Xutong Ren

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Education

Peking University — Beijing, R.P.China
Bachelor of Computer Science, EECS. — Sept. 2015 – July 2019

- GPA: 3.61/4.00.
- Special Research Class of EECS.
- Core Courses
  - Mathematics:
    Advanced Mathematics (96); Algebraic Structure and Combinatorial Mathematics (97);
  - Computer Science:
    Operating Systems (98); Principle of Programming Languages (96);
    Computer network practicum (95); Computer Architectures(94);
  - Programming:
    Introduction to Computation (95); Practice of Programming in C/C++ (95).
- TA: Introduction to Computer Systems

Publication

[1] **Xutong Ren**, Mading Li, Wen-Huang Cheng and Jiaying Liu, "Joint Enhancement and Denoising Method via Sequential Decomposition," in *2018 IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2018, pp. 1–5. (**oral**)

Patent

[1] Jiaying Liu, **Xutong Ren**, Mading Li, Zongming Guo, "Method, System and Computer Device of Low-light Enhancement and Denoising," CN201810243551.9

Research Experience

Research Assistant

Institute of Computer Science and Technology, Peking University. — Beijing, China
Advisor: Prof. Jiaying Liu, PKU. — May 2017 – present

- **Low-light Image Enhancement and Denoising**
  - Solve the problem that low-light enhancement methods ignore intensive noise in original images which leads to simultaneously enhance the noise as well.
  - Propose a joint low-light enhancement and denoising strategy based on a novelsequential Retinex decomposition concept.
  - Perform well for a wide variety of images, and achieve better quality compared with the state-of-the-art methods. The paper and code are available at http://www.icst.pku.edu.cn/course/icb/Projects/JED.html.
  - Bring up the idea, code in MATLAB and publish a paper [1] as the first author.
- **Joint Low-light and Low-rank Algorithm**
  - Explain and demonstrate why solving the Retinex decomposition problem iteratively causes noise to distribute in each component, which in the end impairs the denoising ability.
  - First to combine low-light enhancement method and low-rank denoising approach in order to improve the quality of images. An integrated low-rank decomposition of three channels in RGB space is applied to remove noise from the reflectance map.

Research Intern

Center of Imaging Science, Johns Hopkins University. Baltimore, U.S.
Advisor: Prof. Alan Yuille, JHU. July 2018 – Sept. 2018

- **Recurrent Curriculum Learning**
  - Propose a new form of Curriculum Learning, which follows an organized learning order by gradually reducing oracle information given to the network.
  - Design a general two-stage network model, using outputs of coarse stage to replace oracle information given to fine stage and increase learning difficulty.
  - Apply to different visual tasks such as object detection, segmentation and classification.
- **Transfer Learning via Jigsaw Puzzle**
  - Build a recurrent solution to a jigsaw puzzle of 9! different permutations in a self-supervised manner, without heavy burden of human annotation.
  - Enforce the neural network to learn from spatial contexts of puzzles and transfer the learned features to visual tasks such as medical image analyses.

Honors

- Peking University Award for Academic Excellents 2018
- Wang Shengdi Scholarship (top 10%) 2018
- Peking University Award for Academic Excellents 2017
- 8108 College Scholarship (top 10%) 2017
- The Third Prize of Peking University ACM Competition 2017

Skills

- **Deep Learning**
  PyTorch, MXNet, Torch.
- **Programming**
  C/C++, Matlab, Python, Lua, Java, Javascript, HTML, Go, Wolfram, Arduino.
- **Robotic Design**
  Computer Science and Electrical Engineering Education Program at MIT, Boston.
- **English**
  GRE (325); TOFEL (105).