PEIJUN BAO

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RESEARCH INTEREST

My research interest is on computer vision and machine learning problems in general. Especially, I am interested in the tasks of video understanding such as video classification, localization and grounding.

EDUCATION

Peking University   September 2018 - Present
Master Student in Computer Science

Northwestern Polytechnical University   September 2014 - July 2018
GPA: 90.6/100 Ranking 1/27
Bachelor Student at Honors College, Majoring in Computer Science
Selected Courses with Grade A/A+: Mathematical Analysis, Linear Algebra, Probability Theory, Ordinary Differential Equations, Numerical Methods, Signal and System, Operating System, Data Mining, etc.

RESEARCH EXPERIENCE

Machine Intelligence Lab at Peking University
September 2018 - Present
Supervisor: Prof. Mu Yadong

Image Processing Group at Technical University of Madrid
September 2016 - March 2017
Visiting Student, Sponsored by China Scholarship Council
Supervisor: Prof. Carlos R. del-Blanco

Medical Image Processing Lab at Northwestern Polytechnical University
June 2015 - July 2018
Supervisor: Prof. Yong Xia

PUBLICATION

Dense Events Grounding in Video
Peijun Bao, Qian Zheng and Yadong Mu
The 35th AAAI Conference on Artificial Intelligence, Virtual Conference, 2021 [pdf]

Learning Sample Importance for Cross-Scenario Video Temporal Grounding,
Peijun Bao, and Yadong Mu
submitted to IJCAI 2021 (sucessfully passed the first phase of review, two phases totally)

Tiny Hand Gesture Recognition without Localization via a Deep Convolutional Network,
Peijun Bao, Ana I. Maqueda, Carlos R. del-Blanco and Narciso García
IEEE Transactions on Consumer Electronics, Volume 63, Issue 3, Pages 251-257, 2018 [pdf]

HONOR & AWARDS

Merit Student, Northwestern Polytechnical University
Honors Scholarship, Northwestern Polytechnical University
Exchange Student Scholarship, China Scholarship Council

PROGRAMMING SKILLS

proficient in using pytorch and python
familiar with tensorflow, c, c++ and matlab.

ACADEMIC REFERENCES

Yadong Mu, Professor of Peking University, myd@pku.edu.cn

Carlos R. del Blanco, Professor of Technical University of Madrid, cda@gti.ssr.upm.es

Yong Xia, Professor of Northwestern Polytechnical University, yxia@nwpu.edu.cn

PROJECT LIST

Dense Events Grounding in Video

- In this work, we explore a novel setting of temporal grounding dubbed as dense events grounding. Dense events grounding aims to jointly localize temporal moments of multiple events described in the paragraph.
- Our main motivating fact is that multiple events to be grounded in a video are often semantically related and temporally coordinated according to their order appearing in the paragraph. This fact sheds light on devising a more accurate visual grounding model.
- Based on above motivation, we propose Dense Events Propagation Network (DepNet) for dense events grounding. With a novel aggregation-and-propagation mechanism, DepNet can effectively exploit both the temporal order and semantic relations among dense events.
- This work was accepted by AAAI 2021.

Learning Sample Importance for Cross-Scenario Video Temporal Grounding

- This work investigates some superficial biases that are specific to the temporal grounding task, and proposes a novel targeted solution. The temporal grounding task aims to locate video moment in an untrimmed video, with a given sentence query.
- Most alarmingly, we observe that existing temporal ground models heavily rely on some biases (e.g., high preference on frequent concepts or certain temporal intervals) in the visual modal. This leads to inferior performance when generalizing the model in cross-scenario test setting.
- To this end, we propose a novel method called Debias-TLL to prevent the model from naively memorizing the biases and enforce it to ground the query sentence based on true inter-modal relationship.
- Debias-TLL simultaneously trains two models. By our design, a large discrepancy of these two models' predictions when judging a sample reveals higher probability of being a biased sample. Harnessing the informative discrepancy, we devise a data re-weighing scheme for mitigating the data biases.
- This work was submitted to IJCAI 2021 and sucessfully passed the first phase of review (two phases totally).

Tiny Hand Gesture Recognition without Localization via a Deep Convolutional Network

- This work studies hand gesture recognition when the hand only occupies a small part of the image with the cluttered background.
- Previous works tackle this problem by region proposal based algorithms or sliding window mechanism, with the supervision information of hand bounding boxes. However, it is far more difficult to annotate hand bounding boxes than hand gesture labels.
- In this paper, we propose a deep convolutional neural network to directly recognize hand gestures in arbitrary positions that occupy a reduced image area, without using any region proposal algorithm or sliding window mechanism.
- This work is published on IEEE Transactions on Consumer Electronics, 2018.