

Recent Advance in Computer Vision

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3. TAO 연구 (CAU Hospital & NVIDIA)
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To Do List from Previous Seminar

22.10.12

- 개인 연구 : Related Work – Pilot survey 계속 진행 (목표 : 데이터셋 및 비교 알고리즘 구체화)
 - Survey와 함께 결정내려야할 혹은 고민해야할 사항
 - Survey 계속 진행하면서, 2D(공부하기에 좋음) vs 3D(실적내기에 좋음) 어떤 방향으로 범위 좁힐지.
 - CT쪽이 domain 강점이 있는데, 다른 2D domain이 괜찮을지.
 - 목표 데이터셋의 범위를 넓게(다수의 질병, 구조물) 혹은 좁게(하나의 질병, 구조물) 가져갈지.
 - 3D로 간다면, TAO 데이터셋에 집중하는 것이 좋을것. => 주제 변경
- SW중심대학지원사업 : 특허 출원 계속 진행 => 소중대는 모두 완료, AI대학원지원사업은 1건 출원지시요청
- TAO 연구 : Activity 논문 회신, Label 데이터 수신, nvidia driver, docker, singularity 설치 및 학습 진행
 - => 전체적으로 대기중, 레이블 데이터 수신 전까지 관련 문헌 조사 및 정리
- 졸업논문 : minor 수정 작업, 발표 자료 수정, IEEE Access 양식에 맞춰 나머지 섹션 작성
 - => 심사위원 두 분께 답변서 제출 완료, 답변 모두 받음.

Overall Progress



- 컴퓨터비전 코어 분야로 연구 주제 변경
- 최신 동향을 연구에 반영 가능한 역량 : 6개월만에 논문 1편을 준비할 수 있는 실력
 - 1) 영어 작문, 2) 영어 웅변, 3) 영어 프레젠테이션, 4) 아이디어를 표현 가능한 수학 능력, 5) 아이디어를 보여주는 그림 능력, 6) 내년도 관심사를 캐치하는 눈치, 7) 빠른 행동을 위한 능동적 태도
- CVPR과 ECCV를 중심으로 최근 3년 간의 논문들을 조사해봄. => 어떤 식으로 연구가 흘러왔는지 눈치챈.
- Paper submission deadline
 - ✓ CVPR 2024 TBD
 - ✓ CVPR 2023 (Jun 18, 2023 - Jun 22, 2023): Nov 11, 2022
 - ✓ CVPR 2022 (Jun 19, 2022 - Jun 24, 2022): Nov 16, 2021
 - ✓ CVPR 2021 (Jun 19, 2021 - Jun 25, 2021): Nov 16, 2020
 - ✓ ECCV 2024 TBD
 - ✓ ECCV 2022 (Oct 24, 2022 - Oct 28, 2022): Mar 7, 2022
 - ✓ ECCV 2020 (Aug 23, 2020 - Aug 28, 2020): Mar 5, 2020

Related Work

CVPR 2022's research categories

MENU ☐ Select Primary Subject Area		# papers	Oral	Poster
1	Recognition: detection, categorization, retrieval	177	25	152
2	Image and video synthesis and generation	157	26	131
3	3D from multi-view and sensors	137	26	111
4	Low-level vision	110	19	91
5	Vision + language	105	20	85
6	Segmentation, grouping and shape analysis	99	16	83
7	Transfer/ low-shot/ long-tail learning	86	15	71
8	Deep learning architectures and techniques	85	20	65
9	Self-& semi-& meta- & unsupervised learning	84	7	77
10	Video analysis and understanding	77	15	62
11	Pose estimation and tracking	62	14	48
12	Representation learning	61	11	50
13	3D from single images	60	10	50
14	Scene analysis and understanding	56	9	47
15	Face and gestures	54	7	47
16	Computational photography	53	10	43
17	Motion and tracking	53	8	45

