



**HAPPY NEW SEMESTER**

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# **Deep Generative Models (Fall 2024)**

**Ikbeom Jang**

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**CES HUFS**

# **DGM Introduction**

- **Instructor**
- **About the Course**
- **Discussion & Survey**

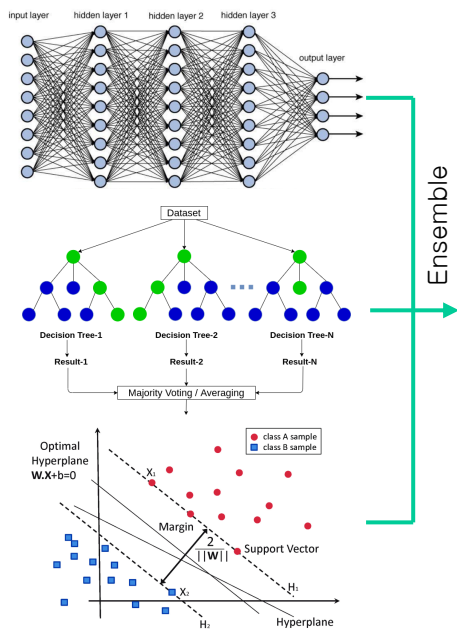
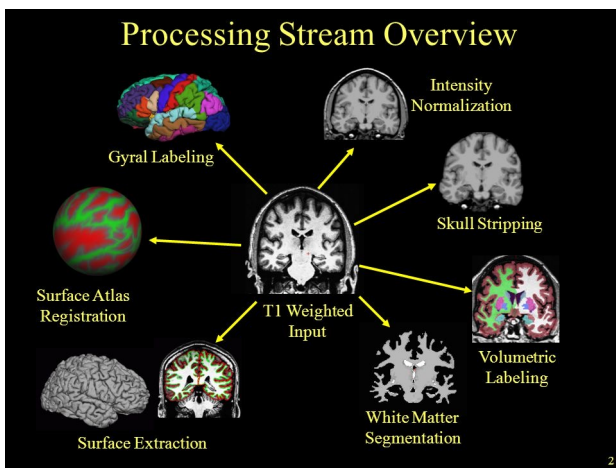
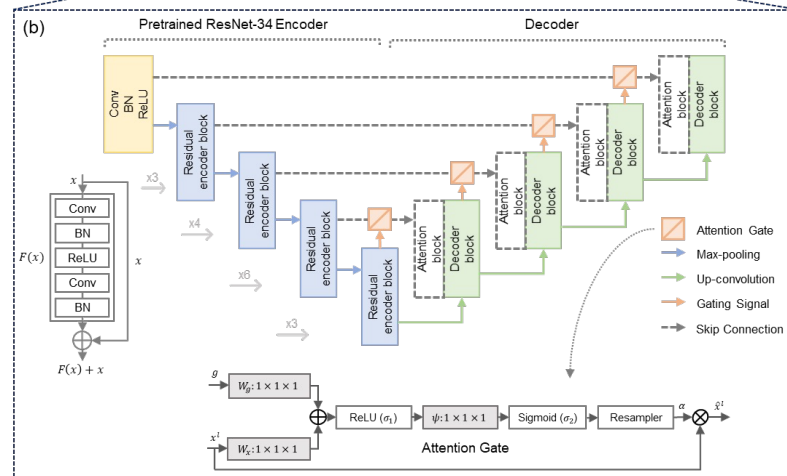
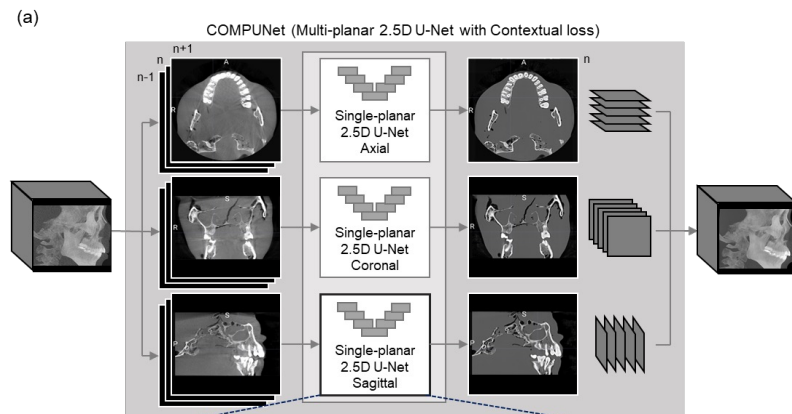
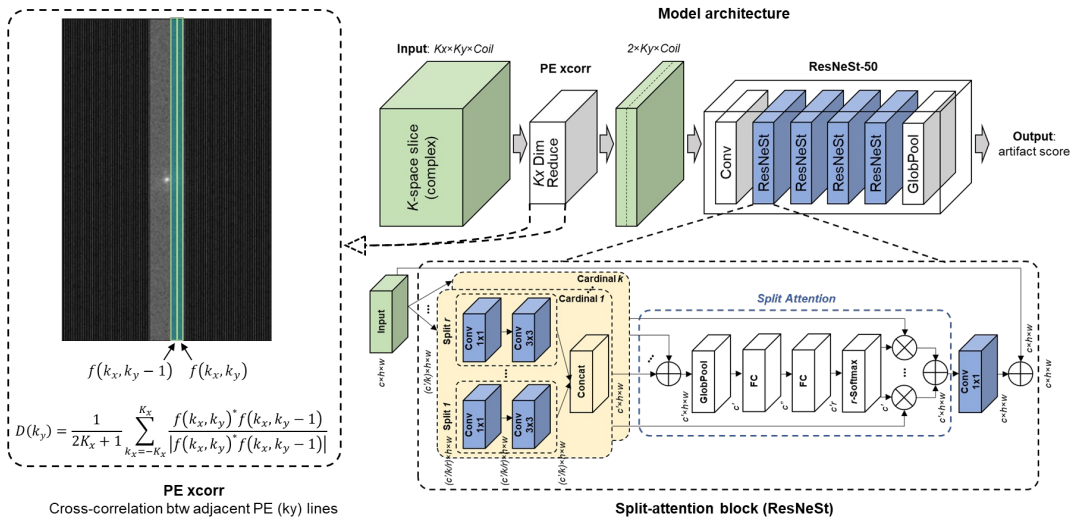
# Instructor

