also not be possible to establish a real time monitoring of a human spine, as X-ray scan produces still images. Although it is the preferred way in some scenarios such as scoliosis diagnosis which requires a precise measurement, some use cases like rehabilitation therapy does not require a precise measurement but a real time monitoring tool.

This dissertation aims to develop a new method to estimate the curve of a human spine in real time. A hardware with three inertial measurement units is developed and a neural network is created to estimate the curve from the hardware readings. The estimation was compared to the output of motion capture system which was also the ground truth for the neural network, to measure the accuracy of the method.

The results suggested the accuracy of the developed method is sufficient for application that does not require a highly confident measurement, such as posture monitoring, spinal therapeutic exercises tracking or other remote applications.

Nevertheless, this dissertation has no intention to replace or improve X-ray scanning in especially medical diagnosis scenarios. Instead, the developed method is assumed to be used in a continuous and real time application in which errors in the estimation of some instants and frames can be tolerated.

About the Speaker:

Mak Ting Hin is currently a part-time MSc(CS) student of the Department of Computer Science in the University of Hong Kong. His supervisors are Dr. T.W. Chim & Dr. Joanne Yip.

All are welcome!

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