KAVILAB

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KAVILAB

Leading Innovation to the Future of Orthopaedics

kavilab.ai

Company Profile

KAVILAB Co. Ltd. is a startup in the Republic of Korea to develop an artificial intelligence (AI)-based pre-operative surgical planning system for trauma and total replacement.

KAVILAB always aims to realize the digital transformation for Orthopaedics. Our technology using AI quickly advances the future of Orthopaedics with many surgeons worldwide.

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CEO Statement

Vince Kang, CEO of KAVILAB

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Dear leaders,

KAVILAB Ltd. is trying to satisfy orthopaedic surgeons using an AI-based personalized surgical planning system for trauma and total replacements, so-called **DeepPLAN**.

We strongly believe that innovation by our company will change the future of orthopaedic surgery.

Definitely, the DeepPLAN will be a great partner to elevate the quality of the surgery and to dramatically reduce your operation time.

KAVILAB can provide research topics as well as AI-based technical support for surgeons who want to publish high IF SCI papers or get national grants for their own research.

We hope to make a bridge for research collaboration

Many thanks

Vince Kang

Company History

KAVILAB is growing up with innovation

2020 - 2021

- Attraction Fund from KIBO (115,000 USD)
- Registration as High Potential Venture
- Establishment of Industrial R&D Center
- Pending 18 Patents (Registered 6 Patents)
- Obtained 3 National Grants for R&D
- Opened Symposium for Medical AI in Orthopedics
- Won the 3 awards from Demo Day and Startup Competition

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2022

- Obtained National Project for AI Voucher (154,000 USD)
- Installation of Product in Ulsan Univ. Hospital with MOU
- Obtained National Grants for R&D (193,000 USD)
- Attendance in AI EXPO for demonstration
- Initiation of KFDA for DeepPLAN T

2023

- Obtained National Project for AI Voucher (231,000 USD)
- Obtained National Project for Data Voucher
- Obtained Global Cooperation Program for Company, N Up (154,000 USD)
- Obtained National Grants for R&D (193,000 USD)
- Pending the additional 4 Patents
- Permitted GMP and Manufacturing License
- Official Clinical Trials via the Ministry of Food and Drug
- Obtained Program TIPS (386,000 USD)

Mission and Vision

Discover the potentialities in KAVILAB

Digitalization

Digital transformation for Orthopedic surgery

Surgical Plans

From emergency to complex cases

Time Save

Few hours → Few minutes

For Hospitals

More patients, cost reduction, more profit (Insurance payments)

For Surgeons

Faster, more accurate, and efficient operation

For Patients

Better treatment outcome, better quality of life after treatment

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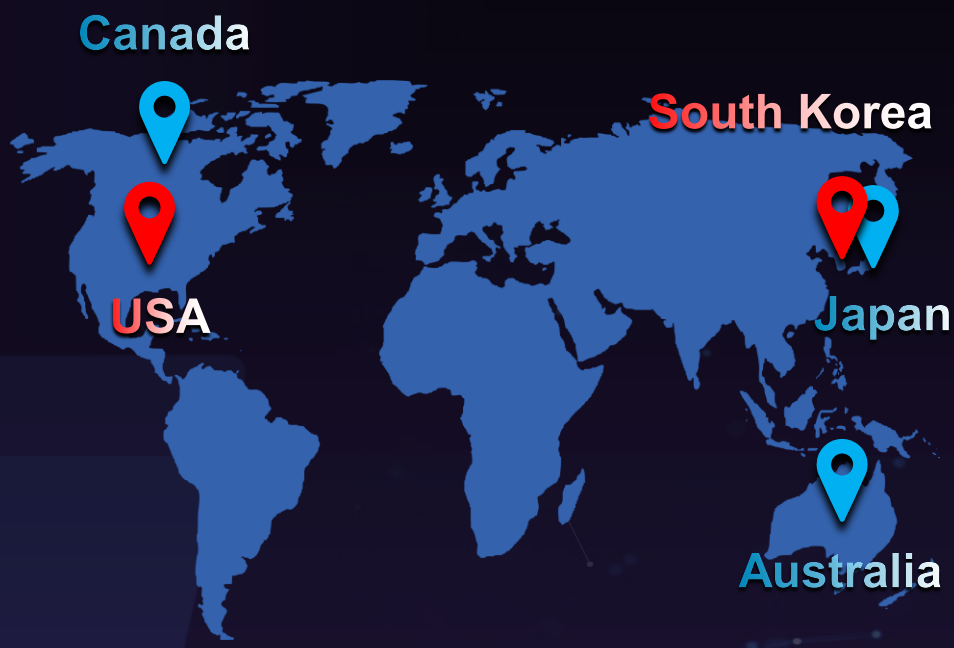
KAVILAB is preparing to expand the market with MDSAP, FDA approval



KAVILAB has a plan to open a new market of pre-operative surgical planning for Orthopaedics through the insurance payment system.

