AI Education:

Curriculum and Course Development

Omnis Labs

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The need for a conceptual, practical AI course

Problem: AI education should be conducted both online and offline in a manner that is easily accessible to the public and professionals who are not AI professionals by helping them understand critical AI concepts and tools.

Solution: We have designed an educational program that uses a suite of web-based content and AI platform to provide the public with a better understanding of AI and to help the work force better respond to a rapid increase in demand for AI skills. The courses are designed for non-CS majored through a systematic presentation of AI concepts and their applicability to various areas.

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1. Code-free AI for the workplace

The designed course consists of AI case studies and practical exercises where AI can be applied to everyday problems. And the platform, Deep Block allows students to complete practical tasks in a low-code or no-code environment.

Here, the goal is to increase the utilization of AI technologies for workers outside of the IT industry.

The program can be customized to match the needs of industry and job placement through the use of AI technologies. Particularly, we will focus on computer vision to teach practical AI for public.

Computer vision, is the most well developed AI domain and necessary in many industries to inspect, detect, and measure objects in various types of images, including manufacturing, self-driving car, scientific research, national security and defense, earth science, medical industry, e-commerce, and more.

Many of these are core industries to a nation's economy, and according to the latest report by the global market research company Markets & Markets, the world's computer vision market was estimated at US $1.19 billion in 2018 and is expected to reach $1.73 billion by 2023.

The training modules are designed following an effective teaching methodology with AI models that have clear value in the economy, using examples and workflows that follow real world applications.

General introductory AI courses will cover introduction of DNN and the concept of AI which do not require much programming knowledge. In the computer vision courses, we will teach more practical AI applications like detecting multiple objects from high-resolution images obtained within complex systems.

Commercial applications rely significantly on anomaly detection and semantic segmentation, and proper use of these techniques requires training to be driven through an understanding of data preprocessing and analyzing the problem.

For natural language processing, AI models are generally unique to each language, and even though there is an increasingly pervasive use in commercial applications, the actual models and data sets are specific to the use case. So, we will basically use English to teach NLP but we can collaborate with experts to develop other language processing courses.

Finally, Business leaders and decision makers need to gain a realistic understanding of the benefits and limitations of modern AI technologies. Many organizations are facing difficulties in implementing AI technologies, including proper budgeting, project management, and integration with existing workflows.

Executives and decision makers can gain an awareness of AI and can also gain the skills needed to plan and implement AI projects through our case studies and discussions program.

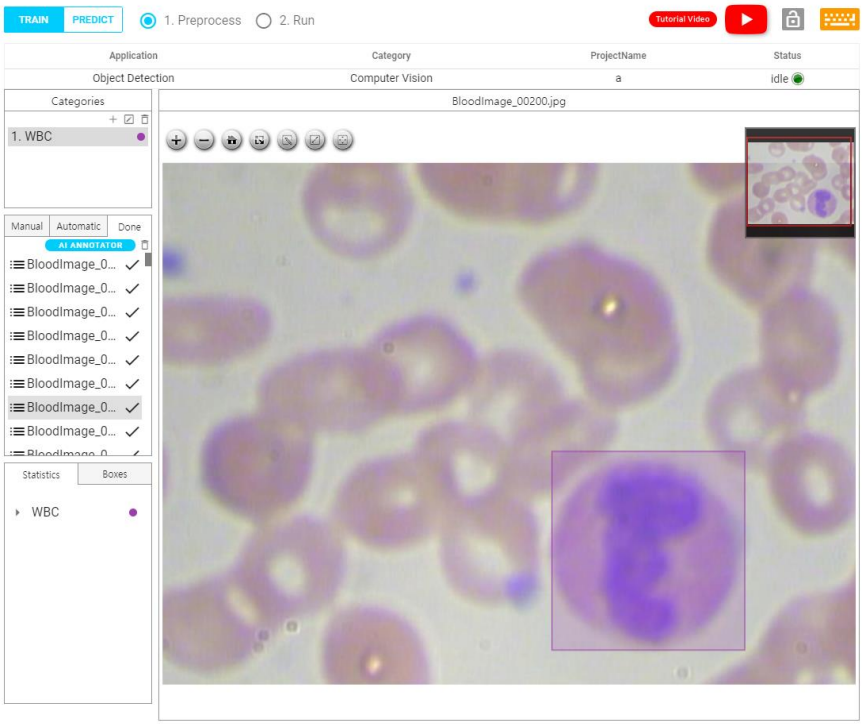
2. Program Overview

We have designed four programs for distinct end users.

