

# RENE UMEH

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## EDUCATION

- 
- 03/2020 – Present**      **Hanyang University | Bachelor of Mechanical Engineering** (*Seoul, South Korea*)
- GPA: 3.98/4.5
  - Awards and Scholarships: Hanyang International Excellence Award (2020,2021,2022), Global Korean Scholarship (2020), Samsung Global Hope Scholarship (2021~2023).
  - Activities: Hanyang Debate Society, Hanyang RACE club (life size EV manufacturing club).
- 01/2022 – 05/2022**      **University of Texas at Austin | International Exchange Program** (*Texas, USA*)
- GPA: 4.0/4.0
- 01/2018 – 05/2020**      **Hanyang Institute of International Education | Korean Language Program** (*Seoul, South Korea*)
- Grades: Speaking – 96/100, Writing – 98/100, Reading – 97/100, Listening – 96/100.
  - Awards and Scholarships: Outstanding Performance Scholarship.
- 09/2015 – 09/2018**      **St. Gregory's College | High School Education** (*Lagos, Nigeria*)
- Awards and Scholarships: High School Valedictorian, Helmbridge National Science Competition – First Place.

## WORK EXPERIENCE

- 
- 09/2023 – Present**      **Hanyang University with SPACEMAP | Research Assistant** (*Seoul, South Korea*)
- Key Responsibilities*
- Optimized 3D Voronoi diagram tessellation algorithms to detect collisions of RSOs in space.
  - Managed front-end development of the company's website. Increased content impressions on LinkedIn by 2000%.
- 06/2023 – 08/2023**      **Korean Institute of Science and Technology (KIST) | Intern** (*Seoul, South Korea*)
- Key Responsibilities*
- Created a database of 200 3D modelled characters for training a 3D reconstruction model based on PiFU.
  - Tested performance and updates on image to 3D reconstruction task.
- 06/2022 – 08/2022**      **Rice University with Lavner Education | IT Intern** (*Houston, USA*)
- Key Responsibilities*
- Maintaining database for students, fee payments, and registrations. Processing paperwork and responding to user requests.
  - Taught and designed separate lesson plans for middle to high school student on various courses weekly. Adapted classes according to age and skill level to teach IT concepts like programming languages (Java, C++), git control, 3D printing, graphic design, CAD.
- 12/2020 – 02/2021**      **OHP Finishings Ltd. | AI Intern** (*Lagos, Nigeria*)
- Key Responsibilities*
- Designed and finetuned a segmentation model to demo wallpaper designs on walls in pictures.
  - Managed correspondence between the firm and Korean trading partners which involved translating between English and Korean.

## EXTRACURRICULAR & VOLUNTEERING ACTIVITIES

- 
- 09/2022 – Present**      **Samsung Foundation Scholars' Union | President** (*Seoul, South Korea*)
- Organized student outreach and networking programs and planned funding for the union's yearly budget; prepared financial reports.
- 11/2020 – Present**      **Hanyang RACE club | Mechanical Part Design Team** (*Seoul, South Korea*)
- Designed, developed, and tested parts for formula racing car projects. Optimized chassis, truss and suspension systems using Catia.

## SKILLS & PERSONAL DEVELOPMENT

- 
- Programming Languages and Frameworks: Python, C++, JavaScript, Git, MATLAB, HTML.
  - Engineering CADs: SOLIDWORKS, AutoCAD, Catia, Ansys.
  - Spoken Languages: English (Native Speaker), Korean (Fluent).

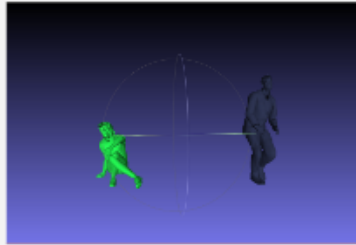
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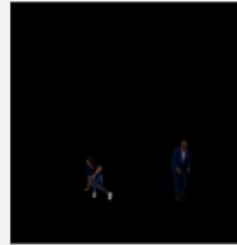
## CONFIDENTIAL – Korean Institute of Science & Technology



3d obj



Semantic Segmentation



RGB render



Normal render

### Goal

- Create and train a model capable of generating 3d representations of 2d instances, based on PiFu infrastructure.

### Process

- Created a synthetic 3D dataset using **NVIDIA Omniverse** for training model including RGB, normal, and depth renders, and joint information of human characters, with specific focus on break dancing scenes and scenes containing furniture.

### Result

- Created a dataset of 200 unique scenes containing characters and furniture and trained 3D prediction model.