18	Adversarial attack and defense	52	10	42
19	Datasets and evaluation	52	7	45
20	Machine learning	41	7	34
21	Action and event recognition	40	8	32
22	Efficient learning and inferences	40	3	37
23	Medical, biological and cell microscopy	37	5	32
24	Vision applications and systems	32	4	28
25	Navigation and autonomous driving	31	2	29
26	Vision + graphics	24	6	18
27	Privacy and federated learning	21	3	18
28	Vision + X	20	4	16
29	Physics-based vision and shape-from-X	16	2	14
30	Robot vision	16	3	13
31	Explainable computer vision	15	2	13
32	Demo	15	1	15
33	Optimization methods	14	2	12
34	Transparency, fairness, accountability, privacy and ..	14	4	10
35	Document analysis and understanding	12	1	12
36	Biometrics	11	2	9

Source: <https://blog.roboflow.com/cvpr-2022-best-papers-and-highlights/>

Top 5 Google scholar citation papers for each CVPR & ECCV 2020~2022

Conf.	GS Citations	Title	Authors
ECCV 2022	143	Bytetrack: Multi-object tracking by associating every detection box	Zhang et al.
ECCV 2022	80	Motr: End-to-end multiple-object tracking with transformer	Zeng et al.
ECCV 2022	60	Slip: Self-supervision meets language-image pre-training	Mu et al.
ECCV 2022	42	Detecting twenty-thousand classes using image-level supervision	Zhou et al.
ECCV 2022	36	Vqgan-clip: Open domain image generation and editing with natural language guidance	Crowson et al.
CVPR 2022	854	Resnest: Split-attention networks	Zhang et al.
CVPR 2022	761	Masked autoencoders are scalable vision learners	He et al.
CVPR 2022	451	A convnet for the 2020s	Liu et al.
CVPR 2022	293	Video swin transformer	Liu et al.
CVPR 2022	263	Scaling vision transformers	Zhai et al.
CVPR 2021	1355	Exploring simple siamese representation learning	Chen et al.
CVPR 2021	973	Rethinking semantic segmentation from a sequence-to-sequence perspective with transformers	Zheng et al.
CVPR 2021	575	Coordinate attention for efficient mobile network design	Hou et al.
CVPR 2021	568	Scaled-yolov4: Scaling cross stage partial network	Wang et al.
CVPR 2021	559	Pre-trained image processing transformer	Chen et al.
ECCV 2020	3954	End-to-end object detection with transformers	Carion et al.
ECCV 2020	1350	Contrastive multiview coding	Tian et al.
ECCV 2020	812	Oscar: Object-Semantics Aligned Pre-training for Vision-Language Tasks	Li et al.
ECCV 2020	799	Uniter: Universal image-text representation learning	Chen et al.
ECCV 2020	710	Raft: Recurrent all-pairs field transforms for optical flow	Teed et al.
CVPR 2020	5060	Momentum contrast for unsupervised visual representation learning	He et al.
CVPR 2020	2620	Efficientdet: Scalable and efficient object detection	Tan et al.
CVPR 2020	2605	Analyzing and improving the image quality of stylegan	Karras et al.
CVPR 2020	2038	nuscenes: A multimodal dataset for autonomous driving	Caesar et al.
CVPR 2020	1513	CSPNet: A new backbone that can enhance learning capability of CNN	Wang et al.

논문 서베이 프로그램 정보 공유

Harzing's Publish or Perish (Windows GUI Edition) 8.6.4198.8332

File Edit Search View Help

My searches

> Trash

Search terms	Source	Papers	Cites	Cites/ye...	h	g	hI,nor...	hI,annual	hA	acc10	Search
✗ Computer Vision and Pattern R...	Google Sch...	260	125911	41970.33	231	260	102	34.00	118	238	2022
✗ Computer Vision and Pattern R...	PubMed	0	0	0.00	0	0	0	0.00	0	0	2022
✗											
✓ multi image classification [title]...	Google Sch...	630	3444	1722.00	26	45	13	6.50	22	61	2022
✗	Google Sch...	417	1214	607.00	16	22	6	3.00	13	24	2022
Neural Information Processing ...	Google Sch...	40	2148	1074.00	19	40	12	6.00	18	25	2022