1. **Introductory** content to spread awareness and understanding to the general public.
2. **Beginner** course on the use and operation of AI systems.
3. **Intermediate** course on deployment and evaluation of AI systems.
4. **Executive** education on proposals, approvals, and costing of AI projects.

Key Features

- Training is carried out on a fully-managed suite of professional AI tools.
- The cloud-based suite is backed by a GPU cluster that supports dozens of concurrent users, providing a powerful environment over the internet for any laptop or workstation without need for expensive hardware.
- The courses are run by a team experienced in educational programming and AI.
- Deep Block's image annotation tools support high-resolution images from high-tech industries, including satellite and microscope imagery.



Deep Block AI Suite

Deep Block provides an entire AI image analysis workflow without coding, from the

accuracy of the models to model evaluation and deployment. Deep Block provides a fully-featured, browser-based analysis suite where students can learn and use AI model by understanding how to annotate data and optimize AI models.

3. Curriculum

Introductory content

	Title
1	What is AI? Provide a simple explanation with well-known presenters.
2	Secrets of Game AI systems Interview with the developers and professional gamers.
3	The History of AI Conversation comparing academia and the practice.
4	Elementary AI systems Simple rule-based coding
5	Professional AI Use cases in professional fields
6	Art and AI Novel techniques including neural style transfer
7	AI in media Tools and workflows in the filmmaking and broadcasting
8	AI in Science Fiction Feasibility of futuristic representations in books, TV, and film.
9	AI Impact Overview of services that have been greatly improved with AI, such as Google Translate
10	Point-and-Click AI Overview of Deep Block, a mouse-based web interface for computer vision

Example: Art and AI
Can I paint like Joong-seop Lee?
With Deep Block's Style Transfer tool, students will learn to transform their own image into Joong-seop Lee's style https://www.youtube.com/watch?v=L3ya7P0-Alg

Beginner Course (No Coding)

Chapter	Contents
1	What is AI?
2	AI introduction 1
3	AI introduction 2
4	AI introduction 3
5	Data preparation 1
6	Data preparation 2
7	Basic AI applications
8	Tips of choosing an appropriate AI model
9	Data preprocessing 1
10	Data preprocessing 2
11	Optimization methods for AI model training
12	Evaluating the AI models
13	Inference in AI models
14	Deployment of AI models 1
15	Deployment of AI models 2
16	Limitations of modern AI
17	DIY Project, Part 1 (creating custom AI object detector using Deep Block)

18	DIY Project, Part 2
19	DIY Project, Part 3
20	DIY Project, Part 4

Intermediate Course (Low Coding)

Chapter	Content
1	Introduction to computer science
2	History of AI
3	AI Introduction
4	Introduction of neural network
5	AI application examples
6	Pros and Cons of deep learning
7	Python basic 1
8	Python basic 2
9	JavaScript basic 1
10	JavaScript basic 2
11	Introduction to crawling
12	Crawling practice
13	Introduction to data preprocessing
14	AI model training and optimization strategy
15	AI model inference
16	How AI models are evaluated
17	How AI models are deployed
18	Deep-learning based object detection model Raccoon detection from images
19	Example of natural language processing using AI Text generation
20	Example of natural language processing using AI Sentiment analysis

Executive Course

	Contents
1	Trends in medical imaging
2	E-commerce and AI
3	Anomaly detection in manufacturing
4	Biological growth cycle analysis in agriculture

Learning Modalities

All units will consist of a blend of content and activities that are meant to Inspire and inform the student, and then provide directions and tools for a practical implementation of the specific AI applications in the unit.

