[MIRAIT ONE Corporation]
Implements Demonstration Experiment of AI Image Analysis of
SANRIKU FIREWORKS COMPETITION

Visualizing the status of visitors and parking areas, identifying issues in event operation

Major telecommunications construction company MIRAIT ONE Corporation (head office: Koto-ku, Tokyo; President and Chief Executive Officer: Toshiki Nakayama; "MIRAIT ONE") and FIREWORKS Co., Ltd. (address: Rikuzentakata-shi, Iwate; Representative Director and President: Katsuhiro Asama; "FIREWORKS") jointly implemented as demonstration experiment for the visualization of visitors and vehicles in parking areas using AI image analysis technology to deal with the issue of concentration of people and vehicles when the SANRIKU FIREWORKS COMPETITION was held by FIREWORKS in October 2023. As a result, we confirmed the effectiveness of visualization through analysis and observation of AI analysis conditions.

Recently, COVID-19 has subsided and there has been an increase in large events such as fireworks events and festivals. However, this has brought about a concentration of people entering and leaving venues, and congestion and the time required have frequently been picked up by news programs on television. This is a point that is a significant issue in event operation.
In this demonstration experiment, cameras were installed at two entrance gates and the roads leading to four parking areas, and the video was recorded. These videos were analyzed using the AI image analysis service of Intelligence Design Inc. to identify to number and attributes of people entering the venue, the number of vehicles headed toward parking areas and the idling times serving as an indicator of congestion, and the effect of these was verified.

As a result, it was confirmed that the status of visitors and entry into parking areas can be visualized, and that this provided valuable data enabling the identification of conventional operational issues dependent on experience and confirmation of the effect of measures for increasing the uniformity of the flow of people. Furthermore, in contrast to conventional counting of the number of people, it was confirmed that it also has the benefit of being able to visualize without operation. Furthermore, it was proven that efficiency of installation of cameras on site can be improved through simulation of the placement of cameras and the analysis subjects (people and vehicles) in 3D models for the realization of high-precision AI analysis by using the "Event DX: Setup Planning Service" utilizing digital twins.

In this demonstration experiment, the effectiveness of using AI image analysis technology to visualize

the number of people entering and idling times was confirmed, but attributes such as sex and age could not be accurately determined. Going forward the cause of this will be analyzed to conduct initiatives to improve the precision of determination of such attributes at the next event. In addition, analysis was performed using recorded video this time, real-time analysis will be performed in future to provide feedback on site in an initiative to realize smoother operation such as dynamic assignment of operational personnel and changing of reception areas. Furthermore, MIRAIT ONE aims to accumulate the expertise obtained in these events, and utilize it in services promoting event DX.

An overview of the demonstration experiment is provided in the attachment.

About MIRAIT ONE Corporation
MIRAIT ONE Corporation was launched on July 1, 2022 through the integration of MIRAIT Holdings Corporation, MIRAIT Corporation, and MIRAIT Technologies Corporation. MIRAIT ONE has established "co-creating an exciting future through challenges and technology" as its purpose (significance of existence), and is engaged in the resolution of issues faced by customers and society and regional revitalization by promoting initiatives such as urban development and regional development, corporate DX and GX, green business and global business based on the technical capability cultivated until now in telecommunications facility construction and the civil engineering business.

About FIREWORKS Co., Ltd.
FIREWORKS was born in Rikuzentakata, Iwate, which is in the Sanriku region, in April 2021 with the desire to inspire Japan's world-renowned fireworks industry and cheer up Japan from a local region through sustainable and advanced operation of fireworks festivals with a private company as the principal operator. FIREWORKS will provide support for hosting fireworks events   nationwide, the operation of companies hosting fireworks events and ticket sales, and conduct collaborative projects with major corporations utilizing fireworks content.

<About Intelligence Design Inc.>
Intelligence Design commenced business in May 2018 based on the theme of "socially implementing the latest technology centered on AI." Although AI-related technology has   become widely recognized by the general public, the social implementation of such technology has not progressed. To address this, with the belief that enabling simple and reasonable use of AI-related technology would contribute to the advancement of technology, Intelligence Design developed the "IDEA" series and is promoting UDX (urban digital transformation).

