



ICT Insight

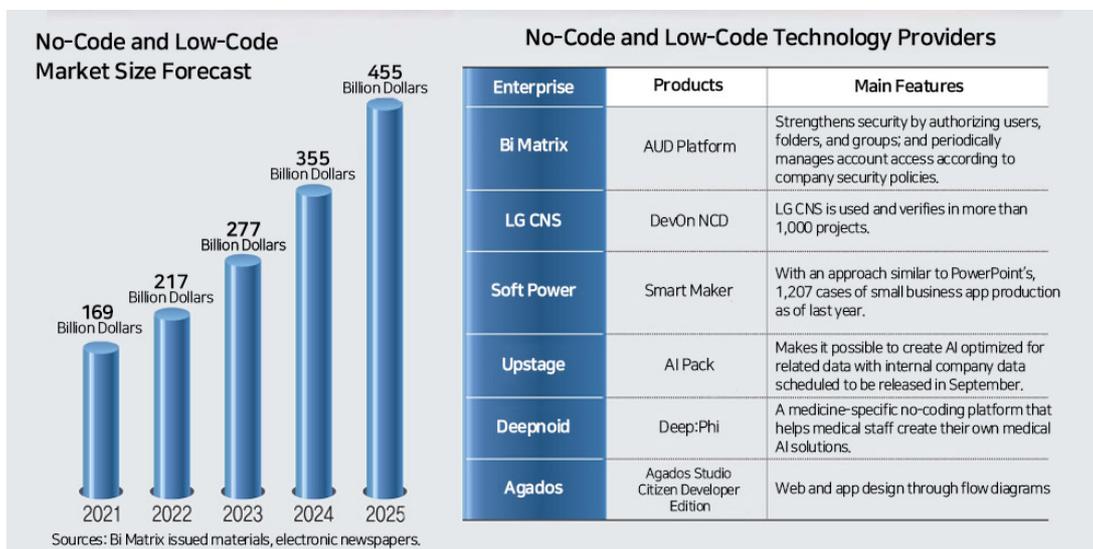
## • Coding Technology that Changes Coding : No-Code, Low-Code

• Written by | Bae Young Geun, CEO of BI-MATRIX

### Growth No-Code and Low-Code Market Growth

With the emergence of the cloud and changes in the market environment due to digital transformation (DX), the demand for business system construction and business automation is increasing. In addition, as business organizations without development experience jump into IT work, the need for no-code (code-less) and low-code that can develop software is increasing even in industries that lack knowledge of coding.

Gartner, a global research institute, has selected no-code and low-code as key strategic technologies and has announced that the market will grow to US\$187 billion by 2030. Next, it is predicted that by 2024, 65% of business applications will be developed with no-code and low-code. Forrester Research, a US research firm, also found that 75% of all enterprise software will be built on a low-code basis by 2022. Global companies are also rushing to launch products in the low-code and no-code platform markets. Examples include Microsoft's Power Apps, Google's Vertex AI, AWS's Honeycode. Meanwhile, investment in startups is also active. In 2021, Bubble raised \$100 million from Insight Partners in Series A, and in the same year, Adalo raised \$8 million from Oceans Ventures and others in Series A. In Korea, efforts are continuing to take the lead the technologies such as Samsung SDD and Kakao.



Sources: Bi Matrix issued materials, electronic newspapers.

## Background

### Background of the Emergence of No-Code and Low-Code Platforms

No-code and low-code technology in itself is not an innovative technology. How to improve productivity by automatically and easily developing software has been a long-cherished and eternal dream for developers. So far, developers have been trying to figure out how to create a website or app with as little programming as possible.

Then, why did no-code and low-code suddenly jump into the spotlight?

The first reason is the shortage of IT manpower. After the COVID-19 pandemic, we often hear stories about the shortage of IT developers along with the rapid growth of the non-face-to-face software service market. In the case of Korea, the reality is that there is a shortage of 14,000 people this year alone, and when expanding to the global market, it is said that there is a shortage of 12 million developers. No-code tools can be used with certain IT knowledge. For example, a no-code solution can be used when there is a need to make a prototype in a new business or for digitalization in line with business improvement. Until now, programmers were needed regardless of the scale or complexity of the system, but no-code can be applied to a small and simple system, and the shortage of IT developers can be solved by utilizing existing talent.

The second is the generalization of cloud services. This structure, which can be used mainly for pay-as-you-go or monthly payments without purchasing expensive servers or software, is the basis for a no-code tool that can be developed at a low cost.

Finally, there is diversification and complexity of the task. As customer needs become more diversified and complex, they have a significant impact on business. When the need for a small amount of a variety of products or services, a system can be established with a low investment to quickly examine market reactions.

## Outline

### No-Code and Low-Code Overview

No-code and low-code are similar, but the areas in which they can be used are different. It is appropriate to select and use the appropriate format for the user's purpose.

- No-code: A no-code platform requires no development experience. It is a development platform designed specifically for general users and business users. It is suitable for small projects and businesses. However, the templates and functions are fixed, so there are restrictions on extension and change.

- Low-code: The low code platform is a development platform designed for professional developers and non-technical business users. It requires little training or experience and uses visually based modeling to simplify the development process. Users with coding experience can handle in-depth coding when coding directly is needed. Unlike the no-code tool, low code requires basic knowledge about coding. However, since coding is possible, free functions can be implemented, which has high versatility and expandability. In addition, it is easy to link with an existing system. It is beneficial from a governance perspective, as the IT team can monitor and control all development projects. Multiple individuals or groups can see exactly what they are doing and who is doing it, so they can collaborate and work in the same module at the same time.