Goal	Inspire	Inform	Implement
Content	General topics on uses of AI across research, industry, and the public sector	Key topics on AI system design, applications, and frameworks	Live exercises with real content that demonstrate AI applications
Delivery	Lectures delivered by notable guest speakers from industry and academia	Seminars showcasing projects developed and led by the Omnis Labs team	Tutorials which cover real world problems utilizing the Deep Block platform
Modality	Videos	Seminars & Case Studies	Tutorials, Lectures

Instructors

Instructors

Name	Responsibilities	Career history	Education
Gwihwan Moon	Project Management	Netmarble Games CMS Edu Qarasoft	Seoul N.University B.S. in Computer science
Sung-ho Park	CS, Online Learning Management		Ajou University B.S. in CS
Taeheon Park	Technical support, Platform maintenance	Netmarble Games Seoul National University Internet Convergence and Security Lab	Seoul N. University B.S. in Computer science
Yoobin Han	Educational Contents development, Offline education		Seoul N. University B.S. in Computer science

4. Curriculum Design and Implementation

Level-specific content has been created around the needs to the separate levels according to their needs and practical use of AI Systems. Each level has unique needs in terms of Analytical and Technical learning goals.

		Beginner	Intermediate	Executive
Target Groups	Background	K12 Young public with non-CS major	3 years' work experience in non-AI field	Senior managerial position
	AI Concerns	Jobs Impact of AI	Upskilling and utilizing modern AI-based tools	Increasing Company Profitability and Competitiveness with AI
Learning Goals	Analytical	Strengths and Limitations of AI	Model Creation, Optimization, and Evaluating	Business Strategy Human Resource Strategy
	Technical	Data Annotation, AI Workflow, Understanding AI	AI Workflow Management, Model selection and optimization, Model validation	Read summary reports produced by AI team

Student Profiles and Outcomes

Beginner A person who wants to know AI or need to know basics of AI. Their main incentives and motivation are to understand the use of AI and to improve work efficiency using AI tools, to gain an understanding of AI that affects their lives and job prospects.

Intermediate A person who wants to improve their competency and cultivate an ability to utilize state-of-the art AI tools for on-the-job uses to increase their productivity and daily throughput. They will have industry-specific problems and they have already identified in areas where more intelligent computing systems will enhance their ability to spend time on value-added activities rather than repetitive work.

Executive Education A person who has expertise in managing companies or other organizations where they need to make decisions regarding the deployment of AI system that will improve their productivity, customer satisfaction, and organizational goals. They are not the user or the implementer, but they will make decisions and need to manage AI projects.

5. Custom Course Development

The above programs can be delivered as integrated solutions for organizations that need to deploy AI training programs. For these customer programs, we can develop additional content as well as coordinate with the host institution on the production and delivery of online and offline courses.

