Exam revision

Semester 2, 2021

Kris Ehinger

Exam format

- Online timed Canvas LMS quiz
- Released at a specified time and only available within that time window
- 2 hours + 15 minutes
  - You can work for the entire time; there is no enforced “reading time”

Authorised materials

- Open book exam: you may use subject materials (slides, workshops), textbooks, and your own notes
- **NOT OPEN INTERNET**
  - Do not make use of any messaging or communications technology
  - Do not use Google, Stack Overflow, or any other online search services
  - Do not post questions online
  - Do not discuss with friends, roommates, etc.
- Calculators/code are allowed for computations

Exam troubleshooting

- Canvas quizzes save your answers automatically as you work, so long as you are online
- For troubleshooting advice (e.g., what to do if you lose internet connection), please read the unimelb guide to LMS quiz exams (before the exam!):
  - https://students.unimelb.edu.au/your-course/manage-your-course/exams-assessments-and-results/exams/how-do-i-take-my-exam/formats/LMS-quiz

Exam submission

- The quiz will **automatically** submit when the exam window ends or the time limit is reached
  - If you start the exam late, you will not get the full 2 hours + 15 minutes
  - Note that the quiz submits automatically even if you are not online at that moment

Exam submission: File uploads

- You can include files uploads (e.g., images) in your answers
  - If you have difficulty uploading these to Canvas, you can submit them to a OneDrive repository
- If you submit files to the OneDrive late (after the timestamp of your exam submission on Canvas), we can accept them, but:
  - You will receive a penalty of **1 mark per minute late** (rounded up), deducted from your **final overall mark in COMP90086** (not deducted from the exam mark)
  - Any files over 30 minutes late will not be accepted

Question types

- Short-answer questions: answer in about 2 sentences
- Definitional or conceptual questions
  - Briefly explain what a parameter in an algorithm does
  - Compare two methods
  - Give an example of how a method might be used or a problem that might be encountered with a method

Question types

- Numeric examples: perform algorithmic computations
  - Work through an algorithm with a toy dataset
  - Show the steps to explain how you got your answer

Question types

- Longer-answer questions: several sentences
- More detailed explanation or analysis
  - Compare and contrast methods for a given application
  - Outline the steps of an algorithm in a given context
  - Explain the theoretical motivation for a method
  - Explain or derive a technique

Exam coverage

- Expect a range of topics from the entire semester (lectures + workshops)

- Topics on the following slides are a memory refresher, not an exhaustive list…

Image formation

- Pinhole camera model
- Intrinsic and extrinsic parameters that affect image appearance

Image filtering

- Filtering operation, types of filters
- Mathematical properties of convolution
- Fourier (frequency) domain
- Relationships between filtering operations in the spatial vs. frequency domain

Light, colour, shadow, edges

- Diffuse reflectance model
- Colour representation and colour spaces
- Recovering surface normal and reflectance
- Identifying edges in images

Convolutional neural networks

- Typical architectures, layers, parameters
- Commonly-used networks
- CNN training
- Self-supervised learning

Local features and matching

- Invariance to image variations
- Keypoint localisation vs. “bag of features” approaches
- Feature detection and description
- Feature matching, Hough, and RANSAC

3D, depth, and stereo

- Camera calibration
- Stereo depth
- Epipolar geometry
- Single-view depth (depth cues, classification)

Shape & texture

- Parametric and non-parametric texture synthesis
- Texture transfer
- Shape skeletons and contours
- Face models

Image generation

- Generative vs. discriminative models
- Autoencoders
- GANs
- GAN evaluation

Image segmentation

- Clustering methods
- Graph-based methods
- Classification methods

Object detection

- Region-proposal methods
- Single-stage methods
- Object detection evaluation