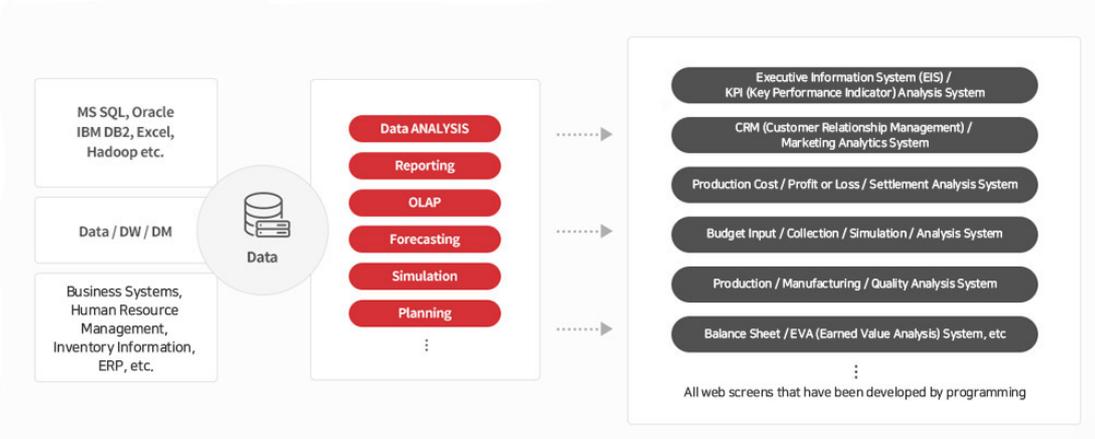
The advantage of developing business applications using no-code/low-code technology is that non-developers who do not have specialized development knowledge can develop applications. Of course, in actual development, basic knowledge such as how to use development tools and business logic is required. However, compared to coding development, no-code/low-code is overwhelmingly easier to develop applications. If the relevant expert is familiar with the workflow and understands the challenges of the task to be solved, they can develop the application, reflecting the requirements of the field.

Moreover, since most low-code development platforms do not require compilation, field feedback can be immediately modified and reflected in the project.

Another advantage is the speed of application development and deployment. In no-code/low-code development, an environment is created for creating intuitive screens by drag and drop, creating business logic just by combining pre-prepared functions and an environment for operating the developed application, allowing it to be made and operated in a short period of time.

## Case Low-Code Usage Cases

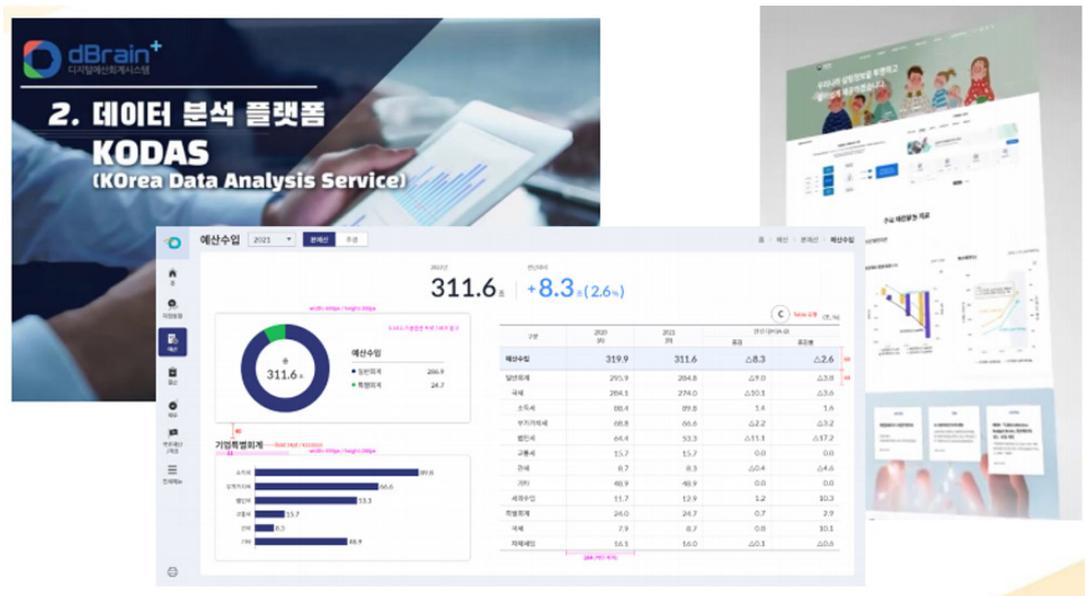
Various functions are required to build a business system. Until now, due to the technical limitations of each professional solution providing these functions, it was necessary to introduce several tools to build one business system. A software robot that provides a low-code function automates coding, providing convenient usability so that even a beginner developer or a collaborator can develop a work system. If a screen is developed in Excel, low-code provides a function that automatically converts the screen into an HTML5 web screen operated by JAVA, making it easy for anyone to create the web screen that they need.



In addition, low-code can save time and cost at the frontend stages such as BI/OLAP, Dashboard/Visualization, Report, UI/UX, and Excel. By systematizing data analysis work and establishing a statistical system, work productivity is more than doubled compared to manual work.



For example, when developing the policy management system for the Ministry of Economy and Finance's next-generation dBrain, various screens were quickly built using a no-code solution, and in particular, in the case of a real-time PT system for paperless reporting, one beginner developer produced more than 60 screens in just three weeks, which greatly reduced the cost and time required for screen development.



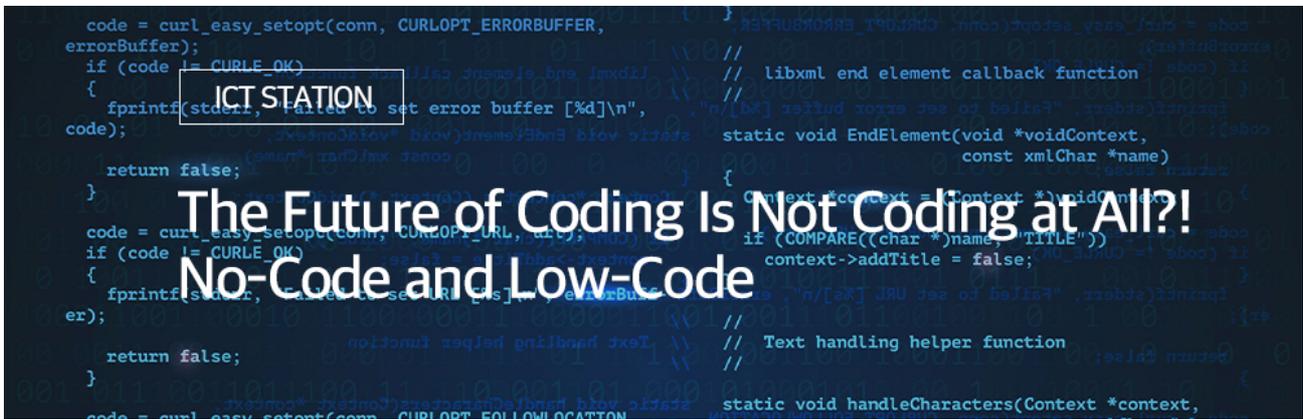
## Conclusion

### Closing Remarks

On the other hand, there are barriers to entry in the no-code and low-code market. I think the negative view that developers have is the biggest obstacle to market expansion. Representatively, there are voices of concern that there will be a lock-in phenomenon and security issues with the no-code platform.