- Ikbeom Jang
  - Department: Computer Engineering
  - Contact: [ijang@hufs.ac.kr](mailto:ijang@hufs.ac.kr)
- Education
  - BS: Yonsei Univ.
  - MS/PhD: Purdue Univ.
  - Postdoc: Harvard Medical School
- Industry
  - Medical startup in Silicon Valley, USA
  - NVIDIA, USA
  - Co-founder of AI startup in USA
- Teaching Experience
  - Full-time lecturer at Purdue Univ.
  - Guest lecturer at Harvard Univ.
  - Half-time teaching assistant at Purdue Univ. x 10 semesters

# Instructor & Lab

- International **AI Competitions/Challenges**
  - Winner (1st place), A-AFMA Ultrasound Challenge @ IEEE-ISBI
  - 4th place, ABCD Neurocognitive Prediction Challenge @ MICCAI
- **Research Keywords**
  - Algorithm: [Machine learning](#), Deep learning, Generative AI, Statistical methods
  - Application: [Medical imaging](#), Brain, Neurodegenerative disease (e.g., dementia)
  - Data: Image quality assessment, Data synthesis
  - Label: Data labeling methods
- Recent **Publications & Presentations**
  - CVPR
  - NeurIPS
  - MICCAI
  - IEEE ISBI
  - ICCV
- **Lab Website:** <http://labhai.hufs.ac.kr/>