Current Procedural Terminology (CPT) codes in the USA are numbers assigned to each task and service that patients can get from a healthcare provider. KAVILAB is still trying to get the CPT code for pre-operative surgical planning for Orthopaedics using Artificial Intelligence.

For this reason, KAVILAB seeks research partners worldwide that can provide assistance such as local clinical trials.

Creative Team

Vince Kang
CEO / Founder

- B.S in Beijing University of Chinese Medicine
- MBA in aSSIST Franklin Univ.
- Ph.D., DBA Candidate in aSSIST Franklin Univ.
- Business Development of New Medicine in Listed Pharmaceutical Company
- Experience in Medical Scientific Liaison
- Experience in Sales Dept. of Medical SW Company

Louis Youn
Deputy CEO & CTO
Co-founder

- Ph.D. in Biomedical Engineering (College of Medicine, the Catholic Univ.)
- Affiliated Professor in College of Medicine, Yonsei Univ.
- [Former] Clinical Professor in Singapore Pte. Ltd, Singapore
- [Former] Research Assistant Professor in College of Medicine, the Catholic Univ.
- [Former] Collaboration Researcher in UC DAVIS, USA
- [Former] Visiting Research Scientist in MIPS, Stanford Univ. USA

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Moo-Sub Kim
Deputy CEO & COO
Co-founder

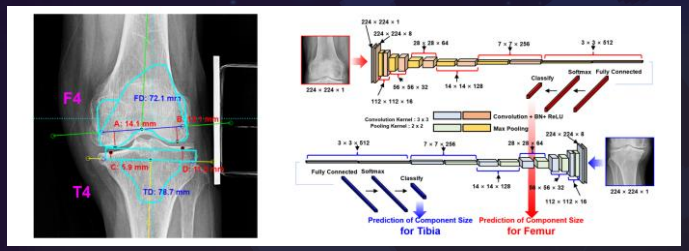
- Ph.D. in Biomedical Engineering (College of Medicine, the Catholic Univ.)
- Accounting, Financial Affairs, Administration, Personnel, Management
- Part-time Lecturer in Dept. of Radiology, Shinhan Univ.
- [Former] Research associate in Dept. of Orthopaedics, College of Medicine, the Catholic Univ.
- [Former] Researcher in Research Institute of Biomedical Engineering, the Catholic Univ.

Young Dae Jeon
CMO

- Assistant Professor (M.D.) Dept. of Orthopaedics in Ulsan University Hospital
- Ph.D. Candidate in College of Medicine, Ulsan University
- Fellowship in Clinical Professor at Seoul National University Bundang Hospital
- Insurance Commissioner in Korean Orthopaedic Society for Sports Medicine
- Commissioner of Standardization Subcommittee in Korean Orthopaedic Ultrasound Society
- Certified Specialist in Korea Workers' Compensation & Welfare Service

Core Technologies

Deep Learning-based Decision, Classification



Convolutional Neural Network which we proposed provides useful information and assistance to make a decision for the diagnosis, planning, and surgical treatment.

Deep Learning-based Segmentation

DL-based deep learning model for automatically segmenting fractured fragments from CT images.

Hyeonjoo Kim, et al. Scientific Reports 13.1 (2023): 20431.

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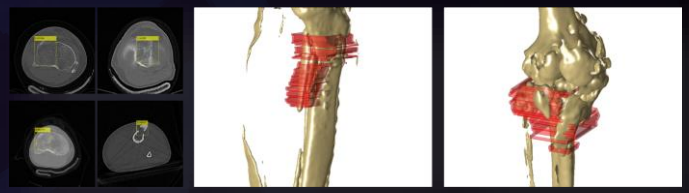
Deep Learning-based Object Detection

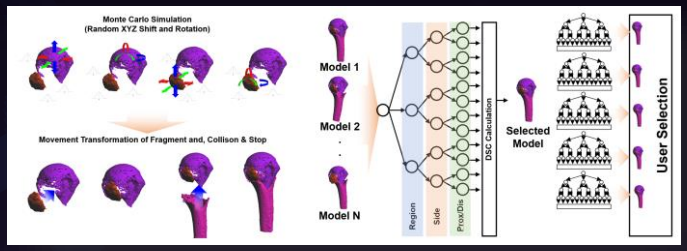


DL-based object detection model finds the fractured region and provides a guide for the location of the orthopedic implant.