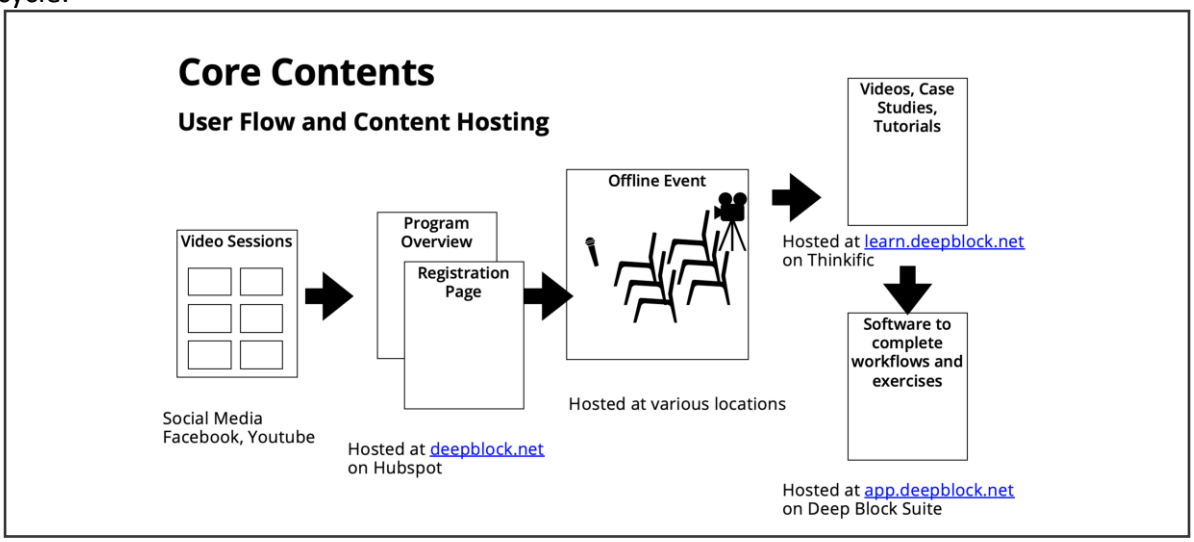
Additional Topics for Custom Courses

In addition to the above schedules, for large groups of 100 or more individuals, we can develop customer modules covering any of the following topics.

Basics	Computer Vision	Natural Language Processing	Data Science	Economic Impact of AI	Social Impact of AI
AI Engineering	Model Training and Evaluation	AI Application Development	Cloud Infrastructure Management	IoT and Edge Deployment	
AI applications	Healthcare	Manufacturing	Smart City	Aerial Imaging	
Executive Program	Pros and Cons of AI	Scoping and Budgeting AI Investments	Copyright and IP Rights Related with AI	HR Planning for AI Project	Corporate Governance with AI & Big Data

Recruitment

To ensure participation in the host's AI program with us, we collaborate with the host to produce web-based and social media content to engage and register course participants. This includes configuring and maintaining the software needed to produce social media content, guide traffic to the program registration page, and managing the full user experience throughout the study lifecycle.

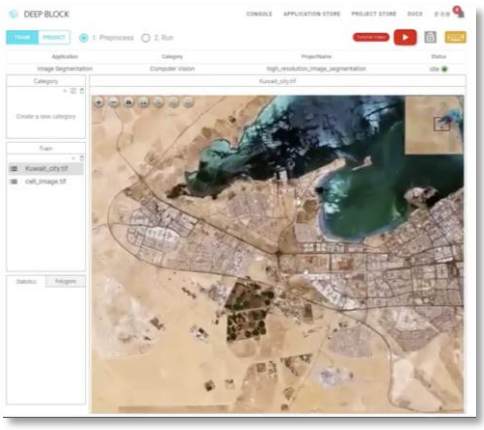


User Journey

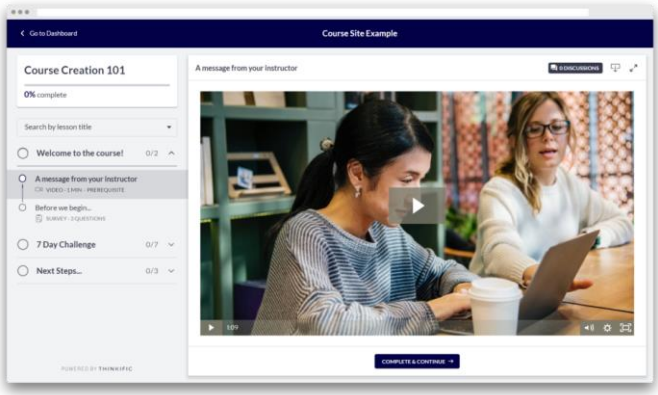
Activity	Step	Location
Fill out form on program website, choose online or offline	**Register**	Program Homepage
Attend Seminar	**Gain Understanding of topic**	Offline: Attend Event Online: View on LMS
View tutorial Videos	**Learn how to do a practical exercise**	Offline: Tutorial Preview Online: View on Deep Block
Perform Exercise	**Complete assignment**	Online Only on Deep Block
Publish exercise outcomes	**Share results and interpretation**	Deep Block