Google Scholar search

Authors: Years: 2019 - 2019

Publication name: Computer Vision and Pattern Recognition ISSN:

Title words:

Keywords:

Maximum number of results: 1000 Include: ☒ CITATION records ☒ Patents

Cites	Per year	Rank	Authors	Title	Year	Publication
✓ h 5476	1825.33	27	T Karras, S Laine, T...	A style-based generator architecture for generativ...	2019	... vision and pattern reco.
✓ h 3706	1235.33	33	J Deng, J Guo, N X...	Arcface: Additive angular margin loss for deep fa...	2019	... and pattern recognition
✓ h 3335	1111.67	28	J Fu, J Liu, H Tian, ...	Dual attention network for scene segmentation	2019	... computer vision and ...
✓ h 2339	779.67	29	K Sun, B Xiao, D Li...	Deep high-resolution representation learning for ...	2019	... computer vision and p...
✓ h 2200	733.33	30	M Tan, B Chen, R ...	Mnasnet: Platform-aware neural architecture sear...	2019	... Vision and Pattern ...
✓ h 2112	704.00	31	H Rezatofighi, N T...	Generalized intersection over union: A metric and...	2019	... pattern recognition
✓ h 1748	582.67	32	T Park, MY Liu, TC...	Semantic image synthesis with spatially-adaptive ...	2019	... and pattern recognition
✓ h 1499	499.67	35	AH Lang, S Vora, ...	Pointpillars: Fast encoders for object detection fro...	2019	... pattern recognition
✓ h 1459	486.33	34	JJ Park, P Florence,...	DeepSDF: Learning continuous signed distance fu...	2019	... pattern recognition
✓ h 1404	468.00	56	ED Cubuk, B Zoph...	Autoaugment: Learning augmentation strategies ...	2019	... Computer Vision and ...
✓ h 1296	432.00	36	S Shi, X Wang, H Li	PointRCNN: 3d object proposal generation and det...	2019	... vision and pattern reco.
✓ h 1288	429.33	71	L Mescheder, M O...	Occupancy networks: Learning 3d reconstruction ...	2019	... pattern recognition
✓ h 1212	404.33	38	B Li, W Wu, Q Wu	Siamese++ Evolution of siamese visual tracking	2019	Computer Vision and ...

Citation metrics

Publication years: 2019-2019
Citation years: 3 (2019-2022)
Papers: 260
Citations: 125911
Cites/year: 41970.33
Cites/paper: 484.27
Authors/paper: 4.21
h-index: 231
g-index: 260
hI,norm: 102
hI,annual: 34.00
hA-index: 118
Papers with ACC >= 1,2,5,10,20:
252,246,240,238,234

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Paper details

Select a paper in the results list (to the left of this pane) to see its details here.

Copy Paper Details

Tools

Preferences...

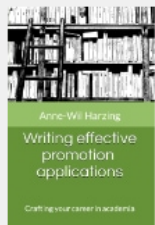
Online User's Manual

Frequently Asked Questions

Training Resources

YouTube Channel

Become a PoP Supporter



다운로드 : <https://harzing.com/resources/publish-or-perish>

산학협력프로젝트(SW중심대학지원사업)

산학-2 실적 현황

- 국제 논문 2편 & 특허 2건 : 모두 완료
- 결과보고서 초안 작성 완료, 11월 내로 제출 예정

TAO 연구 (CAU Hospital & NVIDIA)

Activity & Treatment

- Activity: 논문 진행 대기중
- Treatment
 - CT 데이터 수신 완료
 - Label 데이터 수신 대기중
 - 개발환경 세팅: nvidia driver, docker, singularity 설치 완료

■ 중견 연구 과제 제안서 작성

- 금일 14시에 온라인 설명회 예정(추후 녹화본 시청 예정)
- 접수일은 22.12.01~22.12.12로 보임(한국연구재단 신규사업공지 게시글 참고).
- 제안하는 연구 주제 : "임상의사지원 시스템을 위한 멀티모달 AI 시스템 자동화 연구(가제)"

| 졸업 논문

- 석사학위 청구논문 심사답변서 교수님들께 송부 완료
- 답신 수신 완료

To Do List

- 개인 연구 : 논문 읽기 진행
- SW중심대학지원사업 : 결과보고서 제출
- TAO 연구 : Activity 논문 및 Label 수신 대기
- 중견 연구 제안서 : 온라인 설명회 시청, 제안서 작성
- 졸업논문 : 후속 절차 완료