Young-Dae Jeon, et al. Diagnostics 14.1 (2023): 11.

Monte Carlo Transformation

The reduction of the fractured fragment using Monte Carlo simulation which can randomly reset to the physical states of an object.



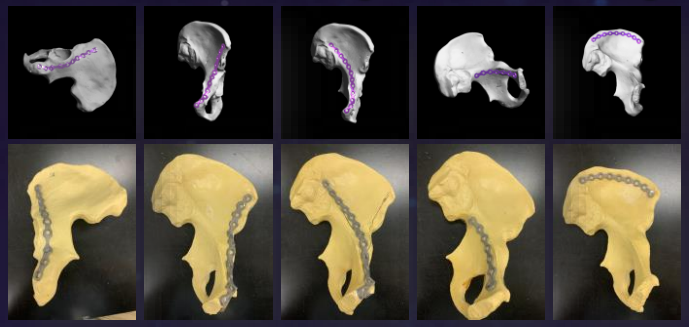
Medical Image Processing

3D Imaging technology using GPU acceleration quickly provides high-quality image reconstruction with strong intuition.

3D Modeling and 3D Printing

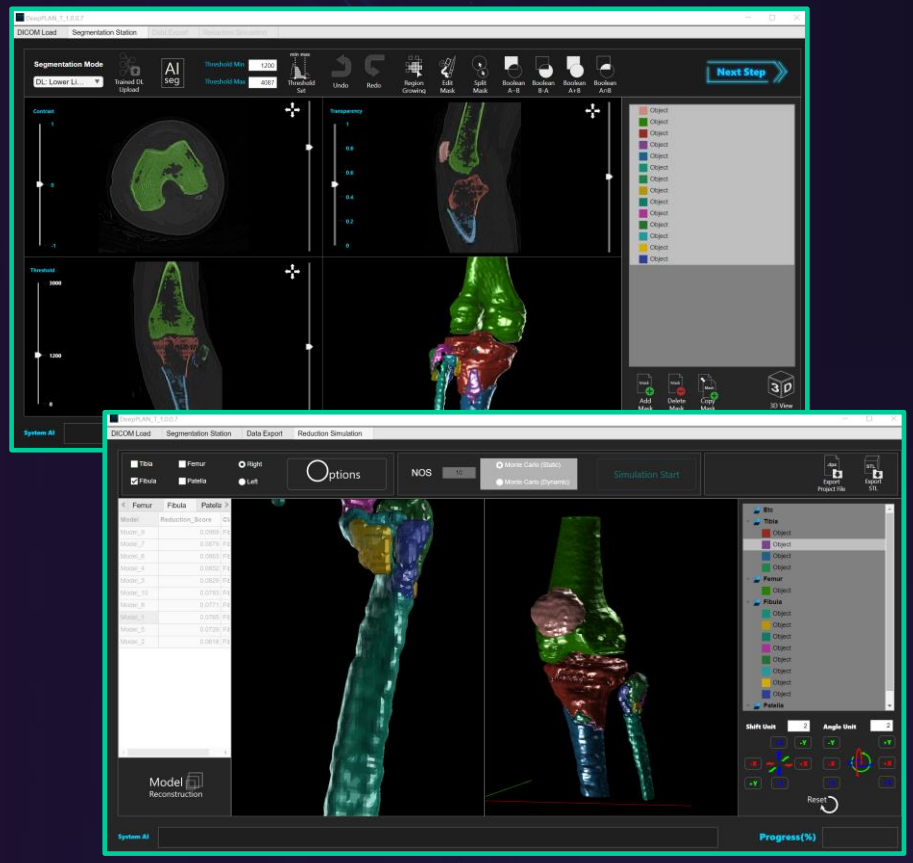
The technology of 3D CAD/CAM realizes the patient-specific instruments as well as the several personalized implants.

Woo-Lam Jo, et al. Scientific Reports 13.1 (2023): 10542.



