2D/3D Optical/Range/Scene Flow, 2D/3D Tracking and Plant Growth from 3D Range Data

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Activities/Courses

• Acting Chair of Computer Science 2016/2017

• CS2035b - Data Analysis and Visualization (MatLab) Monday and Friday 4:00pm to 5:30pm, HSB2036.
Computing Optical Flow

(a) The middle frame from the **Yosemite Fly-Through** sequence and (b) its correct flow field.
Examples of Recent/Ongoing Research

- Computing 3D Optical Flow for gated MRI data of the left ventricle of a beating human heart using a model of the left ventricle [with Prof. Huang Fang, CSU]

- Scene flow (stereo depth maps plus left/right 2D optical flow) versus Range flow (3D depth maps and the $X$, $Y$ and $t$ derivatives) to compute 3D optical flow of surface points (with Seereen Noorwali)

- Detecting Tornado “hook echos” in Doppler weather data, computing 3D wind velocity as 3D optical flow using dual Doppler radar and Windprofiler data, computing long storm trajectories in Doppler weather data (with Bob Mercer, Hongkai Wang, Yong Zhang and many others).
• Using 3D point clouds of multiple views of a growing plant (and the closed 3D triangular meshes computed from their registration) to non-invasively measure the 3D growth of the plant, using its 3D height/area/volume measurements and the 3D areas of its canopy and individual leaves (with Ayan Chaudhury)

• Computing hierarchical 3D Scene/Range flow from synthetic (ray traced) and real car driving sequences (with Seereen Noorwali)

• Computing 2D optical flow at occlusion using segmented closed occlusion regions (with Hua Meng)

• Computing motion and structure from optical flow in a sequence of x-ray images of a bending knee event (with Yves Pritchard).
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