# **Mutecsoft** Introduction

2024. 2





# **Overview of the company**

Mutecsoft is a professional software development company based on data analysis that provides new value to customers through various data analysis. It has solutions that analyze sensor-based non-destructive analysis (MFL/RFECT/EMAT/etc), healthcare, and bio-big data, and is developing into AI-related solutions.

Corporate	MutecSoft Co., Ltd
CEO	Hong Jong jin
Date of establishment	February 1, 2010
Business sector	Companies specializing in AI and data analytics
Personnel	10 full-time employees and 8 freelancers (90% of development personnel)
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A representative Phone	02-588-3810
Homepage	http://www.mutecsoft.com
Email	contact@mutecsoft.com



## **Core Competencies**







- 2010. 02 Foundation
  - 2010. 04 : Participated in KT BMP WIPI Player development project.
  - 2010. 06 : Participated in LiMo promotion project(SKT, Samsung Electronics, Innoace) & government project (Week Agency ETRI).
  - 2010. 08 : Contract awarded for Samsung SDS Android WIFI Agent app.
  - 2010. 10 : Selected for WBS(World Best Software) national project.
- 2011
  - 2011. 01 : Contract for LGU+ Android terminal development.
  - 2011. 04 : Contract for porting major domestic Android apps overseas.
  - 2011.06 : Development of Android file sharing application.
  - 2011. 10 : Contract awarded for Samsung SDS iOS WIFI Agent app.
- 2012
  - 2012. 01 : Selected as a partner for M7 System Android Framework development.
  - 2012. 04 : Continued development in the 2nd year of the WBS (World Best Software) project.
- 2013
  - 2013. 04 : Continued development in the 3<sup>rd</sup> year of the WBS (World Best Software) project.
  - 2013. 06 : Development of SKT Easy Mode.
  - 2013. 10 : In development of LG U+ HDTV app.
  - 2013. 11 : Development of SKT iBeacon preliminary project.
- 2014
  - 2014. 04 : Development of SKT iBeacon management app.
  - 2014. 05 : Core library development completed for LG U+ strategic phone app.
  - 2014. 10 : Development of SKT CLINK project.
  - 2014. 11 : Development of hybrid app for Korea Centers for Disease Control and Prevention.
  - 2014. 12 : Development of LG U+ next-generation HDTV.
  - 2014. 12 : Delivery of mBeacon Client solution to Bit&Pulse.



#### 2015

- 2015. 01 : Developed LG U+ Video Portal.
- 2015. 02 : Continued with ETRI SS Convergence Project for the 3rd year.
- 2015. 03 : Participated in the development of Hanwha Eagles Smart Ball Park Baseball Stadium App (Location-based Beacon Service).
- 2015. 05 : Developed LG U+ Music Belling Project.
- 2015. 07 : Enhanced mobile app for Korea Centers for Disease Control and Prevention (Mobile Accessibility Certification, iOS/Android).
- 2015. 08 : Executed the Food and Drug Administration DNA Image Processing Project (JSP/Spring Framework/OpenCV).
- 2015. 09 : Contracted for Gas Corporation Robot Control and Non-destructive Testing Project (Data Analysis Task).
- 2015. 10 : Secured contract for Mobile Education Service Development by NAVER Foundation (CONNECT Foundation) (iOS/Android).

#### 2016년

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- 2016. 01 : Developed ETRI OIC IoTvity Contract (Arduino and Healthcare Sensor Integration).
- 2016. 02 : Continued with ETRI SS Convergence Project for the 4th year.
- 2016. 03 : Developed AMTelecom One M2M IoT Server/Client.
- 2016. 04 : Signed a contract for TCT Alcatel Souple Prime SKT-bound T-phone porting.
- 2016. 07 : Contracted for Gas Corporation Non-destructive Testing Operation and Analysis Program Enhancement (Data Analysis and Visualization).
- 2016. 08 : Developed Traditional Medicine Resources DNA Analysis System (Spring Framework).
- 2016. 10 : Developed support tools for ETRI Web Acceleration Application Development and WebD2D Application Development.
- 2017년
  - 2017. 02 : Signed a contract for ETRI Glass Project.
  - 2017. 03 : Developed AMTelecom One M2M IoT Big Data Processing.
  - 2017. 04 : Secured a project to develop precise inspection equipment and structural condition monitoring system for large-scale water supply pipelines.
  - 2017. 06 : Delivered location positioning solution for ETRI Glass IoT devices.
  - 2017. 08 : Improved 3rd year of development for Amtelecom Agriculture IoT-Web-App.
  - 2017. 10 : Ported and developed app for EOFlow Insulin Injection Medical Equipment on Android platform.
  - 2017. 11 : Developed web service for Public Safety Science and Technology.