◆ Purpose of the demonstration experiment

To visualize conditions with AI image analysis to address the issue of concentration of people and vehicles when events are held, and verify whether this is effective for identifying issues and confirming solutions to issues.

◆ Period of the demonstration experiment

Event period: October 08, 2023

◆ Overview of implementation

In this demonstration experiment, cameras were installed at two entrance gates and the roads leading to four parking areas, and the video was recorded. These videos were analyzed using the AI image analysis service of Intelligence Design Inc. to identify to number and attributes of people entering the venue, the number of vehicles headed toward parking areas and the idling times serving as an indicator of congestion, and the effect of these was verified.

◆ Main survey results

(1) Confirmed the effectiveness of visualization of gate entrance conditions and identification of issues.

(i) Visualization of entrance conditions

As shown in Figure 1, by identifying people in the video and using people crossing the yellow line to count the number of people entering the venue, the distribution of people entering the venue could be visualized as shown in Figure 2. Furthermore, it was confirmed that people could be identified without any problems even at a night event in the form of a fireworks festival.

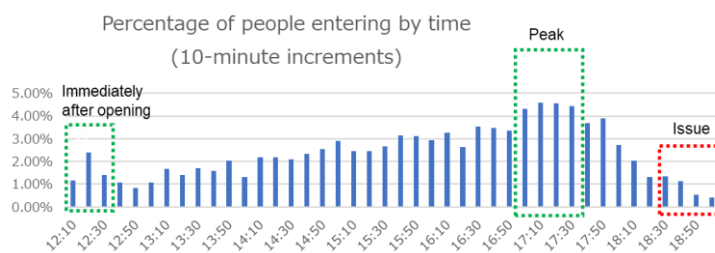Figure 1. Condition of analysis of people entering the venue   Figure 2.

(ii) Identification of issues

Visualization of entrance conditions enables the identification of two specifically quantified issues as shown below, and the effectiveness of visualization was confirmed.

Issue 1: Lower the peak of 4% or more people entering the venue to make it more uniform

Issue 2: Reduce the approximately 10% of people unable to enter the venue before the start of the fireworks

(2) Visualization of parking area entrance conditions and confirmation of effects of measures

(i) Visualization of entrance conditions

As shown in Figure 3, vehicles were identified in the video and vehicles crossing over the yellow line in to the venue were counted to visualize the status of vehicles entering the venue , and the time required to pass from right to left through the white box was used as idling time, with the length of this being used to determine the state of congestion, as shown in Figure 4.
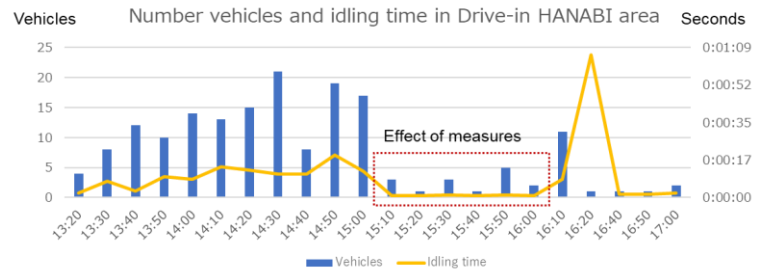

Figure 3

Figure 4

(ii) Confirmation of the effect of measures

For this event, social media was used to recommend that people park their cars by 3pm, and visualization showed that 65% completed parking, confirming that the measures were effective.

Idling time was over 10 seconds from 1:50pm to 3pm, and it was found that congestion occurred. Based on these conditions, the issue of improving this point along with the congestion that occurred from 4:10 pm to 4:30pm came up.

◆ Confirmation of effectiveness of 3D simulation

Appropriate placement of cameras is an essential element for increasing precision of AI image analysis, but actual event preparation periods are busy, and it is difficult to find time for adjustments. For this reason, adjustments were made in advance while closely aligning with FIREWORKS. This made it possible to install with predetermined conditions when installing, resulting in installation in a short amount of time