However, it should be noted that no-code and low-code technology is meaningful because it enables both citizen and professional developers to collaborate by providing technologies and frameworks that increase reusability and reduce the need to write code. Rather than getting rid of professional developers, it is possible to increase efficiency by collaborating with citizen developers.

The biggest advantage is that, by using the no-code and low-code tools, even non-developers can participate in development, which can further improve the efficiency of development. However, it is necessary to conduct a careful preliminary review related to the tool and platform. In particular, efficiency and productivity should be kept in mind without increasing the burden on internal quality, security policies, or managers.



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As the Fourth Industrial Revolution continues and the COVID-19 crisis persists, the world is struggling from a shortage of developers. This is because, according to the flow of digital transformation, not only information technology (IT) companies but also traditional industries such as manufacturing, distribution, and finance need developers. In this situation, no-code and low-code have emerged as substitute technologies.

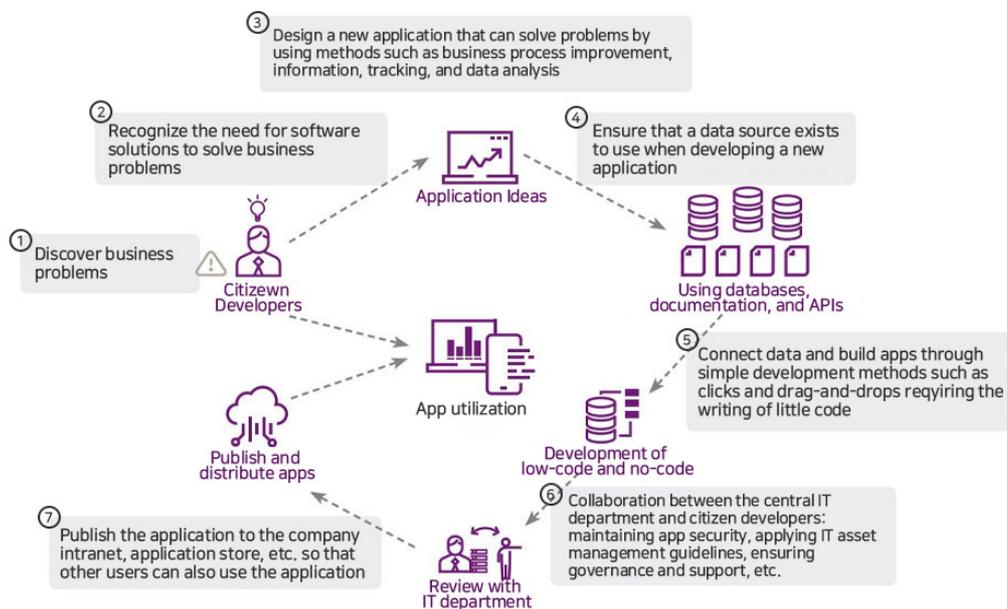
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## What Are No-Code and Low-Code?

No-code and low-code are development methods that automate the work process by creating an application without requiring or minimizing the developer's direct coding (program development). "No-code" literally means programming without coding. A program can be created by entering drag-and-drop to move blocks or areas with the mouse or input commands with one's voice. "Low-code" means that the work is minimized and simplified so that even ordinary people can easily write code similar to a developer's with minimal coding knowledge. Most no-code and low-code are intuitively structured, so that even ordinary people can easily create programs if they learn simple usage. The advantage of the no-code and low-code platforms is that most services can easily link with other existing services such as the cloud, map services, and payment services for data storage, saving time and money required for service development. In addition, errors can be greatly reduced because no-code and low-code write elements that have already been programmed without having to directly write code. Thanks to this convenience and due to the lack of IT developers, no-code and low-code programs, which can be programmed with a simple click or by voice without learning coding, are attracting attention.

## Focus on the Activities of No-Code and Low-Code Users and Citizen Developers

Due to the activation of no-code and low-code platforms, the role of citizen developers is expected to occupy a significant portion of the development area. "Citizen developer" refers to a field expert who directly develops an application program necessary for their specialization, rather than delivering the requirements to the company's IT development department. Market analysis companies such as Verified Market Research predict that the low-code market will grow more than 44% annually until 2026, and Gartner estimates that by 2023, there will be four times as many no-code and low-code users (i.e., citizen developers) at large enterprises than professional developers. Utilizing citizen developers is not without its drawbacks, but its strong advantages are more than its disadvantages. One of the advantages of using citizen developers, selected by Gartner, is that the shortage of software development manpower can to some extent be reduced. In the situation where there is a shortage of software engineers worldwide, it is difficult to quickly develop code-based developers, so it is not easy to efficiently solve the software development manpower shortage. On the other hand, nurturing citizen developers is quick and easy.



Hintchcliffe, D. (2016, April 18). The advent of the citizen developer. ZDNET.

<https://www.zdnet.com/article/the-advent-of-the-citizen-developer/>

Another advantage of using citizen developers is that field experts, not developers, can take the lead in developing applications in specialized fields such as medical care, where the entry barrier for non-specialists is high. Since the explaining and understanding of the expertise the software developer is reduced, it becomes possible to design and develop more accurate and reliable applications. When asked about users of AI tools and technologies in the 2022 Healthcare AI Survey, more than half (61%) of all respondents said that doctors were users, followed by healthcare providers (45%) and healthcare IT companies (38%). The advantage of using citizen developers is that they quickly understand the requirements of their business field and that the development speed is very fast. Jonathan Barden, business technology leader at global service provider UST, said some application projects took 9 to 18 months to build. He said, "The typical delivery time for low-code is 5 weeks. It's hard to expect such fast live times from a traditional developer."

## **Case Study and Application of No-Code and Low-Code**

### **1. An application that can be used simply from a practitioner's point of view**

Korea Electric Power Corporation (KEPCO), Jeungpyeong Branch is a no-code platform and is developing and using a mobile application called Next Generation Construction Site Monitoring without developers. It seems so simple from a developer's point of view, but considering that the original application's cumbersome process of attaching on-site photos to email, sending memos for information such as construction numbers and codes, and making phone calls or sending text messages to various partner agencies, it can be evaluated as a great project that saves time and money while implementing the functions necessary for business.

