Creating a Motion Tracking Setup for Interactive Scientific Visualization

Creating/interfacing tracking software with commercial hardware, for interactive scientific visualization.

‘A picture is worth a thousand words’. But being able to interact with the picture... is priceless.

Visualisation forms an integral part of scientific discovery. We, human beings, are extremely capable of discerning patterns; a 10-year-old can recognise patterns in noisy data, that even the most sophisticated algorithms have trouble with. Simulations of fluid-mechanics often result in such data patterns, given the complexity of the governing equations. Visualising such data has played a critical role in driving theoretical advancements in the past.

The goal of this project is to create and interface in-house visualization software, with off-the-shelf tracking hardware. The resulting setup will allow real-time manipulation of image frames using hand gestures. The student will gain invaluable experience in software-hardware integration.

PREREQUISITES
- Programming in C/C++
- Familiarity with Cinder/Kinect SDK/Leap Motion SDK
- Ability to work independently

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In the CSE Lab we combine computational methods, computer science tools and domain specific knowledge to solve scientific and engineering problems in areas such as Fluid Mechanics, Nanotechnology and Life Sciences. The core computational competences of our group are in particle methods and in stochastic optimization techniques. Motivated by challenges in application fields, we focus on identifying the common elements among computational techniques and on formulating common methodological, algorithmic and software structures that facilitate their further development.