Thank you

Eyeball Volume Estimation

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16th Nov, 2022



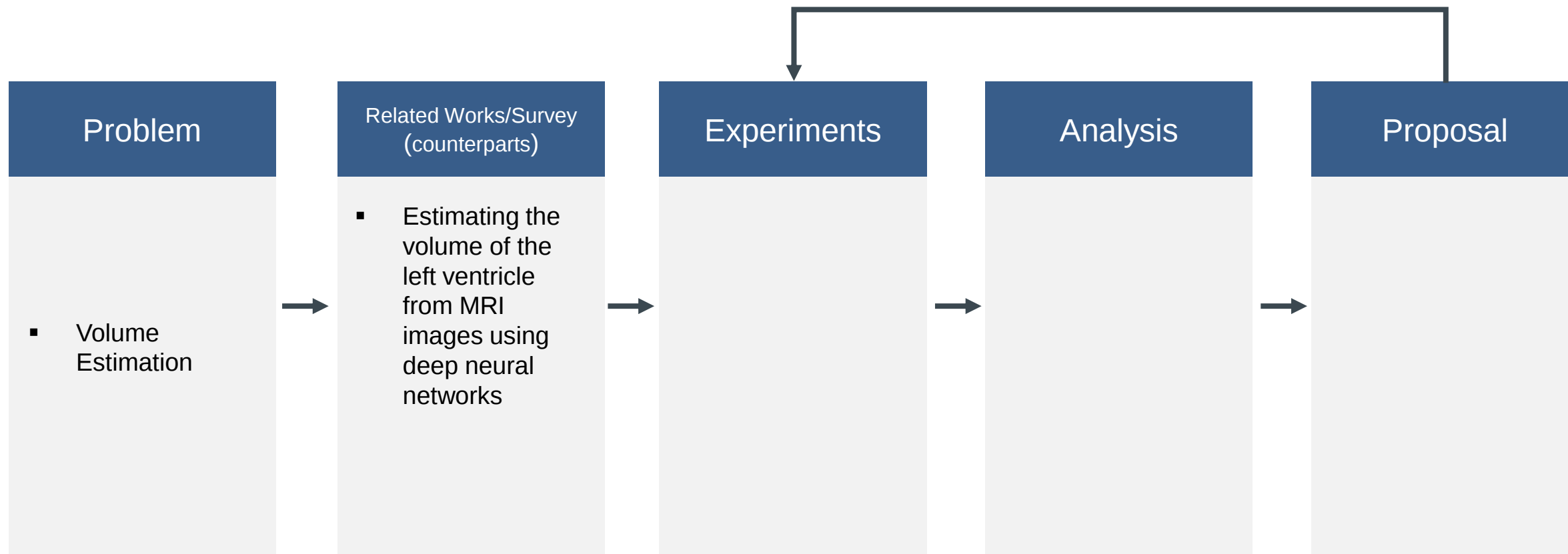
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1. To Do List from Previous Seminar
2. Introduction
3. Related Work
4. Experimental Settings
5. Experimental Results