### **2. A simple application without low efficiency**

7-Eleven chose low-code for the purpose of providing product pricing information to local managers. Paul McCallum, 7-Eleven's head of technology in the U.S., has developed an on-site price optimization app that gives regional managers access to relevant sales figures. This low-code component was written by Paul McCallum in just four days. Managers use a laptop, tablet, or smartphone to conveniently view data; collaborate with merchants; and improve product placement in stores. Compared to Excel spreadsheets, the app is easier to use, and administrators can send a report to the store to update prices by notifying them of inaccurate pricing information.

### **3. Easier and more profitable application development**

Face Quote, an application launched by Zurich UK as a no-code/low-code platform, estimates the user's age when a user takes a self-portrait, and calculates insurance premiums based on this.

Although this application was developed in seven days, it is evaluated as an easy and commercial application because it is easy to access, intuitive, and attracts attention from the customer's point of view.

### **4. Get rid of useless applications with low-code**

When NTT Data Services acquired Dell Services in 2016, it leveraged low-code during the merger and acquisition process. NTT discovered several "one-time" financial and HT applications during the acquisition. Afterwards, a contest was conducted with several low-code platform vendors to find the most suitable platform for updating the app in question. NTT Data paired each vendor with the company's senior developers and business analysts, and then simulated real-world problems for each team. Based on this, a new low-code-based application would be developed or, conversely, the existing application would be scrapped. In the end, they were able to successfully filter out the unnecessary items, thereby reducing the number of Dell service applications from 1,000 to 122, using low-code.

## **Principles of Using No-Code and Low-Code**

### **1. Manage low-code so that it does not become shadow IT**

"Shadow IT" refers to a phenomenon in which employees purchase cloud applications or services that are not approved by the IT department, and the IT management department or the person in charge does not understand it. However, according to the publicity of low-code companies, no-code/low-code platforms that appear to be able to develop everything can also become shadow IT.

It is good to develop an app that accomplishes one's required tasks, but everything must be identified and managed by the IT management department.

## **2. Provision of appropriate IT resources and personnel**

Gartner, an analyst firm, recommends distinguishing between “green” and “yellow” safe zones and “red” risk zones. Green safe zones indicate that citizen developers independently create workflows and automations, while yellow safe zones indicate that citizen developers collaborate with professional developers to create more powerful applications. A red risk zone is a work area that requires the supervision and approval of IT and is subject to the control of IT, and citizen development is carried out within a separate governance framework.

## **3. Securing APIs and connectors**

In order for citizen development to succeed in companies, IT must proactively provide connectors and configure a solid API (application programming interface) to access internal data. Developers need to organize API management and documentation well. Leverage existing RPA tools, and train individuals is also beneficial. Robotic process automation (RPA) is the fastest growing segment of low-code/no-code platforms. RPA tools such as Zapier, UiPath, and Power Automate easily import and visualize database data with relatively simple settings, making it a good bridge between existing systems and low-code/no-code platforms.

## **4. Review and evaluation**

It is unreasonable to ask general employees to develop an app while they are thinking about business indicators, marketability, and company-wide usability. Therefore, indicators such as time required to complete a process should be recorded and managed, and business indicators should be reviewed and evaluated for their usefulness. This will prevent general employees from developing workaround apps for problems.

## **5. Creating an innovative culture**

One of the reasons why the no-code/low-code platform has not spread widely in the past is that employees consider it an additional task rather than a general daily task. Companies should view no-code and low-code as securing the digital workforce of the future, and be prepared to support and reward employees so that they will be willing to accept it. In addition, it is necessary to consider maintaining the interest of one’s successor and documenting the purpose and background of the developed app.

## Development of No-Code and Low-Code Coexistence with Coding

As IT technology advances, low-code and no-code are expected to occupy a significant portion of the development field. However, related industries point out that the best results can be achieved only when professional developers and citizen developers work together. This is because low-code alone cannot build or handle large-scale systems or complex processes.

Thanks to no-code and low-code, we get a familiar platform that is constantly evolving. However, it is expected that a strong IT team will be needed to coordinate the functions of applications made with no-code and low-code and to provide stable services.

### Reference

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- Weekly ICT Trends, No. 2057 

People in ICT

“I hope that electronic medicine,  
which used to exist only in our imagination,  
will now become a reality and will help many patients.”

Interview | Yoobin Lee, OceansBio Researcher



"E-medicine, which existed only as a figment of the imagination, is now a reality, and I hope it will help many patients." Let's hear the passionate story of Lee Yu-bin, a researcher at OceansBio, an electronic medicine development company attracting attention in the field of future healthcare technology.

Q

**Hello, please introduce yourself to our readers.**

Hello. My name is Lee Yu-bin. I am in charge of research and development related to electronic medicine at OceansBio.

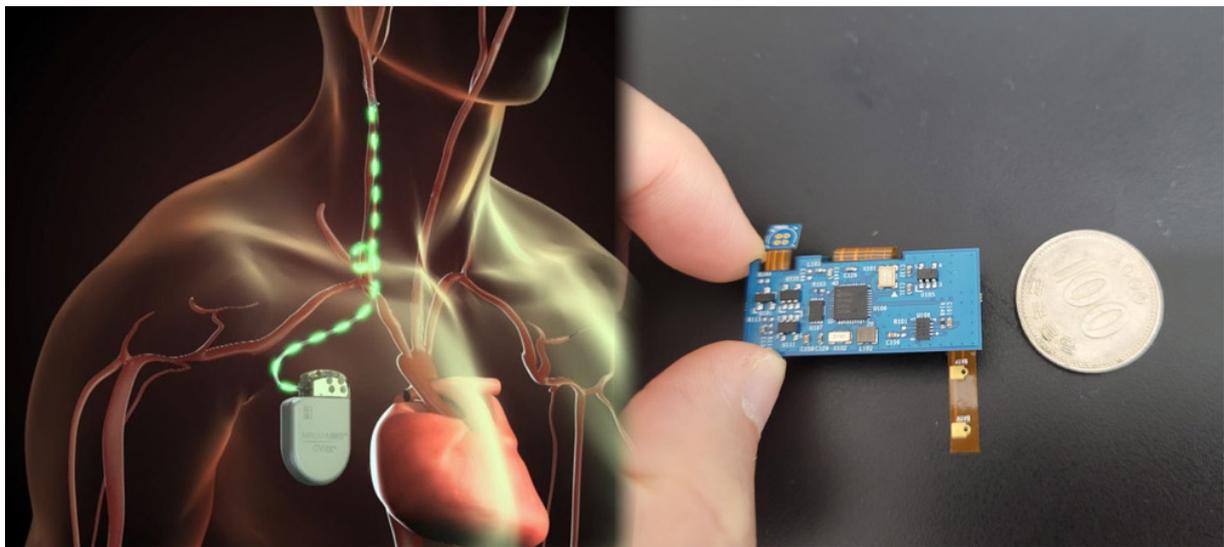
Q

**What kind of business does OceansBio do?**

OceansBio is a company that aims to develop and commercialize advanced medical devices called "electronic medicine" through the introduction and convergence of new technologies.