- 2018
  - 2018.01: Secured 2nd-year project for developing precise inspection equipment and structural condition monitoring system for large-scale water supply pipelines.
  - 2018.02: Contracted for language learning feature development for mobile education service by NAVER Foundation (CONNECT Foundation) (iOS/Android).
  - 2018.03: Developed Bridge app for EOFlow insulin injection medical equipment.
  - 2018.04: Commenced 2nd-phase development of language learning feature for mobile education service by NAVER Foundation (CONNECT Foundation) (iOS/Android).
  - 2018.06: Won contract for building BioBank and Genome Information Management System for Veterans Hospital.
  - 2018.07: Contracted for development of Samsung SDS Samsung VDI app and SVPN PC app (VPN Client Solution).
  - 2018.10: Developed railway rail diagnostic system using EMAT for Korea Standards Research Institute and Korea Railroad Corporation.
  - 2018.12: Developed and maintained servers for KT AirmapKorea project.
- 2019
  - 2019.01: Secured 3rd-year project for developing precise inspection equipment and structural condition monitoring system for large-scale water supply pipelines.
  - 2019.02: Developed Bridge2 app for EOFlow insulin injection medical equipment (iOS/Android).
  - 2019.03: Continued development of railway rail diagnostic system using EMAT for Korea Standards Research Institute and Korea Railroad Corporation.
  - 2019.05: Developed EOMApp for EOFlow insulin injection medical equipment (iOS/Android).
  - 2019.06: Participated in iOS development for SKPlanet, SKT Smart IOT Home (https://www.sktsmarthome.com).
  - 2019.09: Developed HelloBell app for Apple Watch by HelloFactory.
  - 2019.10: Developed sensor data logging and verification software for Hyundai Autron (Registered as a Hyundai Autron [Affiliated with Hyundai Motor Group] Partner).



- 2020
  - 2020.01: Secured 4th-year project for developing precise inspection equipment and structural condition monitoring system for large-scale water supply pipelines.
  - 2020.03: Commenced 4th-phase development of language learning feature for mobile education service by NAVER Foundation (CONNECT Foundation) (iOS/Android).
  - 2020.04: Developed EOMApp for EOFlow insulin injection medical equipment (iOS/Android).
  - 2020.05: Established K-POP news and community site (https://catchk.net/).
  - 2020.09: Built user-friendly life logging data collection system for ETRI.
  - 2020.11: Developed AI model for predicting metal degradation time using ultrasonic inspection for Korea Institute of Nuclear Safety (KINS).
  - 2020.12: Completed pilot project for 5G remote collaboration between Dongtan Seong Sim Hospital and SK Planet (Director's Award, Minister of Welfare Award).
- 2021
  - 2021.01: Secured 5th-year project for developing precise inspection equipment and structural condition monitoring system for large-scale water supply pipelines.
  - 2021.01: Developed Narsha app for EOFlow insulin injection medical equipment (iOS/Android) FDA inspection and clinical trials.
  - 2021.02: Implemented 2nd phase of user-friendly life logging data collection system for ETRI.
  - 2021.02: Developed ultrasound analysis software for water resource technology diagnostic robots.
  - 2021.03: Continued 2nd phase of user-friendly life logging data collection system for ETRI.
  - 2021.03: Started 5th-phase development of language learning feature for mobile education service by NAVER Foundation (CONNECT Foundation) (iOS/Android).
  - 2021.06: Developed MK Bookclub community site and MK Lounge voice chat platform for Kim Mikyung TV.
  - 2021.07: Developed on-demand response transportation service app (integrated with map navigation).
  - 2021.07: Developed non-face-to-face food nutrition management service support program.
  - 2021.08: Developed AI-based crack evaluation software for Sungkyunkwan University.
  - 2021.09: Developed platform for rapid search and filtering of genetic diversity in rice varieties for National Academy of Agricultural Science.
  - 2021.11: Established integrated information platform for freshwater biodiversity for National Nakdong River Institute of Biological Resources.