## Image Processing Deep Learning Project– AI Theory & Programming Course

```
[33] plot_image(22, predictions, y_test, x_test)
```

[29 45 40 66 75]



skunk 100% (skunk)  
lobster 0% (skunk)  
lamp 0% (skunk)  
raccoon 0% (skunk)  
dinosaur 0% (skunk)

```
plot_image(2000, predictions, y_test, x_test)
```

[82 83 2 92 14]



tulip 100% (tulip)  
butterfly 0% (tulip)  
sweet pepper 0% (tulip)  
baby 0% (tulip)  
sunflower 0% (tulip)

```
[38] plot_image(4000, predictions, y_test, x_test)
```

[35 98 34 46 71]



sea 76% (sea)  
man 16% (sea)  
fox 7% (sea)  
woman 2% (sea)  
girl 0% (sea)

```
plot_image(5000, predictions, y_test, x_test)
```

[47 59 56 33 69]



palm\_tree 100% (palm\_tree)  
pine\_tree 0% (palm\_tree)  
rocket 0% (palm\_tree)  
forest 0% (palm\_tree)  
maple\_tree 0% (palm\_tree)

313/313 - 5s - loss: 1.5769 - accur  
모델의 정확도 (top-1-error): 57.65%  
모델의 정확도 (top-5-error): 84.26%

### Goal

- Create a CNN from scratch and use the CIFAR 100 dataset to train it.

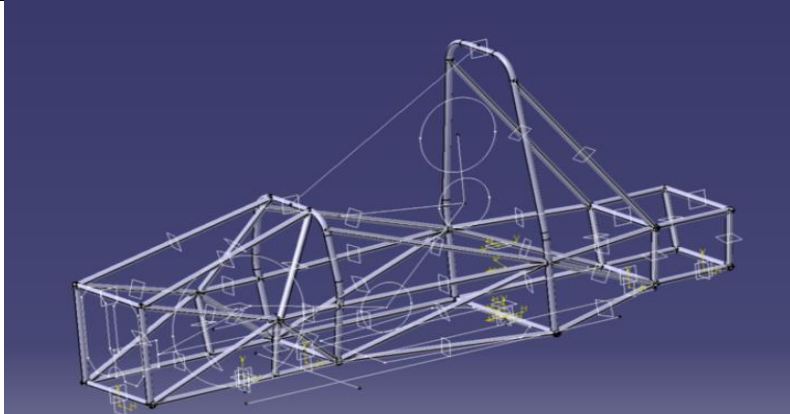
### Process

- Wrote the code for the AI using **TensorFlow** and **Python**.
- Adjusted the depth and width of the layers. Randomly changed the rotation and color of images in the learning dataset

### Result

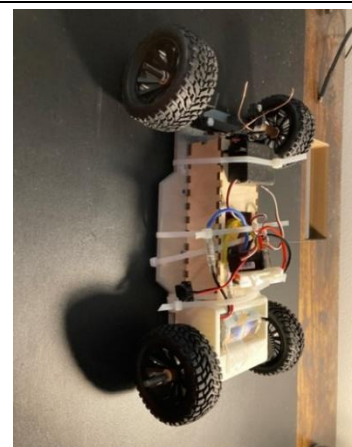
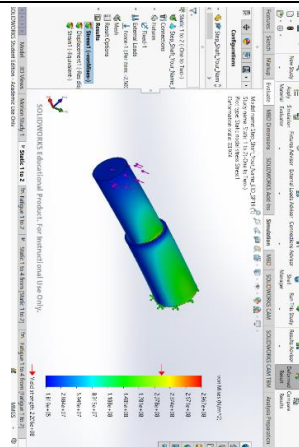
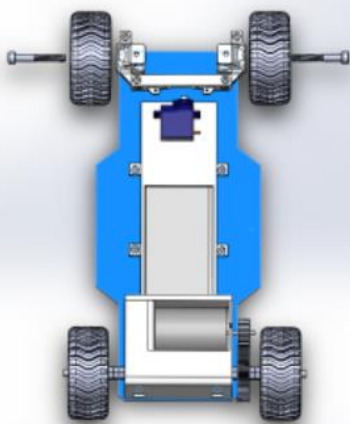
- Achieved a top-1-error accuracy of 57% and a top-5-error of 84%.