Q

**What is electronic medicine?**



Electronic medicine have a relatively short history of only several decades abroad, and in Korea, electronic medicine is relatively unfamiliar new medical devices, currently at the stage of establishing and verifying concepts and policies. The nervous system, which extends extensively throughout our body, centering on the brain and spine, sends and receives signals by tiny electrical potential differences (action potential). Electronic medicine is a medical device that directs electrical stimulation to the area or connected nerves to be treated. Depending on the condition to be treated or the target area, electronic medicine can be divided into invasive electronic drugs implanted in the human body and a non-invasive electronic drugs that apply electrical stimulation through the skin.

**Q**

**Before joining the company, did you want to work in the e-pharmaceutical industry?**

I couldn't even imagine this before joining the company. However, I seem to have vaguely thought that I might not work in a job related to my major as the recent industry trend has become a form of convergence science rather than separated into specific fields.

**Q**

**Could you tell us the top 3 prides of your company?**

First, it is a startup aiming to localize electronic medicine and nerve stimulation, which are considered as next-generation medical technologies. This technology will help many patients who are unable to respond to current medications. Second, it is a positive company for autonomous capacity building. When you want to learn something, you can receive the training at any time upon request, which is very helpful in developing your skills. Third, it is an employee-friendly company. For example, our researchers have a flexible working system. As long as you follow the set number of working hours, you can go to work at any time. The project seems to progress quickly because you work at a time when you can maximize your efficiency.

**Q**

**What is the most memorable thing you have done at work?**

Testing a prototype with my team members is the most memorable. It was a new and exciting memory because it felt like a thought in my head had become a reality.

**Q**

**What kind of employee do you wish to be?**

I want to be seen as a trustworthy and reliable employee. I want to be a person who can have a positive influence on others; I want to trust others and entrust things to others, and they to me, whether professionally or personally.



**How did you prepare for employment?**

Since this is an unfamiliar field, I tried to understand the current technology trends and the basic knowledge I should have. I thought that objective self-evaluation and understanding of the field could lead to high achievement.



**What is your MBTI (Myers-Briggs Type Indicator)? And what type of MBTI is suitable for OceansBio?**

I am an ENFP (a witty person of action). In our company, the type of person who is self-directed and tries to reach goals by setting milestones on their own seems to be a good fit. The company will be good for people with an "E" tendency: people who like to work together and encourage each other.



**If there were a drug that could give you any ability, what kind of drug would you want to have?**

It would be nice to have a medicine that could give me the ability to teleport. Commuting to and from Seoul was difficult no matter how I tried to adjust it. When I close my eyes at home, I would like to be at work when I open them. I think that would be a wonderful ability to have!



**What are your future goals?**

This field, which our company is setting goals in and working hard to attain, is currently receiving a lot of attention worldwide, and I hope that research and development of new technologies and rapid commercialization will help many patients.



### **Any messages to our ICT Industry Hot Clips readers?**

The value of complex standards seems to be increasing these days. Do not think that you have to have a specific job because that was your major, but think that it is advantageous to develop good foresight and try various things with creative thinking.

ZOOM IN - I

# Top Startup in Korea A Leader in Autonomous Driving Device Services

RideFlux Inc. CTO Hawook Jeong



RideFlux Inc.

## General Status

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- **Implementing Agency**  
National Information Society Agency
- **Business Details**  
Building up intelligent information industry infrastructure

## Company Status

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- **CEO**  
Junghee Park
- **Business Type**  
Development and supply of software
- **Year of Establishment**  
2018. 05.
- **Homepage**  
<https://www.rideflux.com/>

## Key Accomplishments

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Open service of the first real-time demand-responding autonomous driving in Korea. (Jeju International Airport and SoCar Station)

Longest distance charged autonomous driving transport services in Korea. (between Jeju International Airport and Jungmun Tourist Complex)

Open services of the first district autonomous driving in Korea. (in Seoguiipo Innovation City)

## Launching era of advanced autonomous driving in Jeju Island

Established five years ago, RideFlux is a startup business developing software. It is committed in commercial operation of services for customers for the purpose of realizing full autonomous driving in Korea. In this regard, it succeeded in inviting investments of KRW 29.2 billion in Jeju Island to collaborate with mobility service businesses in providing quality autonomous driving services.

Currently, the company allows customers not owning automobiles to rent vehicles in order to provide autonomous driving services available reservations or real-time calls. It also ambitiously plans to secure safety and reliability by increasingly expanding scope of service operation through consistent technology development.

Present autonomous driving technology markets in the world show trends of technology expansion with large capital investments. Aggressive investments have been made in the fields of autonomous driving technology by world-class IT businesses including Intel, and experts anticipate rapid growth in the technology markets.

Distribution of autonomous driving technologies has been promoted mainly by complete vehicle businesses in Korea. RideFlux leads the fields of such autonomous driving technologies by continuous invitations of investments and securing high-end technologies. It also endeavors to develop technologies capable of responding to every situation on road for safety, with the target of 'Infinite possibility created by autonomous driving.



## Perfect solutions exceeding levels of the world's largest businesses

RideFlux recognized the huge potential in the markets of autonomous driving technologies in Korea based on high-end technology participated in its ICT funded project that got support, making way for the establishment of the startup business. In the situation demanding urgent buildup of large-size autonomous driving data adequate for the environment of Korea, RideFlux is now capable of realizing more active technology development thanks to ICT funds.

RideFlux has achieved great records of designing systems that are capable of further promoting research results by referencing data buildup projects for learning of artificial intelligence of autonomous driving in Korea by making use of ICT funds. The company succeeded in the buildup of dataset of size of 2,000 scenes and 400 thousand sheets, which is vaster than Waymo (1,150 scenes and 230 thousand sheets) in overseas markets, and labels detection ability such as meta information, turn indicators, traffic signal conditions, and lane sensing in various scenarios to enhance versatility. Further, RideFlux commercialized technologies required for actual autonomous driving beyond AI prototype level in the aspect of data utilization for fundamental upgrade of autonomous driving services.