Software

The **Deep Block** AI Suite provides a creative computer vision platform where users can upload images, train and evaluate AI models, and use the model for inference. The tools enable entire AI workflow without coding and it allows from data preprocessing to adjusting the model training epoch and thresholds, such as from general images to satellite imagery.
The **Thinkific** Learning Management System is a fully-featured, enterprise grade suite that provides all of the tools and infrastructure to manage the learning experience, from registration, to course content, to student certification.



Deep Block Online AI Platform

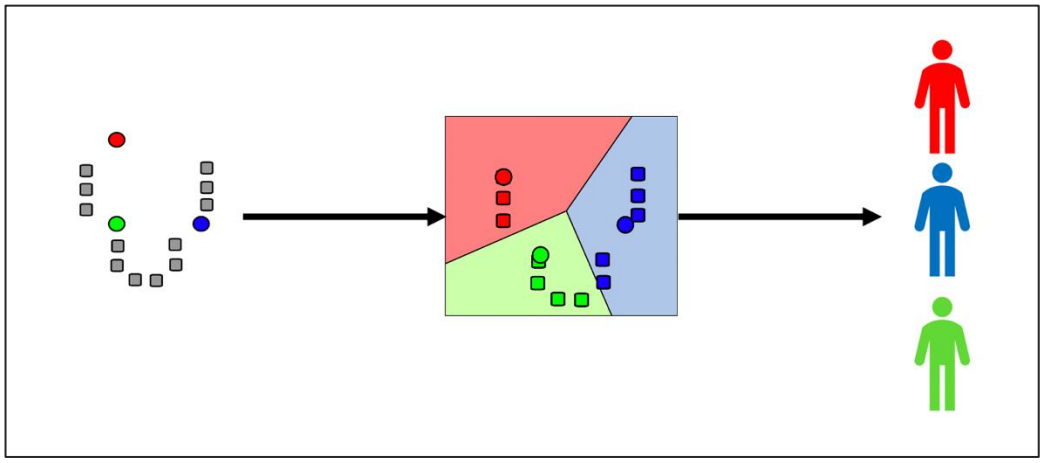


Thinkific Learning Management System

Applicant Statistics and Outcomes

For custom programs, student intake is analyzed through demographics and job status, to provide the host with a clear understanding of the various groups and subgroups of users that they are supporting. An intake survey will gather information regarding several variables, and clustering analysis is conducted to determine the various types of similar profiles.

Category	Variable
Demographics	Gender
	Age
	Town of Residence
	Country of Birth
Education	Highest Level Completed
	Major
	Attendance
Intent	Entrepreneurial Ambition
	Job-seeker Status
	Achievement
Job Status	Employment Status
	Grade or Work Productivity



Satisfaction survey

After each lesson and at key milestones, students receive a brief opportunity to rate their experience and provide feedback. Over the course, we compile data on the overall satisfaction, Net Promoter score, and lesson satisfaction.

Performance Management

To ensure that institutional outcomes are met, we help the host institution calculate a program score based on various targets. Below is a scoring guide based on achieving the target enrollment, Net Promoter Scores reported by students, and exercise completion rates tracked by Thinkific and Deep Block.

$$Index = \frac{(Target\ Enrollment) * 100 + NPS * 10 + (Exercise\ Completion + .4) * 100}{3}$$