## Race car Truss Structure Project – Race Club



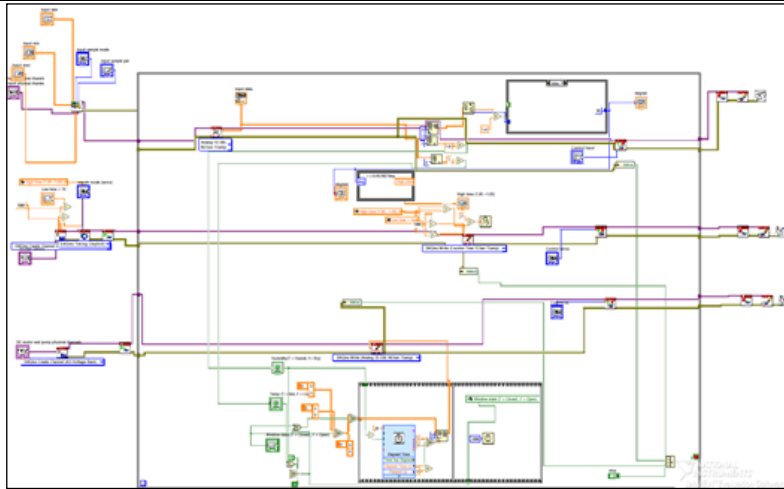
Goal	Process	Result
<ul style="list-style-type: none"> <li>Analyze the previous truss structure of the car and propose a better truss structure to increase structural rigidity.</li> </ul>	<ul style="list-style-type: none"> <li>Used <b>Catia</b> to analyze the structural stiffness of truss structure and load.</li> <li>Cut and welded pipes in the workshop.</li> </ul>	<ul style="list-style-type: none"> <li>Increased structural rigidity by 9%.</li> </ul>

## RC Car Project – Machine Elements Course



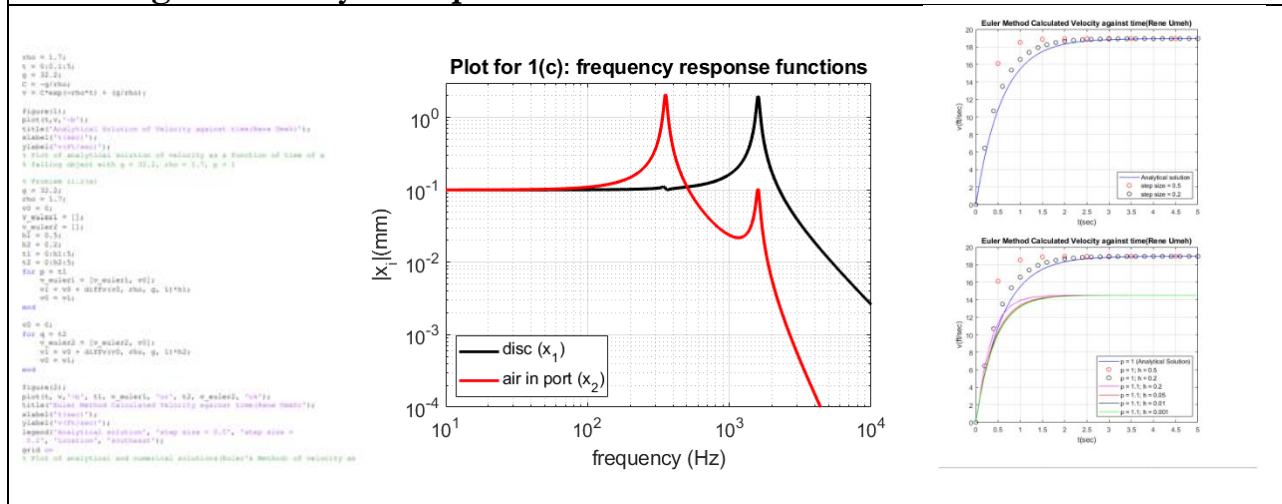
Goal	Process	Result
<ul style="list-style-type: none"> <li>Build an RC car with \$50 budget.</li> <li>Design the RC car to be dynamically safe while optimizing speed.</li> </ul>	<ul style="list-style-type: none"> <li>Designed and analyzed chassis and axle, steering, drivetrain, and joints using <b>SOLIDWORKS</b>.</li> <li>3D printed or ordered parts from suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>Designed the car to withstand collisions at a maximum speed of 10 m/s.</li> <li>Placed third place in the driving competition.</li> </ul>

## Automatic Greenhouse Project – Mechanical Design & Experiments Course



Goal	Process	Result
<ul style="list-style-type: none"> <li>Create a model for an automated greenhouse with a budget of 100,000 won.</li> </ul>	<ul style="list-style-type: none"> <li>Used <b>LABVIEW</b> to create a program that processes light, humidity, and temperature signals from sensors.</li> <li>Purchased motors, breadboards, sensors, and acrylics from suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>Completed the working model within the allotted time and budget.</li> </ul>

## Vibrating Disk Analysis Experiment – Machinal Vibrations Course



Goal	Process	Result
<ul style="list-style-type: none"> <li>Create a computer simulation of a vibrating disk and compare the results to a real experiment.</li> </ul>	<ul style="list-style-type: none"> <li>Used <b>MATLAB</b> to create a code that calculates the disk's natural frequency, time, and frequency response.</li> </ul>	<ul style="list-style-type: none"> <li>Achieved an error of 13% when compared to actual experiment.</li> </ul>