KAVILAB's Products

DeepPLAN T



AI-based Pre-operative Surgical Simulator

DeepPLAN T is a pre-operative surgical simulator for **orthopaedic trauma.** It supports simulating the trauma surgery including the identification of fractured fragments, reduction of all fragments, etc. Deep learning in DeepPLAN T assists in simulating the surgery through full automation or user interaction.

Automatic Segmentation

Deep Learning for segmentation can automatically conduct the semantic segmentation using the mask for the fractured fragments from each CT image one slide by one slide. Lastly, the segmented regions are reconstructed as the 3D image for the intuition.

Automatic Reduction

Monte Carlo transformation can re-arrange the segmented fractured fragments by randomly changing the position and angulation according to the probability model. By the several simulations, the decision tree finds the best-reduced model among the several results.

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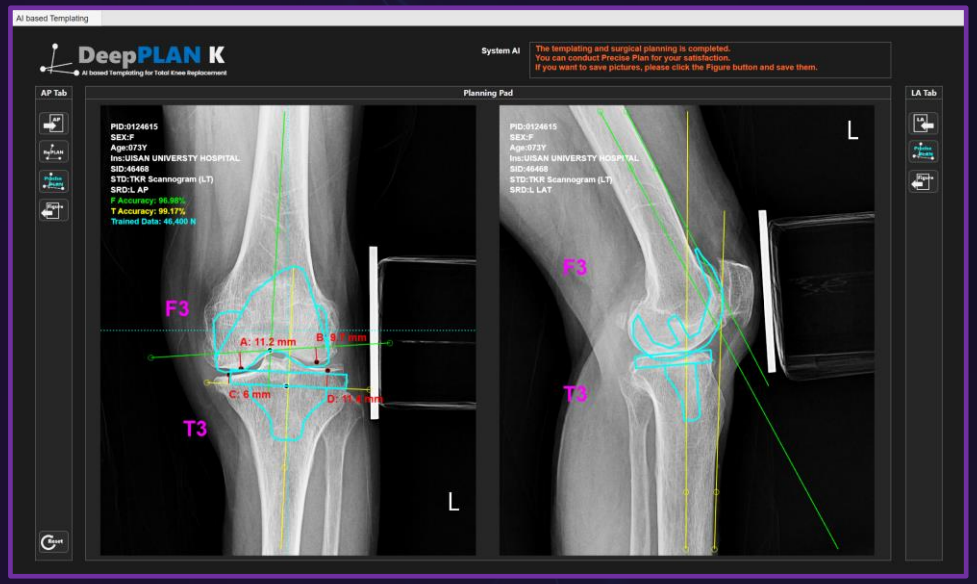
KAVILAB's Products

DeepPLAN K



DeepPLAN K is a deep learning-based digital templating system for **total knee arthroplasty (TKA)**. The surgeon can easily make accurate pre-operative surgical planning for TKA with the assistance of deep learning. It will be a good opportunity to save time and to achieve successful operation.

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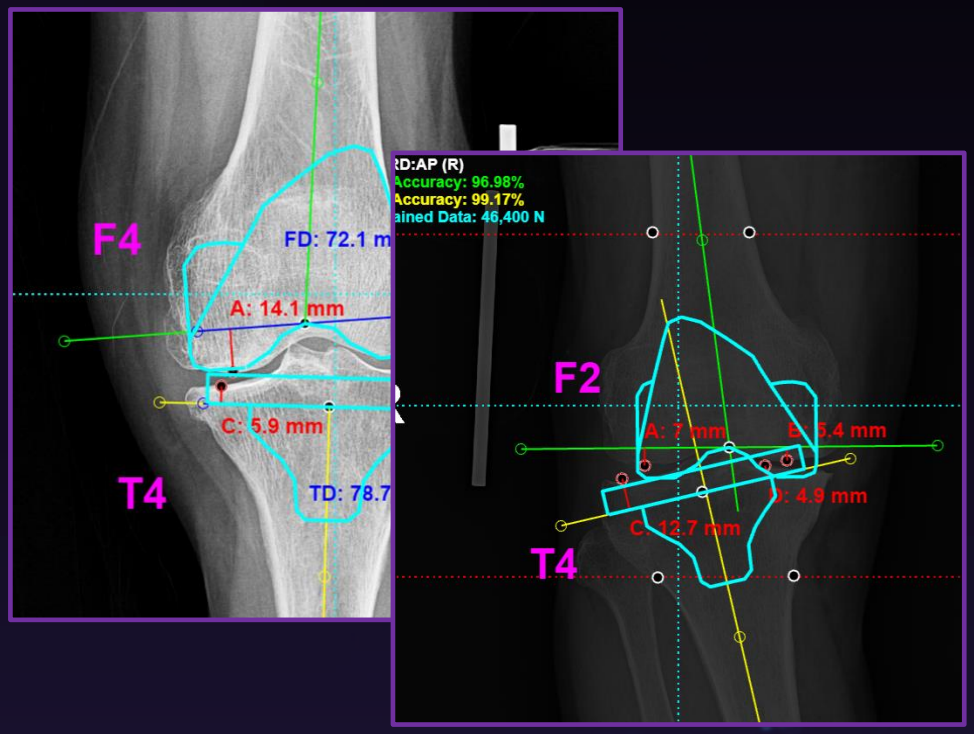
AI-based Digital Templating System for TKA



