Summary of SIP-ADUS project (FY2015)

Name of the project	Development and verification of construction technology of driving video recognition database
Responsible Organization	Japan Automobile Research Institute

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Object of the Project

＜Objective＞
This project establishes the technology for building the image database which contributes efficient development and evaluation of the circumference environment recognition technology which is useful for an automated driving

＜Activity＞
• To equip 5 high-resolution cameras and 5 laser radars to the front, rear, left and right of the vehicle, and passenger compartment in the measuring vehicle. They are also equipped with a GPS and navigation, etc.. These sensor information (distance, position) and vehicles information, (GPS data, the degree of acceleration and deceleration, etc.), are collected together.
• To develop the Automated technologies of the work of filtering and tagging to the collected video data .
• To develop an efficient low-cost compression accumulated technology and search technology of ultra-large-scale video database.

Project Summary

Below mentioned development targets were achieved.
(1) Development of data collection plan
・ developed the driving plan in Japan and collected the video data of 1,347 hour (urban area:Tokyo,Kanagawa,Saitama,Aichi,Osaka,Hyougo sightseeing spot:kyoto,kakakura,Takayama cold region: Hokkaido, highway, regional road)
・developed the driving plan in US and collected the image data of 135 hour (New York, Miami: unique moving object (e.g. Segway) with pedestrian were filmed)
(2) Improvement of data collection vehicle
・improved video quality to be collected in the night and waterproof function.
・developed scene information collection tool using verbal information as a activation trigger and improved operation quality of driving video collecting .
(3) Development of tagging technology
・scene abstraction function: developed automated scene abstraction and JPEG conversion with batch file
・automated tagging function: executed automated tagging to more than 2,000 scenes describing the object with XML format
・manual tagging function: developed manual tagging tool with GUI and complement tagging function of in-between frame
(4) accumulation of driving image data
・Accumulated 4.2 Pata Byte video data (RAW format)
(5) Modification of auto-tagging data
・created 360,000 flame true data having property information from auto-tagging data, by developed manual tagging tool
(6) Development of real-time lossless compression technology
・developed real-time lossless compression technology achieving 46% compression ratio in average (min. 40%, max. 51%, target: 50% or less) with normal PC spec.
(7) Development of searching database
・developed data logical structure using created data and expected use sinario.
(8) Development of evaluation method of driving video recognition database
・developed evaluation method and executed following database evaluation as a trial, ① Database as a recognition algorism performance evaluation,
② Database as object detection method learning, ③ Database characteristic evaluation using statistical method

Future plan

(1) Development of data collection plan
・Classify accumulated driving video database into 27 standard scenes, analyze/evaluate quality and quantity of scenes, and develop additional driving plan to collect necessary data additionally.
(2) Development of tagging technology
・Improve the performance such as detection ratio by better algorism and processing time reduction
(3) Modification of auto-tagging data
・created additional true data from remaining auto-tagging data
(4) Development of searching database
・Develop searching method for statistical scene analysis and video data abstraction search
(5) Development of evaluation method of driving video recognition database
・Execute total evaluation of driving video recognition database using developed three evaluation method
・Execute system and performance evaluation driving video recognition database from OEM, supplier and research institute view points