To Do List from Previous Seminar

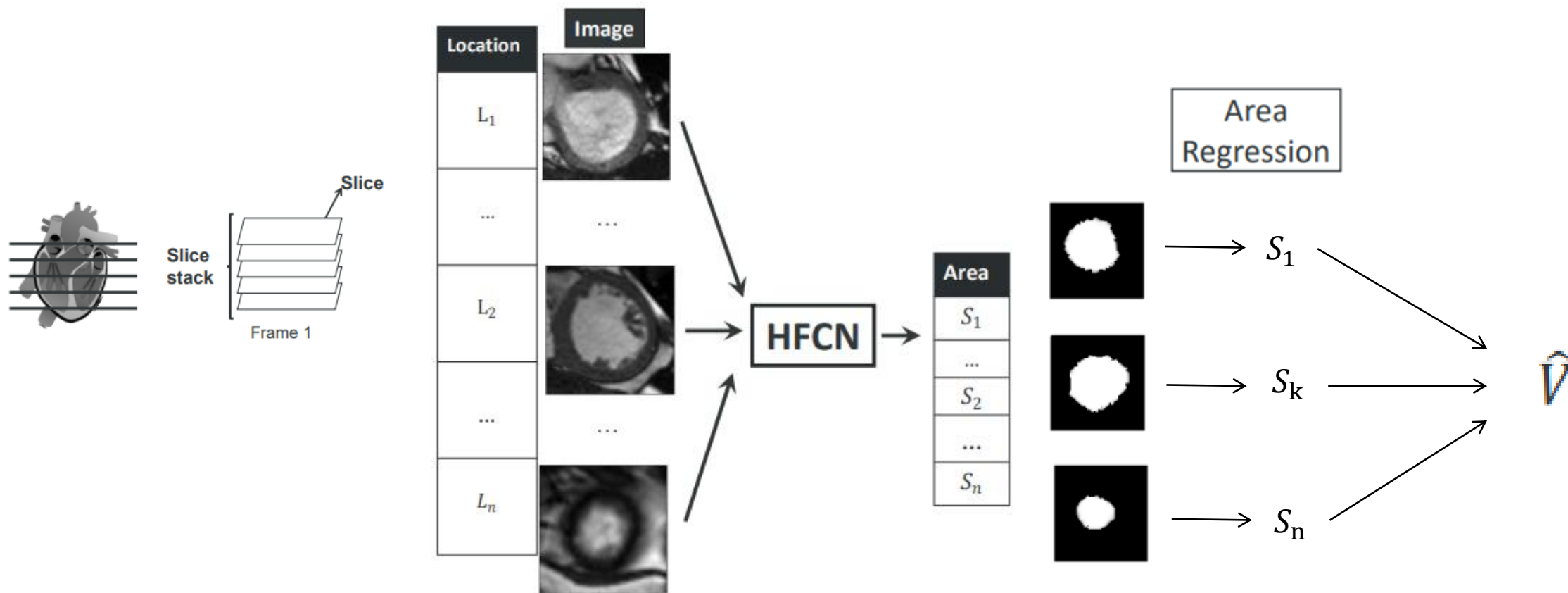
- ✓ 논문 구현 : Estimating the volume of the left ventricle from MRI images using deep neural networks (IEEE Transactions on Cybernetics, February 2019)
- ✓ Volume Estimation : Ground Truth vs Human vs Paper Method
- ✓ ICEIC 논문 초록 작성