Automatic Digital Templating

Convolutional neural networks find the best model of implants with the optimized component sizes. The digital templating is automatically performed by the system. The surgeon can confirm the pre-operative surgical plan within 15 sec after uploading the X-ray image.

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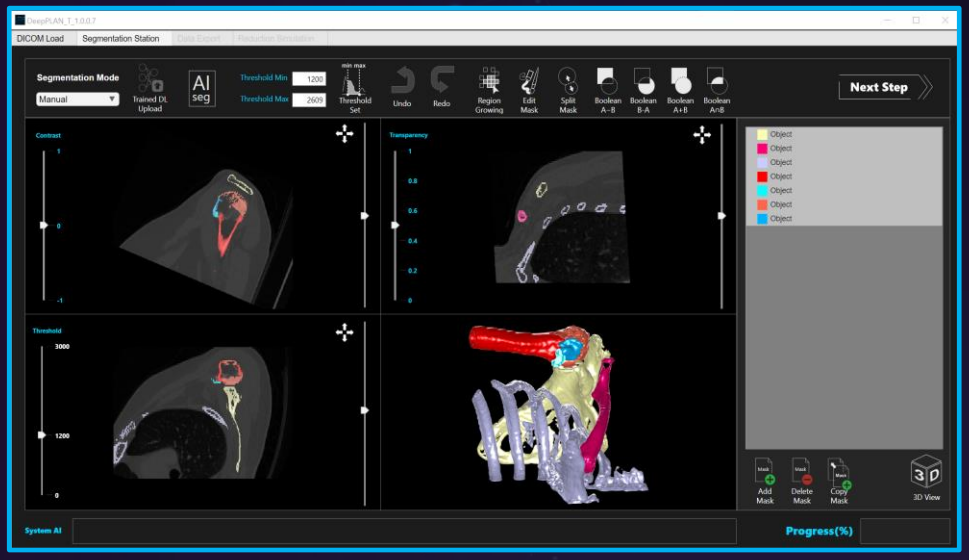
DeepPLAN A

DeepPLAN A is an **interactive medical image control software** that specializes in 3D printing and data generation of deep learning for semantic segmentation. Researchers in the medical field can easily and efficiently handle this tool to progress high-quality studies.



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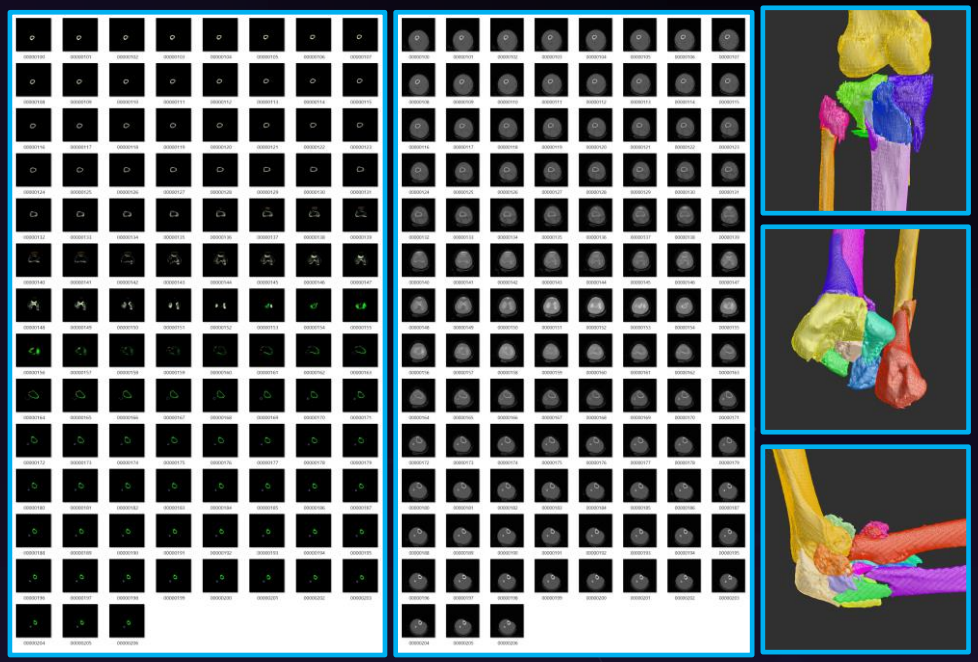
Interactive Medical Image Control Software



