

Attentive Townvehicle

Environment-Aware Personal Intelligent Vehicles

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<http://www.nagao.nuie.nagoya-u.ac.jp/projects/at.xml>

Objectives of AT Project

- Information and Physical Infrastructures including Personal Intelligent Vehicles
- Human-Centered Platform of Integration of the Real World and Cyberspace
- Essential Tools for Safe and Comfortable Barrier-Free Urban Lives

Current Research Focuses

Collision Avoidance Control with AT-Server Communication

Web-based Reliving Support Services

Intuitive and Attentive Maneuvering Interface



Interaction between Vehicles

Cyberspace

Information Infrastructure Intelligent Group Coordination
 Communication with Rich Context Reliving Support
 Seamless Connection with the Global Network Intelligent Image Communication
 Optimal Route Selection Route Negotiation Cooperative Behavior
 Wireless Adhoc Networking Collision Avoidance

Personal Intelligent Vehicles

- Vehicles Adapting Human and Environment -

Augmented Reality

Physical Infrastructure

Autonomy of Vehicles

Obstacle Avoidance
 (Semi-)Autonomous Behavior



GPS/DGPS
 RFID
 Field Test Foundation
 Sensor Fusion
 Multimodal Signal Processing

Real World

Recognition of Surroundings

Interaction with Physical Environment

Emergency Control Fingerprint Recognition Archives of Audio, Visual, and Sensor Data
 Personalization for Driving Settings Presentation of Environmental Information
 Audio-Visual Guidance Analysis and Support of Human Behavior
 Multimodal Interfaces

Intention Recognition
 Human Behavior Prediction

Human

Attentive Interfaces

Interaction with Human



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Environment-Aware Personal Intelligent Vehicles

Research Achievements

AT version 8



Basic Mechanism

- Intuitive Operability
- Adaptive Body Transformation
- Video Recording using a Networked Camera
- Obstacle Detection by Ultrasonic Sensors and Bumper PSD Sensors
- Collection of Various Driving Data

New Devices

- Step Wheel
- PSD-IR Array

Step Wheel

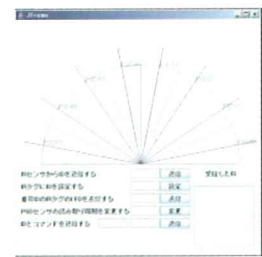
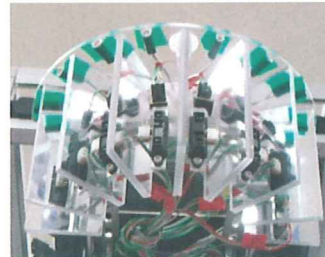
Maneuvering Interface based on Driver's Weight Shift



- Calculation of Barycentric Position with 8 Pressure Sensors
- Control of Accelerated Velocity using Pressure Bias
- Progress of Steering Position DOF
- Boarding/Non-Boarding State Automatic Identification

PSD-IR Array

Near Field Communication Module with IR Transceivers and PSD Sensors



8 IR Transceivers and PSD Sensors included

Integration of Near Field Communication (IR-ID Data Exchange, Command Sending/Receiving, etc.) and AT-Object Distance Measurement

Collision Avoidance Control with AT-Server Communication

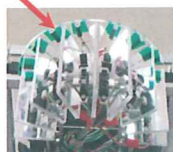
Surrounding Information Retrieval
Neighborhood Establishment
Nearby ATs

Information Server

Communication between multiple ATs mediated by the Server
Message Exchanging
Request for Various Information

Route Negotiation with Near Field Communication

Obstacle Detection by Ultrasonic Sensors and Bumper PSD Sensors



Web-based Reliving Support Services



Recording and Upload Video with AT Control Data to the Server

Sharing User Experiences
Browsing System
Retrieval System

Playing Other Person's Behavior Data



Location-Aware Information Browsing using Google Maps API

Access User Profile
Message Exchanging