Overall Progress



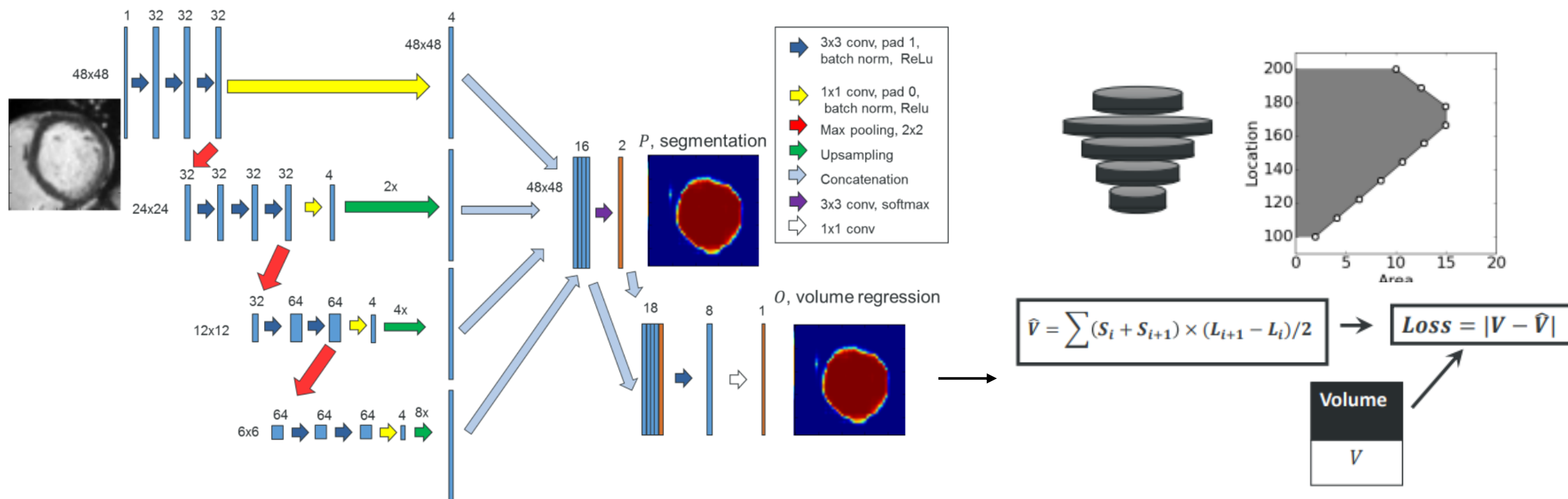
Related Work

Estimating the volume of the left ventricle from MRI images using deep neural networks (IEEE, 2017)



Related Work

Estimating the volume of the left ventricle from MRI images using deep neural networks (IEEE, 2017)



Experimental Settings

Datasets

- ✓ Eyeball segmentation images from 1,237 patients
- ✓ Ground Truth : Eyeball Volume of 532 patients
- ✓ 조건:
 - DICOM파일에 axial view를 뜻하는 메타데이터를 하나라도 포함하고 있는 환자일 것
 - AX1~AX5, AX7까지의 모든 이미지가 있을 것
 - 검수가 완료된 이미지일 것
 - 김수영 선생님께서 전달해주신 값이 있는 환자일 것
- ✓ Input : CT Image
- ✓ Output : Eyeball Volume