Create a Research Topic

DeepPLAN A provides many convenient functions to control medical images such as segmentation, 3D reconstruction, data annotation, Stereolithography (STL) export, etc. Researchers can use the results to study medical image processes, 3D printing, and deep learning.

DeepPLAN can export the results of projects as 3D STL or 2D mask images. The STL file can be used for designing patient-specific implants or studying anatomical analysis. 2D mask images are employed to train the deep learning model for semantic segmentation.

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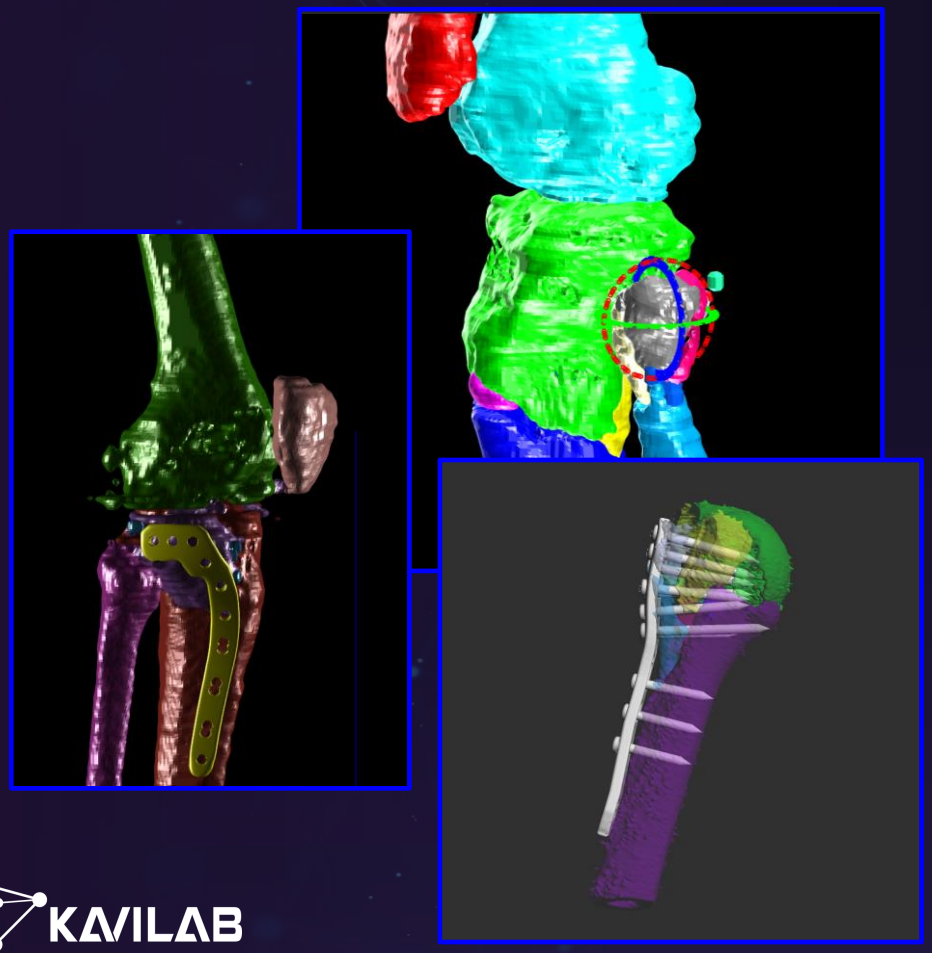
DeepPLAN F



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AI-based Virtual Surgical Planning System

DeepPLAN F is a **virtual surgical planning (VSP) software for orthopedic trauma**. You can create a new design of patient-specific implants for 3D printing. Moreover, you can also establish surgical planning using the info on conventional

Automatic Surgical Planning

Upon obtaining simulation outcomes with DeepPLAN T, DeepPLAN F can produce virtual surgical planning for orthopedic trauma based on the DeepPLAN T results. VSP entails suggesting the optimal implant model from numerous conventional options and arranging its placement to ensure a successful operation.