RideFlux has faced a number of difficulties, but eventually succeeded in securing intensive data in a short span of time to radically improve cognitive algorithm of autonomous driving vehicles, consequently achieving

excellent records. The company collected and processed a vast volume of scenes hard to handle, labeling about 20 million objects with a single data, securing high safety of services, and providing advanced autonomous driving services in diversified forms.

Quality labeling requires 3-dimensional Cuboid, and this show a large difference in efficiency dependent upon labeling methods. RideFlux carefully considered more efficient processes for faster and precise labeling It designed new systems to allow immediate improvement of tools for face-to-face training through direct hiring and labeling feedback, and established systems to improve efficiency.



## ICT funds, valuable springboard for growing to top business

RideFlux participated in the ICT-funded project, and got a lot of support to grow the company. With such expansion, the company will further develop both its current data and software products. Since road environments and driving cultures are different among countries and regions, RideFlux plans to develop fully unmanned driving solutions by continuously building up data ideal for environments of Korea.

At the moment, RideFlux is doing its best to realize a world where customers can enjoy freedom of movement whenever and wherever they want through expanding servicing regions and implementing fully unmanned driving services with adequate safety and reliability.

# TIME LINE

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- 2018.05.**  
RideFlux established
  - 2019.03.**  
Technology-intensive venture business certified
  - 2020.03.**  
Certified frontier venture business by Korea Technology Finance Corp.
  - 2020.05.**  
Open service of the first real-time demand-responding autonomous driving in Korea (between Jeju International Airport and SoCar Station at Singwang Crossroads)
  - 2020.07.**  
Commencing permanent linkage services with V2X first in Korea
  - 2020.12.**  
Won commendation from the Minister of Small and Medium Business Administration
  - 2021.11.**  
First autonomous driving services on free lane in Korea (Seoguipo Innovation City)
  - 2021.12.**  
Certified knowledge property management business, and elected Inno-Buz  
Won commendation from the Minister of Land, Infrastructure, and Transport  
Succeeded in inviting Series-A Round investment (KRW 16.5 billion)

ZOOM IN - II

# Grand Launch of Innovative Helmet Device with ICT Fund

analogue plus, CMO Brina O

 analogue plus

analogue plus

## General Status

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- **Implementing Agency**  
National IT Industry Promotion Agency
- **Business Details**  
Shaping the global ICT innovation cluster

## Company Status

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- **CEO**  
Park Jae-heung
- **Business Type**  
Application software supply and development
- **Year of Establishment**  
2016.
- **Homepage**  
<https://www.analogue-plus.com/>

## Key Accomplishments

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Ranked No. 1 in NAVER popular brands with Core Technology Development  
Achieved 168% YoY sales increase in 2021  
Matchless technological capabilities through steady R&D

## Over 10-fold Bigger Fund Raised through Crowd Funding

safe communication and listening to music can be done in a state of wearing a helmet during a ski trip, and the idea was adopted in the in-house accelerating program.

CEO Park, who resigned to establish his own startup, was engrossed in developing a communication device that can be attached to the helmet and launched Ahead, a helmet-attached device. This way, he took the first step in the sports market. CEO Park raised more than 10-fold the target amount from crowd funding as development money, and he was awarded the President's Prize at the Korea Invention Patent Exhibition 2018.

Analogue Plus's technology is a voice assistant that can command with voice without the manipulation of buttons. The company has a non-exposure technology by inserting the speaker and battery module inside a helmet. The company has over 10 patents including Beam Foaming function with which smooth call is possible without disturbance for a user concentrating on exercise outdoors. Especially Analogue Plus made technical achievements that won prizes in patent exhibitions many times.



## Helmet Technology Successfully Combining Function and Fashion

People at Analogue Plus were thinking about a technology that enables users to enjoy exercise without sacrificing fashion. As a result of discussions, the company concluded that consumers want innovative design products combined with function and fashion and released a superb prototype with which consumers can sympathize by comprehensively observing their use patterns. After the release of the prototype, Analogue Plus set the business goal of "Instilling more fundamental change into consumers' life," and it has been devoting itself to R&D passionately.

Analogue Plus has been designing and selling general helmets since 2018, starting with a communication device for helmets. Through continuous sales expansion, the company posted KRW 2.7 billion and KRW 5 billion in sales in 2020 and 2021, respectively. The company was ranked No. 1 in NAVER brand recognition, and it has also been making remarkable achievements in terms of market share. One of the success factors of Analogue Plus can be said to be differentiated willingness and technology level with which the company can combine technology and design, going beyond mere helmet manufacturing, while continuously researching IoT and ICT technologies.

## ICT Fund Igniting MZ Generation's Passion

Analogue Plus took part in the ICT Fund project because it hopes to develop markets through its own technology and characteristics. The company has been coming up with diverse technologies related to smart helmets through various state support projects; especially Analogue Plus has focused on innovative product development through new material R&D.

With the ICT Fund project, Analogue Plus could lay the foundation for entry into new business. Based on the existing branding and the internal organization's capabilities, the company could reinforce its own identity and upgrade competitiveness through the fusion of software and hardware.

Like most small and medium businesses (SMBs), Analogue Plus was concerned about securing R&D cost. However, the company participated in the ICT Fund project, which has become a driving force to sustain the employees' passion. All employees of the company consisting of the MZ generation, except CEO Park, could settle down in the market by performing R&D and technology innovation with enthusiastic passion and spirit. Now, the company is reaping the fruit of their efforts, passion, and spirit.



## Fulfilling Social Responsibility in the Net Zero Carbon and New Normal Era

Analogue Plus is establishing its corporate strategy aimed at responding to the global climate crisis and practicing carbon neutrality after accomplishing success through the ICT Fund project. At the time when a new mobility policy in line with net carbon zero society is needed, eco-friendly personal mobility will gain more attention, so Analogue Plus plans to accelerate technology development more to enhance the safety and convenience of personal mobility users. Analogue Plus is determined to make life more convenient and abundant by developing wearable devices used in users' everyday life and become a company that fulfills its social responsibility.

Analogue Plus is urged not to forget its challenge and technology-innovating mindset, always looking for new things for latecomers waiting to participate in the ICT Fund project. A message that there is nothing that cannot be achieved if effort is continuously made, aiming at a clear goal while thoroughly analyzing the market situation, is delivered to cheer up latecomers.