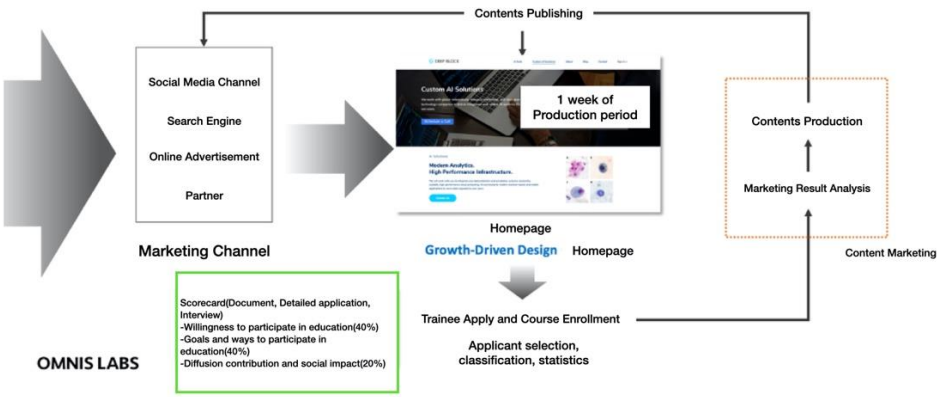
Index	C	B	A-	A
Target enrollment	50%	70%	90%	100%
Net Promoter Score (NPS)	7	8	9	10
Exercise Completion, tutorials	30%	40%	50%	60%

Certificates

Participants are also provided with completion certificates that they can add to their resumes and share on platforms such as LinkedIn, which is the largest business social platform with over 570 million users worldwide.

Program Promotion

We will apply the principles of growth driven design. As students are registered in the host's course, we will continue to publish content to improve and enhance the host's reputation and enhance the value of the students' certificates.



Operational Overview for Web content

We work with the host to produce the necessary web-based content using the following framework.

Steps	Description	Materials Needed	Staff Involved
1. Location	Make a reservation for the physical location, recording equipment and video crew	Funds to pay for reservations in advance	Program Lead, Camera Operators, Video Editor
2. Speakers	Confirm the schedule of the speakers	Via phone or email	Program Lead, Speaker
3. Practice	Develop lecture with speaker following the practice content.	Deep Block	Lecturer, Speaker
4. Quality Control	Review lecture materials and test slide content for compatibility	Slides	Project Manager
5. Recording	Record video session	Physical location, Lighting Setup, Two 4K cameras, Multiple memory cards, Wireless audio system, Laptop for Presentation, Off-camera display for presenter	Guest Speaker Program Lead, Project Manager, Two camera operators
6. Post-processing and video editing	Ingest Video, Synchronize Multicam and Slides, Edit, Color Correct, Compose Slide Overlays, Encode and Export	Video Editing Station. 8-core, GPU-accelerated, 1TB SSD Storage, 4TB Additional Storage	Program Lead, Video Editor
7. Quality Control	Review published video	Private Online Storage	Program Lead, Project Manager
8. Publishing	Upload video to video sharing site, fill out all meta information, promote organically, and boost viewership by sponsoring post.	Social Media accounts, Budget for paid reach boosting.	Marketing Manager

Operational Overview for Online/Offline Blended Course

We work with the host to produce the necessary course content using the following framework.

Steps	Description	Materials Needed	Staff Involved
1. Location	Make a reservation for the physical location, recording equipment and video crew	Funds to pay for reservations in advance	Project Manager, Camera Operators, Video Editor
2. Case Study & Seminar Content Planning	Develop lecture and case study for the topic of the module.	Examples from Open Access Journals and Open Source community	Program Lead, Data Scientist, AI Engineer
3. Content Creation	Synthesize the materials from journals and software into a seminar package that includes a summary of background information, summary presentation.	Slides	Program Lead, Project Manager
4. Conduct and Record Seminar	Record video session	Physical location, Lighting Setup, Two 4K cameras, Multiple memory cards, Wireless audio system, ambient audio system, Laptop for Presentation, Off-camera display for presenter	Program Lead, Project Manager, Two camera operators
5. Post-processing and video editing	Ingest Video, Synchronize Multicam and Slides, Edit, Color Correct, Compose Slide Overlays, Encode and Export	Video Editing Station. 8-core, GPU-accelerated, 1TB SSD Storage, 4TB Additional Storage	Program Lead, Video Editor
6. Quality Control	Review published video	Private Online Storage	Program Lead, Project Manager
7. Online Tutorial Creation	Create boilerplate exercise on Deep Block	Deep Block Infrastructure, Sample Data, Sample Models	Data Scientists, AI Engineer
8. Publishing	Upload Seminar contents to the website. Enable boilerplate exercise on Deep Block.	Learning Management System, Deep Block Infrastructure, Social Media accounts,	Program Lead, Data Scientist, AI Engineer, Marketing Manager