Design Patient-specific Implants

Surgeons unfamiliar with 3D modeling tools can effortlessly create fresh designs for patient-specific implants through the utilization of DeepPLAN F. Furthermore, DeepPLAN F facilitates surgeons in independently modifying their own designs.

Our Services

Web Viewer Service

KAVILAB provides the KAVILAB Web Viewer Service (KWVS) which can show your surgical plan established by using DeepPLAN through PC, mobile, or tablet anywhere, anytime.

If you accomplished surgical planning using DeepPLAN before the operation, you can upload your project file of DeepPLAN to KWVS. You can see your plan on your smart device while interoperating in the operation room.

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Research Collaboration Service

KAVILAB always seeks research partners for research collaboration. By this collaboration, KAVILAB can assist surgeons to publish SCI papers with excellent topics and our product.

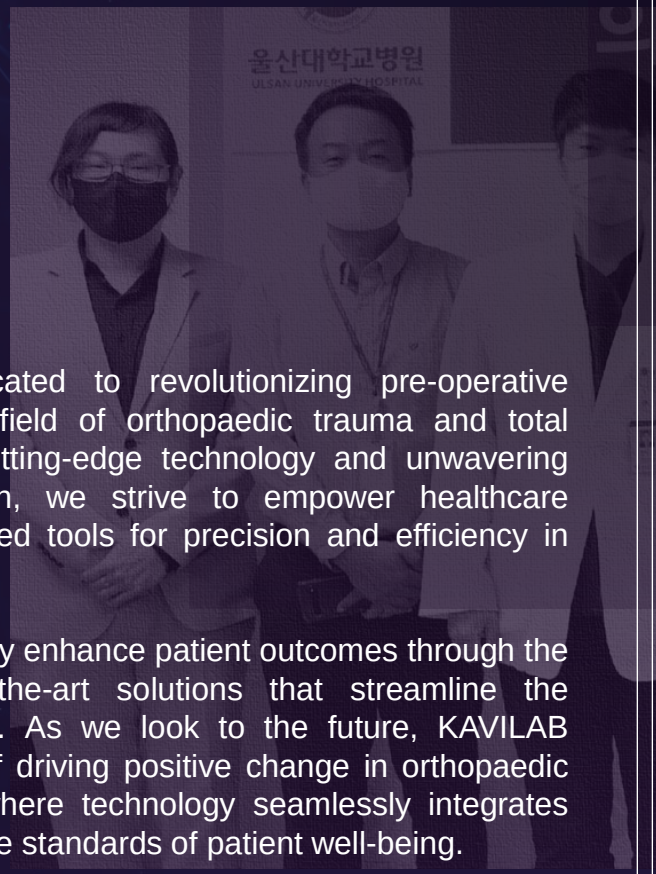
Many good topics using deep learning, 3D printing, and image processing are already prepared to support surgeons who want to get a good project. Moreover, KAVILAB can also assist surgeons in getting national grants by collaborating.

Surgeon-specific AI Training Service

KAVILAB provides AI training services to surgeons who use KAVILAB's products. Because KAVILAB's product employs AI technology, KAVILAB can let AI in the product be trained to reflect the user surgeon's tendencies, experience, and preferences.

KAVILAB has several high-end GPU servers to train the AI models. The trained weight file will be sent to surgeons after training.

Happy Ending



KAVILAB, we are dedicated to revolutionizing pre-operative surgical planning in the field of orthopaedic trauma and total replacement. With our cutting-edge technology and unwavering commitment to innovation, we strive to empower healthcare professionals with advanced tools for precision and efficiency in their practices.

Our mission is to continually enhance patient outcomes through the development of state-of-the-art solutions that streamline the surgical planning process. As we look to the future, KAVILAB remains at the forefront of driving positive change in orthopaedic care, fostering a realm where technology seamlessly integrates with expertise to elevate the standards of patient well-being.

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Many thanks

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