COMP 3301 — VISUAL COMPUTING AND APPLICATIONS

Winter 2018

Department of Computer Science
Memorial University of Newfoundland

Instructor:
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Lectures:
Time slot: Monday, Tuesday, & Thursday 1:00 ~ 1:50pm
Room: EN-1052
Website: http://www.cs.mun.ca/~gong/Courses/comp3301/

Course Description:
Visual perception is responsible for most of our impressions about the world around us. This course introduces how computers are used to both mimic the human visual system (e.g., recognize shapes) and to create visual content (e.g. synthesize images). Related techniques on image processing, image analysis, and image synthesis are discussed under a unified framework. How visual computing principles were used to create visual effects in movies and commercials are also examined.

Prerequisite: COMP 2002

Evaluation:
Assignments (5): 40%
Midterm exam: 20%
Final exam: 40%
Note: If you missed the midterm or assignment deadline due to documented illness or emergency, notify the instructor within a week and the weights will be roll into the final exam.

Course Topics:
- Introduction:
  human perception; intensity & color; image acquisition; display hardware
- **Image basics:**
  image representation; intensity histogram (assignment); histogram operation; image blending;

- **Image processing:**
  image filtering; smoothing & sharpening filters (assignment); Fourier transformation; frequency-domain filters;

- **Raster graphics:**
  line & circle generation (assignment); line clipping; polygon filling; digital halftoning;

- **Image analysis:**
  edge detection; Hough transform (assignment); intensity thresholding; morphology operation; distance transform;

- **Image matching**
  corner detection (assignment); template matching; motion estimation;

- **Image synthesis:**
  geometric operations; warping & sampling; feature-based warping; image morphing;

**Resources:**

All lecture notes will be posted on the aforementioned course website. The lectures provided in this course, including any visual or audio recording thereof, are subject to copyright owned by Dr. Minglun Gong and, in some cases, the authors of the supplemental materials used in the course. It is prohibited to record or copy by any means, in any format, openly or surreptitiously, in whole or in part, in the absence of express written permission from Dr. Minglun Gong, any of the lectures or materials provided or published in any form during or from the course.

The Desire2Learn website ([https://online.mun.ca/](https://online.mun.ca/)) is used for posting all assignments and you are required to check regularly regarding to assignment announcements and due dates. All assignments are due prior to the midnight of the specified dates. Late submissions will not be accepted. Finished assignment must be submitted online via Desire2Learn. Physical submissions are not required.