# Instructor & Lab

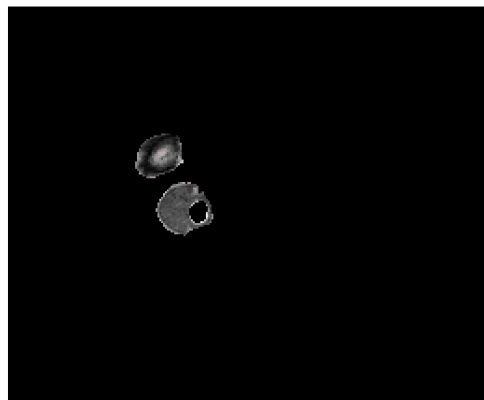


# LAB HAI

Health &amp; Artificial Intelligence Lab @ Hufs

# Instructor & Lab

Input MRI



True PET



Synthesized PET

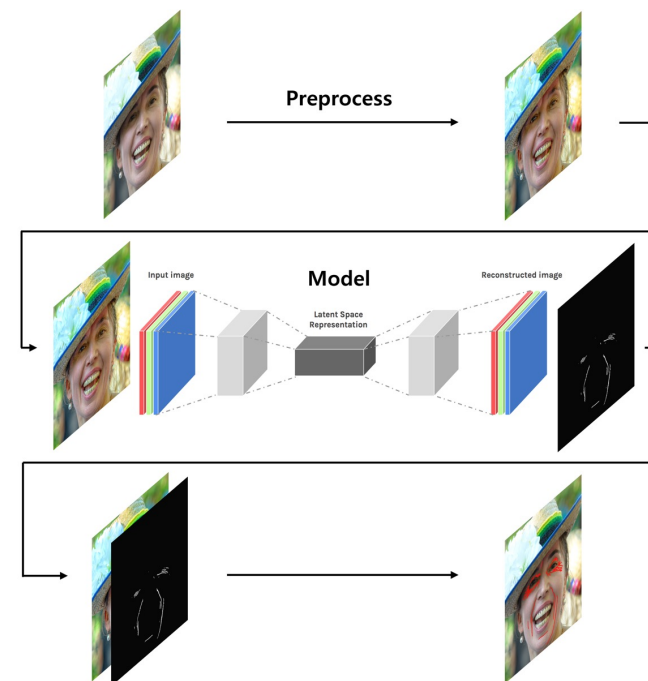
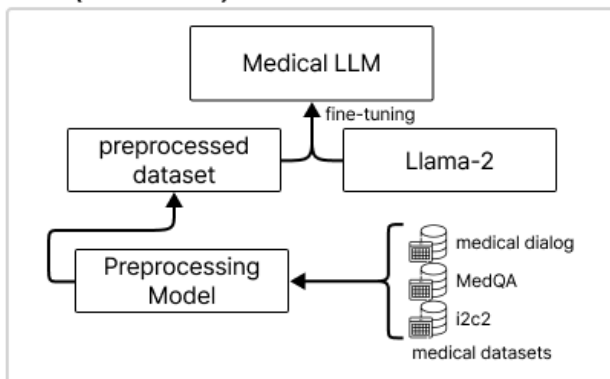


## Medical LLM

Medical Question Answering Model & Application



## Mella (Mediacal LLM)



# LAB HAI

Health & Artificial Intelligence Lab @ HUFS

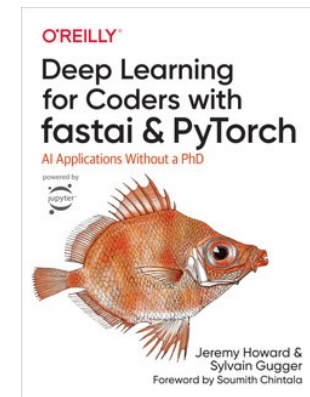
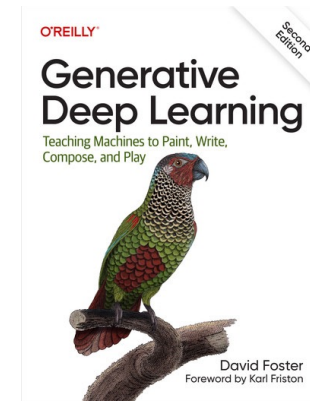
# About the Course

