

Haelee Bae

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EDUCATION:

M.S in School of Electrical Engineering and Computer Science, 2021, GIST, Korea

B.S in Computer Science and Engineering, 2019, Hanyang University, ERICA, Korea

SKILL

- Mathematical understanding and statistical knowledge of machine learning and deep learning
- Defining, problem-solving and validating results based on chemical and biological data
- Developing Python, Pandas, and Pytorch frameworks
- Developing the latest deep learning models such as GraphNeural Networks, Convolutional Neural Network, and Transformer

RESEARCH EXPERIENCES :

Gwangju Institute of Science and Technology

2019.08 - present

Bioinformatics and Intelligence Lab researcher (Advisor: Hojung Nam)

Research Topic: Artificial intelligence-based drug-protein interaction prediction

- Predicting drug-protein interaction using artificial intelligence to reduce drug development period and cost
- Collection and purification of drug and protein information from complex large public databases such as BindingDB and UniProt
- Applying Graph Neural Networks (GCN, GAT, GIN, MPNN, DMPNN models) that can be expressed and learned in the form of molecular structures to drugs, Applying 1D Convolutional Neural Networks to protein sequences,
- To represent drug-protein interaction explainable, design a deep learning model to reflect the importance between drug atom and protein sequence and predict binding affinity
- Use Pytorch framework, Deep Graph Library, Pandas, RDKit
- Result: binding affinity accuracy improvement(0.01, mean squared error for pKd), currently submit to SCI journal

AWARDS

Dream AI Grand Prize

2020.12

NVIDIA, Gwangju Institute of Science and Technology

Topic: AI-based drug development service

- Service development and revenue pipeline design to improve the drug discovery process
- Developing a drug-protein interaction prediction model by learning more than 1 million protein sequence data on the Transformer model and expressing drugs as fingerprints
- Use Tensorflow, Pyqt
- Responsibilities: data processing for model training, GUI implementation, Revenue pipeline design

Capstone Design Grand Prize

2019.06

Hanyang University

Topic: AR system for clothing promotion

- Development of a system that allows customers to try on clothes without trying them on
- Clothing pixel extraction using Unet learned by clothing data, Development and implementation of 3D character body mapping algorithm, After customer face recognition mapping and rendering to the feature points of the character's face
- Use Keras, Opencv, Dlib, Adobe Fuse CC(Beta)

Super challenge hackathon Great Prize

2018.02-2018.02

Inha University

Topic : Marketing service utilizing face recognition and face mapping

- Development of customer participatory marketing system to maximize advertising effectiveness
- Rendering of customer face on celebrity face in ad video after customer face recognition
- Use Python, Opencv, Dlib

ACTIVITIES

National R&D Real Challenge Program

2021.04 - 2021.12

Korea Institute of Human Resources Development in Science and Technology

Topic: Big data & AI-based drug development acceleration platform development

- Propose an automated platform that generates drugs by simultaneously optimizing pharmacokinetic and pharmacodynamic properties to accelerate drug development
- Data collection and processing from large public databases such as ZINC, DrugBank, PubChem, ChemBL
- Development of drug optimization and generation model
 - Expressing compound space with Variational Auto Encoder
 - Explore compound space gradient with Hill climbing for the best pharmacokinetic and pharmacodynamic
- Use Pytorch, Pandas
- Responsibilities: Pubchem data collection and processing, pharmacodynamic(drug-protein interaction) prediction model development, compound spatial gradient exploration for pharmacodynamics

Health Data Academy

2018.12 - 2018.12

Arizona State University, Columbia University, Icahn School of medicine

Topic: Cost Reduction in Malpractice due to Failure to Communicate with Patient

Opportunity hack

2018.10 - 2018.10

Paypal

Topic: Develop non-profit organization "Matthew's crossing food bank" inventory management program

Arizona State University Exchange Student

2018.08 - 2018.12

Hanyang University, Arizona State University

SCHOLARSHIP

Inseong Hongboksoon Scholarship

2021.11

Gwangju Institute of Science and Technology

Government Scholarship Student (Full funding)

2019.09 -present

Gwangju Institute of Science and Technology