# TIME LINE



## **2016.**

Established Analogue Plus Co., Ltd.

Certified as a venture business

## **2017.**

Established a research center

## **2018.**

Launched the firm's own brand CRNK

Awarded the President's Prize at the Invention Patent Exhibition

## **2020.**

Released the smart helmet "ALPHA"

Participated in CES 2020

## **2021.**

Launched the new product CRNK 2021 (helmet and goggles)

Selected as Excellent Sports Company of the Year

Chosen as a promising design innovation company

ZOOM IN - III

# Leading Green Growth with Carbon Neutrality Analysis Big Data Platform

NEO information systems co., Ltd. Assistant Manager Elli.Koh



Neo Information Systems

NEO information systems co.,. Ltd.

## General Status

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- **Implementing Agency**  
Korea Information & Communication Industry Institution
- **Business Details**  
Constitution of network infrastructure

## Company Status

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- **CEO**  
Go Jae-hyung
- **Business Type**  
Neo Information System
- **Year of Establishment**  
2000.
- **Homepage**  
<http://www.neoinfosys.com/>

## Key Accomplishments

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100% and 80% market shares in Korea's national driver's license test course and driving schools, respectively

Development of automatic scoring system for driver's license test, first ever in the world

Designated as a global small hidden champion company in 2018

## Perfecting Digital System throughout the Driver's License Test Process

Neo Information Systems (NIS), established in 1995, is the first company recognized as an automatic driver's license test scoring system company from the National Police Academy. The company is supplying the automatic scoring system by developing the system for fair and objective test, and it's rated as an efficient and stable system.

NIS is currently enjoying a matchless status in the Korean automatic scoring system. The firm's know-how has been verified in the domestic market for more than 20 years by adding its technological capabilities along with various domestic and international references.

NIS's solution realizes a perfect total process: theory test, yard test, and road test, as well as management. In the management process, all process ranging from registration of test to driver's license issuance is computerized. By diffusing the driving school affairs management system by which score can be immediately checked at driving school, the system is stably operated. The yard (function) test is designed to cope with situation that may occur on real roads, and scoring is fully automated without a supervisor riding together with the examinee. For road driving, the core of driver's license test, an objective evaluation system is pursued by adopting a road test system, the first ever in the world. The entire test process is carried out by digital technology, so reliability and fairness have been greatly enhanced.



## Successful entry into the Asian and Middle East markets

NIS's excellent solution recognized in Korea is exerting an enormous effect on developing overseas markets. NIS informed a successful overseas market entry by participating in the construction and system installation project of Iraqi Kurdistan National Driver's License Test Course in 2006. The company's technological capabilities were recognized by the Russian authorities by supplying its driver's license test system to eight regions in Russia in addition to Chelyabinsk in 2011.

Since then, NIS built Botswana Gaborone National Driver's License Test Course and installed its automatic scoring system in 2014. NIS also constructed the system in 17 driving schools in Dubai and UAE in 2017. The company showed good performance by taking part in the Rwanda's national driver's license test course in 2019.

### Neo Smart Driving test System



**Aroundview checking System**

어라운드 뷰 프로그램을 통해, 감독관은 실시간으로 통제실에서 차량 내 수험생의 상황을 모니터링 할 수 있고 모든 과정을 실시간으로 녹화하여 민원 발생 시 활용 가능



**Neo Score Pro: Smart Scoring**

장내기능시험 및 도로주행 시험의 자동채점 소프트웨어로, 수험생의 정보를 WiFi를 통해 전달 받아 주행 코스를 안내받고 실시간 점수 확인 가능

## **Exporting Solution to Singapore with the ICT Fund**

NIS showing outstanding achievements domestically and internationally could participate in the ICT Fund project to enter overseas markets. In 2021, NIS applied for the information and communication works business's overseas market entry project, so the company took part in the support program to win orders of overseas works projects from information and communication works companies.

Although NIS could not smoothly carry out overseas market entry recently due to the COVID-19 pandemic, the company posted remarkable achievements based on excellent technological capabilities and know-how built up thus far. NIS could sign an agreement to supply the automatic scoring system in the motor sector ordered by the Singapore Police Force through participation in the ICT Fund project. NIS could receive plenty of invisible help from the Singapore Police Force that was satisfied with NIS's outstanding product stability.

## **Various Government Fund Projects Need to be Propelled in the Future**

NIS said the success factor for entry into the Singaporean market was because of its participation in the ICT Fund project, which produced good results. The reason is that the government support project was greatly helpful in terms of network infrastructure construction. NIS signed an agreement to supply its system with demonstration solution's smooth operation, when they visited Singapore last year with the help of the government support project.

Based on the performance of the ICT Fund project, NIS plans to exert more effort in developing overseas markets. The company has an ambition to export the solution to all regions in Singapore through the supply of the solution to Singaporean national driver's license test course, and also expand exports throughout Asia by making Singapore as a bridge to enter the Asian markets. Centered on the Middle East and African regions where the company already entered, NIS plans to reinforce sales to the surrounding countries through vigorous consortium and partnership with public institutions.

NIS hopes that many small and medium businesses (SMBs) can enter overseas markets through the government's various support projects. As the ICT Fund Support project has become an opportunity to give confidence to many SMBs that they can enter overseas markets, the SMBs' competitiveness can increase massively through various support projects like this.

# TIME LINE

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- 2000.**  
Neo Information Systems Co., Ltd. established
  - 2001.**  
Appointed and succeeded as a driver's license automatic scoring system installation company  
(No. 1 approved company by the National Police Academy)
  - 2002.**  
Constructed an integrated information system scoring program for driver's license test courses nationwide (460 courses)
  - 2006.**  
Built Iraqi Kurdistan National Driver's License Course and installed the scoring system
  - 2011.**  
Installed the driver's test system in eight regions in addition to Russian Chelyabinsk
  - 2014.**  
Built Botswana Gaborone National Driver's License Test Course and installed the scoring system
  - 2017.**  
Installed driver's license test scoring system in 17 driving schools in Dubai, UAE
  - 2018.**  
Selected as a global small hidden champion company
  - 2019.**  
Constructed Rwanda's national driver's license test course

ZOOM IN - IV

# Enhancing the Quality of Life with AI Algorithms

DEEPNOID, Executive Vice President Taegyul Kim



DEEPNOID

## General Status

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- **Implementing Agency**  
National IT Industry Promotion Agency
- **Business Details**  
AI convergence illegal duplicate reading system