- Year 2022
  - 2022.01: Development of COVID testing result service and app by SCL (Re)Seoul Medical Science Institute.
  - 2022.02: Development of EOMAap SDK for EOFlow's insulin delivery medical device (iOS/Android).
  - 2022.02: Received an order for the development of a corporate blockchain-based NFT POC.
  - 2022.04: Contract awarded for the development of Hubis SAM by the Korea Disease Control and Preventio Agency.
  - 2022.05: Contract awarded for a crop image analysis support system by the National Institute of Agricultural Sciences.
  - 2022.06: Contract awarded to Water Resources Technology Co., Ltd. For the Agilent 4300 Handheld FTIR signal analysis project.
  - 2022.06: Contract awarded for the 2022 fisheries research information system enhancement by the National Institute of Fisheries Science.
  - 2022.07: Contract with DIF Co., Ltd. For the development of an AI dataset of major Korean food images.
  - 2022.08: Contract for quality control and support for large-scale data transfer for the data collected from participants with rare diseases by the Korea Disease Control and Prevention Agency.
  - 2022.09: Third phase of the development of a user-friendly lifelogging data collection system by ETRI.
  - 2022.10: Recognition of a dedicated R&D department.
- Year 2023
  - 2023.02: Contract with KB Kookmin Bank for data analysis of Dongdaemun supply chain.
  - 2023.03: Contract for the development of LifeLogging system/server additional development with the Electronics and Telecommunications Research Institute (ETRI).
  - 2023.04: Selected for a three-year SME technology innovation project (Development of a non-face-to-face customized treatment service for diabetic patients based on a blood sugar prediction AI algorithm).
  - 2023.04: Selected for an AI voucher project (Introduction of an intelligent blood sugar prediction AI solution based on real user data from the country's first commercial insulin patch).
  - 2023.04: Stabilization contract for the development of EOPatch2.5 iOS for EOFlow's insulin delivery medical device.
  - 2023.06: Contract for website functionality improvement to enhance the utilization of the registration and preservation institution for marine bio-resources by Insilicogen.
  - 2023.09: Contract for the development of the DDC (Drug Delivery Controller) software by EOFlow.



# Implementation of a wearable artificial pancreas with an integrated AI solution



\* Accumulation of purchasing data on insulin patches held by the managing company + generation of multi-institutional hospital clinical data

\* Enhanced AI algorithm linked with multiple wearable devices



## **Excellence and Capability of AI Solutions**

### • MutecSoft DeepTrend & Forecast AI Solution Excellence

- A solution verified by application to prestigious domestic universities and key institutions (Hanyang University, Sungkyunkwan University, KB Financial, ETRI, etc.)
- The solution has been applied and verified in various embedded environments (extensive experience with PCs and mobile phones, etc.)
- Years of medical (Eoflow, Tongtansacred Heart Hospital, etc.) and bio (Korea Disease Control and Prevention Agency, Quarantine Headquarters, etc.) AI development and application"

Orderer	Development name	detail
ETRI	Neural network structure expression model converter technology(technology transfer)	-Learning data conversion technology and syntax parsing technology -Syntax analysis technology and data conversion technology
ETRI	Research Institute Life log collection and analysis	-Collection and analysis of life log data through mobile applications -Collect and analyze sensor data of wearable devices
KOGAS	Non-destructive gas pipeline big data collection and analysis	-Development of a non-destructive gas pipeline data preprocessing and analysis program (Software)
K-water	Non-destructive gas pipeline big data collection and analysis	-Development of non-destructive gas pipeline data preprocessing and analysis program (SW)
KORAIL	Railroad big data collection and analysis	-Development of high-speed ultrasonic data collection and analysis system for railway rail (HW and SW)
KORAIL/KRISS	Development of Railway Rail Big Data Collection and Analysis System	-Development of high-speed ultrasonic data collection and analysis system for railway rails (HW and SW)
KINS	Development of AI Prediction Model for Metal Movie Time Based on Ultrasound Inspection	<ul> <li>Possession of references applying 10 machine learning algorithms including QDA.</li> <li>AI model for damage and crack prediction based on predicting the progress of thermal degradation.</li> </ul>
KB Financial Group	Development of POC for AI Forecasting System for Credit Rating	-Evaluation AI model for Proof of Concept (POC) - Utilizing Amazon AWS for BIG Data, Data Warehouse, and AI.
Sungkyunkwan University	Development of Non-Destructive AI Signal Analysis Program	-Development of AI model for crack evaluation (SW), along with numerous projects related to signal analysis.
DIF Co., Ltd.	Development of Food Data Learning Sets	-Development of training and validation datasets for food-related data along with numerous projects related to signal analysis.
KT Corporation	Development of Intelligent Hazardous DBPOC	-Development of Proof of Concept (POC) for reducing harmful databases in a mobile network operator - utilizing a CNN-based morphological analyzer and AI model.