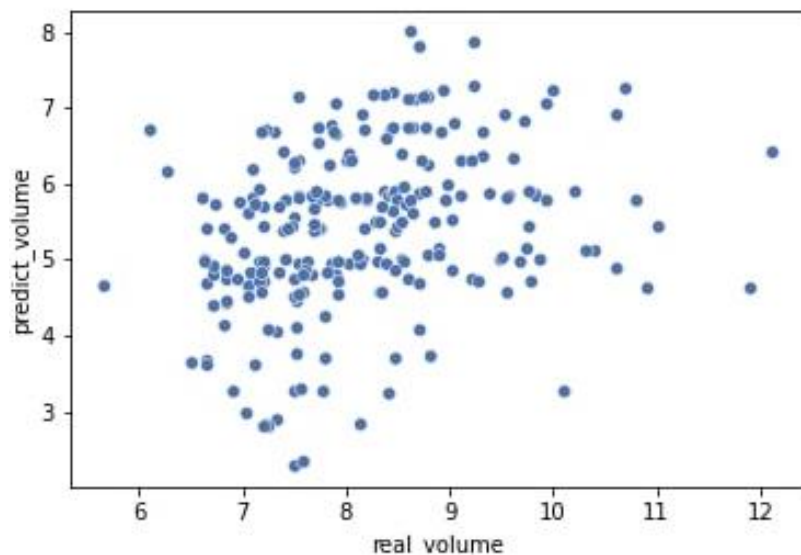
Experimental Settings

Result - Visualization

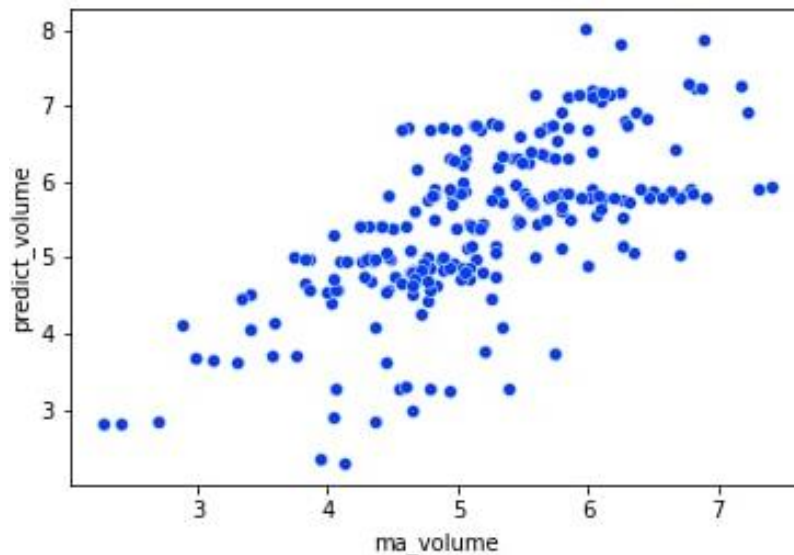
Ground Truth : 김수영 선생님께 전달받은 값

Human : 검수 완료 된 세그멘테이션 이미지의 pixel을 count 하여 측정한 volume

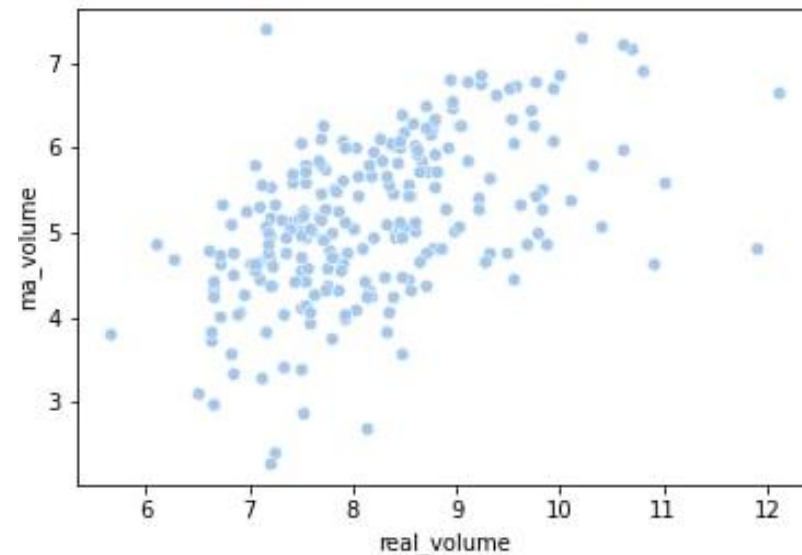
Model : 논문의 Model을 통해 측정한 volume



X : Ground Truth
Y : Model



X : Human
Y : Model



X : Ground Truth
Y : Human

Experimental Results

Result

- Error : Ground Truth – Model Predict Value

✓ Best Case

Patient Number	Ground Truth	Human	Model	Error
101559	6.27 cc	4.69 cc	6.18 cc	0.09
10532	7.53 cc	5.59 cc	7.14 cc	0.39
10604	7.18 cc	4.99 cc	6.7 cc	0.48
10573	7.22 cc	4.62 cc	6.71 cc	0.51

✓ Worst Case

Patient Number	Ground Truth	Human	Model	Error
101483	11.9 cc	4.83 cc	4.63 cc	7.27
101250	10.1 cc	5.39 cc	3.26 cc	6.84
200122	10.9 cc	4.64 cc	4.63 cc	6.27
10622	10.6 cc	5.99 cc	4.9 cc	5.7

Experimental Results

Result

	Ground Truth	Human	Model
Min	5.66 cc	2.28 cc	2.29 cc
Max	12.1 cc	7.4 cc	8.01 cc
Mean $\pm$ Std	8.17 $\pm$ 1.07	5.15 $\pm$ 0.93	5.43 $\pm$ 1.09

Result (MAE & Correlation)

Ground Truth & Human	
MAE	3.018
Corr	0.524

Human & Model	
MAE	0.708
Corr	0.671

Ground Truth & Model	
MAE	2.744
Corr	0.294

Thank you