## Company Status

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- **CEO**  
Choi Woo-sik
- **Business Type**  
Software manufacturing (AI)
- **Year of Establishment**  
2008.
- **Homepage**  
<https://www.deepnoid.com/>

## Key Accomplishments

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Developed medical AI reading system and user-led AI development platform

Developed X-ray-based dangerous article reading system and security market development

Developed illegal duplicate reading system for real-time illegal duplicate reading

## Research on AI's Diverse Uses



Deepnoid, Inc. is a firm developing and operating Web/ Web solutions based on industrial/medical image AI (artificial intelligence) and coming up with PC software- based AI algorithms. Under the business philosophy of "Improvement of health and quality of life through AI," Deepnoid is operating the AI convergence illegal duplicate reading system construction business by obtaining and constructing AI learning/verification data. The company is performing R&D aimed at enhancing AI's utilization so that AI can help in the research, diagnosis, and treatment of a much wider range of diseases than now and offer practical help in the medical onsite work.

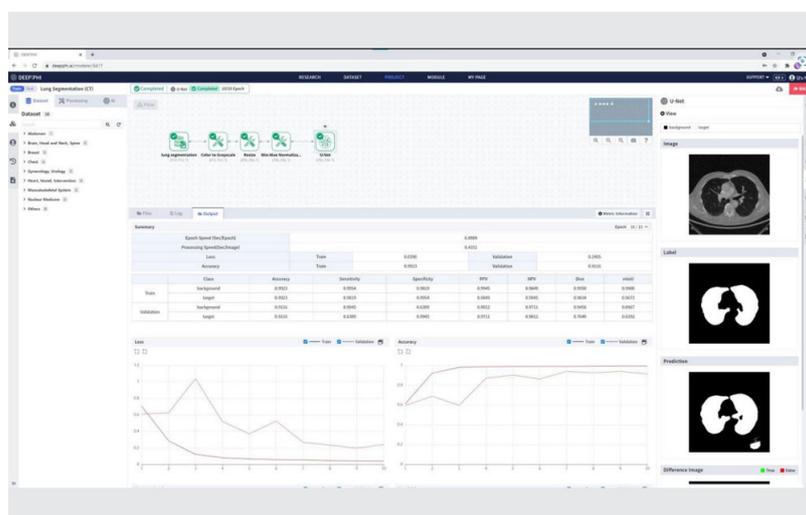
Deepnoid had its beginnings in the recognition of data importance in developing semiconductor software. The company shifted to the AI development business where in data-based research can be performed, possessing technologies in the X-ray, CT, and MRI data analysis and reading business area as well as the technologies to develop user-led AI development-feasible platforms.

# Deepnoid's Unique Technological Competence Proving Accuracy and Effectiveness

OBS Korea (former company name of Deepnoid) was established in February 2008, and its initial-stage business model was analyzing industrial equipment using IoT technology. Deepnoid combining power plant data knowledge with medical care was reborn as an AI expert company, changing its company name to its current name and focusing on medical AI in terms of business area.

If we look at the key performance of Deepnoid, the company conducted R&D of drawing similarity technology with AI-based images, achieving up to 97.9% accuracy and proving accuracy and effectiveness in illegal duplicate reading. This way, the company developed a system that enables similar design right search by measuring similarity from an illegal duplicate reading model. Through a satisfaction survey, the system effect was also proven by enhancing the reliability of the judgement results at tariff sites. Deepnoid has improved the AI model's performance through the generation of drawings data whose preemptive obtainment is difficult through camera by developing drawing image conversion AI algorithms to generate the original design register. The company could secure an AI model that is strong against environmental change beyond the limited preemptive environment by developing generative adversarial networks (GAN) to augment RGB image data.

Deepnoid concludes various work agreements in addition to technical special listing on the stock market through outstanding achievements, based on which it completed patent application and registration. The company is currently researching automatic learning algorithms, and it plans to protect the Korean industry and products distributed through Korean shopping malls by linking with the general public and relevant institutions through the opening of public data AI API to the public.



## Hoping to be the Cornerstone for AI Business Development

Deepnoid participated in the ICT Fund project to consolidate corporate competence and secure new business IP through business commercialization and R&D. The company took part in the AI-based illegal duplicate reading system construction and medical AI development (chest, spine, etc.) projects, and difficulties in the projects include scheduling and budgeting. The problems could be overcome through efforts to change budgets or solve problems via cyclical meetings with management led by the project manager and project supervisor for accurate use and execution of the budgets. After participating in the projects, Deepnoid could perform numerous patent-related jobs including six patent applications and three patent registrations. The company accomplished the establishment of internal development methodology through which users can conveniently access AI. Compared to the situation prior to participating in the ICT Fund project, the goals and scheduling of research could be clearly set, and changes in overall management capability and communication in the research projects could be realized. According to a source at Deepnoid, the achievements are the result of the efforts of many team members and supporting organizations rather than one person's capabilities. He added that the company wants to become a cornerstone for AI business development equipped with better corporate culture based on the achievements.

## Developing Excellent Products with New Challenge and Ideas

Deepnoid will endeavor for business-based commercialization using the ICT Fund project achievements. The company is determined to come up with a system suitable for the corporate organization culture through internal process establishment and development of various methods. Above all, Deepnoid puts priority on communication, noting that the company will grow through communication to collect many people's ideas in finding and solving problems instead of criticizing each other.

A piece of advice was offered: latecomers wishing to make good achievements should participate in the ICT Fund project with analytical thinking—through which diverse success factors can be analyzed—and with various problem-solving abilities. Deepnoid will carry out the development of excellent products by drawing ideas for new challenges as well as using the currently developed products' commercialization for AI and software.

# TIME LINE

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- 2008.**
    - Established Open Business Solutions Korea
    - Registered as a venture business
  - 2013.**
    - Signed an agreement for the development business of core technology in the machinery industry
  - 2016.**
    - Commissioned research on AI vertebral disease image reading
  - 2017.**
    - Selected for the lung disease AI image analysis and research project
    - Participated in the RSNA 2017 (Chicago, US) (RSNA: Radiological Society of North America)
  - 2018.**
    - Selected for the medical image reference data tool development and guideline production project
  - 2019.**
    - Chosen for the AI image automatic reading system project
  - 2020.**
    - Selected for the AI medical image reading service platform construction project
  - 2021.**
    - Performed the illegal duplicate reading system construction business