Sample Schedule of a typical day during the offline course

	Time	Program	Remarks
Data preparation and preprocessing	09:00 – 12:00	AI data crawling and data preprocessing	Lecturer
	13:00 – 16:00	Practice and mentoring	Mentor/Trainee
	16:00 – 17:00	Q&A	Lecturer
Contextual model selection and model optimization strategy	09:00 – 12:00	AI technology trends by field Advice on selecting AI models for each situation	Lecturer
	13:00 – 16:00	Practice and mentoring	Mentor/Trainee
	16:00 – 17:00	Q&A	Lecturer
Computer Vision, Image Processing, Natural language processing Example lab	09:00 – 12:00	Semantic segmentation in pictures (computer vision) Creating your own pictures using AI (image processing) Sentiment analysis using user review text (natural language processing)	Lecturer
	13:00 – 16:00	Practice and mentoring	Mentor/Trainee
	16:00 – 17:00	Q&A	Lecturer

6. Company Overview

Omnis Labs Co. is an AI company established in January 2019. Its mission is to contribute to the democratization of artificial intelligence technology through the development of an easy to use AI platform for non AI professionals called Deep Block.

Deep Block provides simple drag-and-drop web apps that enable entire AI workflow without coding. This platform provides mouse-based data annotation tools with one-click training interface without need for infrastructure management.

Deep Block has been optimized to offer high performance image analytics with artificial intelligence. In particular, Deep Block is specialized in high resolution imagery. Deep Block can be used for many applications, including research in life sciences using microscopy and satellite image analysis for earth science and national defense.

Modern AI implementations require human intervention to train and validate supervised learning models. With Deep Block, people can learn these critical processes using built-in applications and they can create own AI model with the powerful annotation tools Deep Block offer.

The company established a company-affiliated research institute, and holds a patent for their proprietary technology. Omnis Labs is also getting support from the Korea Data Industry Promotion Agency and KOTRA.

As of July 12, 2020, Deep Block is used around the world, including various countries such as India, MENA, Germany, US and Sweden.

The company has recruited a team of AI experts who have computer science degree and they have worked extensively in AI industries, including game AI, computer vision, scientific imaging, and cloud service development.

The team has previously worked at organizations such as Netmarble Games, the largest mobile game developer in South Korea, and in ICT education research department at CMSEDU, the largest private coding institution in Korea.

The core goal of the company is to develop assist in the utilization of AI technology for applications and users outside of traditional IT domains. For this, they have developed the Deep Block platform that currently offers image pre-processing using a point-and-click interface in a no-code/low-code environment.

Privacy Statement for personal information

We handle the personal information of all trainees by adhering strictly to the regulations and privacy laws as outlined in the Personal Information Protection Act, Enforcement Decree, and Standard Personal Information Protection Guidelines of the customer countries. We can work with hosts outside of Korea to ensure compliance with their privacy requirements.

All information is stored for a maximum of one year, from the time of last activity of the students.

We also comply with the European Union's General Data Protection Regulation, and enable all pertinent privacy features in our customer records, mailing lists, and marketing software.

Online AI platform security

Deep Block employs the OAuth protocol recommended by the IETF for login, which is recognized as industry standards by Google, Facebook, Amazon, Twitter and Microsoft

By using the OAuth protocol, the user's passwords are not stored in the database and safe from hacking.

And session expiration policy is applied to ensure the authenticity of the user's session at the server. This can prevent an attacker from intercepting user’s session and authorization.

User files are fully isolated in private GPU clouds.