- **Instructor: Ikbeom Jang**

- Contact: [ijang@hufs.ac.kr](mailto:ijang@hufs.ac.kr)
- Class hour: T 12:30 – 3 PM @ Engr. 309
- Office hour: TBA @ 공학관 418

- **Textbook**

- **Generative Deep Learning, 2nd Edition**
  - by David Foster
  - E-book: <https://learning.oreilly.com/library/view/generative-deep-learning/9781098134174/>
  - 번역본: 만들면서 배우는 생성 AI  
[https://www.hanbit.co.kr/store/books/look.php?p\\_code=B6550508630](https://www.hanbit.co.kr/store/books/look.php?p_code=B6550508630)
- **Deep Learning for Coders with fastai & PyTorch**
  - by Jeremy Howard, Sylvain Gugger
  - Publisher(s): O'Reilly Media, Inc.
  - ISBN: 9781492045526
  - 번역본: fastai와 파이토치가 만나 꽃피운 딥러닝





# About the Course

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- **Course Objective**

- Principles and concepts in deep generative models
- Hands-on skills in generative AI with Python
- Recent achievements in the field

- **Prerequisite**

- **Required:** Probability and statistics, Engineering Mathematics 1, Data structure, Linear Algebra
- **Recommended:** Deep Learning, Computer Vision, Data Mining, Machine Learning, Natural Language Processing

- **Lecture Operation**

- What do you need in grad school? Hands-on skills & experience!
- **Project-focused course:** Concepts (1hr) + Lab (1hr) + Term project (1hr)
- **Final exam** will be replaced with **Term project**
- Make friends and network
- Course participation and discussion are encouraged
- Ask anything if you have questions
- Submit your work on time. Late submissions get 0 score.

# About the Course

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- **Evaluation**
  - Midterm (25%) + Final (40%) + Attendance (5%) + HW (20%) + Others (10%)
  - Others may include class participation and presentations
  - The proportions are subject to be adjusted according to students' achievement
  - Final → Term project
- **Term Project**
  - Topic: anything related to generative models
  - 1) Submit a research paper – e.g., conference, proceedings, arxiv
  - 2) Attend AI challenges
  - 3) Develop app/web or products
- **Important dates**
  - Midterm exam: Oct 22<sup>th</sup> (Tue) in class
  - Final exam: Dec 17<sup>th</sup> (Tue) in class (subject to change)

# About the Course

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- **Lecture notes & notice:** [eclass.hufs.ac.kr](http://eclass.hufs.ac.kr)
- **Computational resources:** Google Colab & Personal laptop/desktop & Cluster
- **You will fail this course in the following cases**
  - Cheating/copying/looking at someone else (e.g., other student, internet, AI)'s work (e.g., exam, homework, report, or project) without proper acknowledgment
  - Showing your work to other student(s)
  - No presence at an exam without a legitimate reason AND a prior notice
  - Attendance below  $\frac{3}{4}$  of all the classes ← university-wide policy
  - Ask when in doubt
  - No exceptions

# About the Course

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- **Notice**
  - Syllabus & weekly schedule available in eclass
  - Weekly schedule is subject to change
  - Instructor may be out of campus for about 2 weeks.
- **Course feedback & suggestions are always welcome!**

# Discussion & Survey

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Take time and think about below:

1. **Why are you here?**

- Why grad school? Why this major? Why this course?

2. Things instructors have done that **helped me**

3. Things instructors have done that **interfered with my learning**

4. What do you like to do **after graduation?**

- If company, which company? If graduate school, which school? Something else?

5. As a computer engineer, I **hope to solve (or contribute to)** ... because ...

6. If you have any **health situations** that may be of concern during class, send me an email or meet me by the 2<sup>nd</sup> week

Gather around to make groups

Introduce yourself to others

Share your thoughts



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