# Participation in AI-based harmful database project for domestic telecommunications companies

The goal is to establish a cyclical structure for acquiring a database by exploring and databasing continuously emerging sites while automatically adding harmful keywords, thus securing a harmful-based keyword database.

App development(Spider app & Verification app)

eceiving keywords from the ADMIN server and performing searches on behalf of it. Transmitting search results from Google, Bing, Baidu, and Yahoo Japan to the ADMIN server.

Developing an app for iOS to inquire about blocking status to the AS-IS server.

Customizing and developing apps based on the ones owned by O'Rap.

#### Crawling server

Implementing infinite crawling capabilities.

Planning and setting up a server for big data purposes. Establishing environments for development and deployment.

Setting up priorities for crawling and scheduling revisits. Installing servers in the USA, Singapore, and the UK (Amazon servers).

Establishing communication with the ADMIN server.

#### ADMIN server

Providing Seed URLs for the crawler to crawl. Supplying new search keywords to the Spider app. Managing Keyword lists, Seed URLs (CRUD operations). Setting parameters for crawling priority. Managing ML model files and transmitting themto the ML classifier. Viewing ML classifier results in order of high likelihood of false positives. Providing a Human Check administrator page for management.

#### Machine Learning

Generating training data.

Transmitting ML judgment results to the ADMIN server. Processing crawled data (ML input data). ML training based on keywords - Supervised Learning.

Transmitting ML judgments and judgment results to the ADMIN server.

Synchronizing ML model files (training result files).

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## KINS(Korea Institute of Nuclear Safety)

Developing a predictive model for estimating the time of metal degradation using ultrasonic inspection.

- Applied 10 machine learning models including Nearest Neighbors, Linear SVM, RBF SVM, Gaussian Process, Decision Tree, Random Forest, Neural Net, AdaBoost, Naive Bayes, and QDA.
- Selected the best machine learning model by synthesizing the above results and performed cross-validation (CV=10) to evaluate it.





<Expanding the dataset for learning>





<Cross-validation>

Model	Accuracy on training	Accuracy on test
Nearest Neighbors	1	1
Linear SVM	1	1
RBF SVM	1	0.180556
Gaussian Process	1	0.263889
Decision Tree	1	0.75
Random Forest	0.972222	0.722222
Neural Net	1	0.986111
AdaBoost	0.472222	0.402778
Naive Bayes	0.981481	0.861111
QDA	1	0.263889

표1. 실험 자료에 대한 기계학습 모델의 결과

## **HelloFactory Customer Store Big Data Analysis**

- Hello Factory utilizes various store data by integrating order information and other data received from various stores based on Hello Bell, and conducts diverse store data analysis.
- By utilizing tables according to time, analyzing turnover rates by menu, and extracting preferred menus according to season and time, restaurant efficiency can be maximized.







Mutecsoft

Development of non-destructive analysis and reporting software for gas companies, water resource companies, and railway companies utilizing EMAT/MFL/RFECT technologies.

Development of comprehensive software for operating, analyzing, and reporting non-destructive analysis robots.

- Robot operation and Integration technology
  - Design of network protocols(UDP/TCP) and engine development
  - High-capacity real-time data management and storage technology
- Robot data analysis technology
  - High-capacity data distributed processing and management technology
  - Support for multidimensional interactive 2D/3D analysis graphics tools
  - Development of various analysis interactive 2D/3D analysis graphics tools
- Report technology
  - Providing various graph and format output functions for analysis data
  - Providing Word and PDF output functions
- Signal preprocessing technology
  - Software for noise and error-free processing of signals
  - Provision of various filters

## **Mutecsoft** Development of non-destructive analysis and reporting software for gas companies, water resource companies, and railway companies utilizing EMAT/MFL/RFECT technologies.



<Main Screen>

## **Mutecsoft** Development of non-destructive analysis and reporting software for gas companies, water resource companies, and railway companies utilizing EMAT/MFL/RFECT technologies.



<Step-by-step Analysis Screen>

**Mutecsoft** Development of non-destructive analysis and reporting software for gas companies, water resource companies, and railway companies utilizing EMAT/MFL/RFECT technologies.



<Data Preprocessing Flowchart>





<Preprocessing Program Interface>

<Filtering Effect Example>