

3次元計測/センサフュージョン/ Three Dimension Measurement/Sensor Fusion

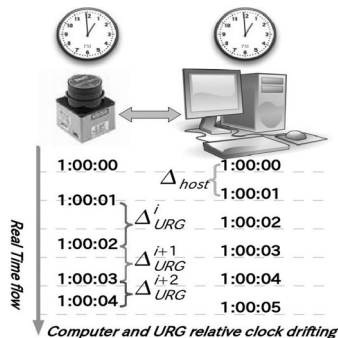
1P1-K05

CORE TIME
14:00 ~ 14:45

Time Synchronization between SOKUIKI Sensor and Host Computer using Timestamps

Alexander Carballo, Yoshitaka Hara, Hirohiko Kawata, Akihisa Ohya, Shin'ichi Yuta(University of Tsukuba), Tomoaki Yoshida

Time synchronization is crucial in several areas, however clocks at end systems are rarely synchronized and often running at different speeds, therefore reducing the accuracy of sensor readings. The new SCIP2.0 protocol of Sokuiki sensor allows acquiring time values by timestamping range readings. Our work consists in a method for time synchronization with clock skew estimation, between a Sokuiki sensor and a host computer.



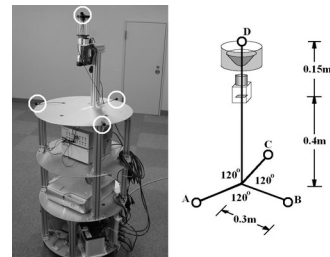
1P1-K06

CORE TIME
14:45 ~ 15:30

Audio-Visual Speaker Detection in Human-Robot Interaction

Thatsaphan Suwannathat, Jun-ichi Imai, Masahide Kaneko(The University of Electro-Communications)

We propose the omni-directional estimation method of speaker's position using the combination of audio and visual information. Estimation of the position of the sound is carried out to calculate the difference of arrival time from sound source to multi-channel microphones. The robust human template matching on the omni-directional image is employed to combine the result of sound source estimation to realize a highly accurate estimation of speaker's location.



1P1-K07

CORE TIME
14:00 ~ 14:45

屋外環境下で用いる自律移動システムに関する研究 第48報 三次元環境モデルと単眼カメラを用いた道路標識位置計測に関する研究

A Study of Autonomous Mobile System

in Outdoor Environment

Part48 A Study of Road Sign Localization Using a Single Camera and 3D Environmental Model

村石隆介, 石川貴一郎 (早稲田大), 瀧口純一, 島嘉宏 (三菱電機), 天野嘉春, 橋詰匠 (早稲田大) Ryusuke Muraishi, Kichiro Ishikawa(Waseda Univ), Junichi Takiguchi, Yoshihiro Shima(Mitsubishi Electric Corp.), Yoshiharu Amano, Takumi Hashizume(Waseda Univ)

This paper describes road sign localization using a single camera and 3D environmental model. The proposed Mobile Mapping System (MMS) performs highly accurate positioning and posture performance. In road sign measurement environment, there are many kinds of objects near a road sign which cause serious misidentification. The proposed localization method utilizes different LOS images to identify collect road sign's corresponding laser data to improve localization accuracy, implemented, and its new features are presented.



1P1-L01

CORE TIME
14:00 ~ 14:45

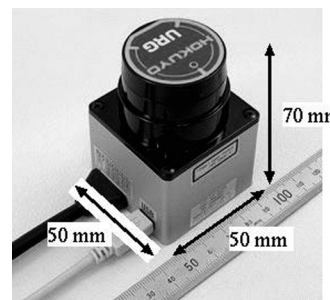
使い易い三次元測域センサのインタフェースを目指して コマンドシステム策定のための研究会活動

Towards a Good Sensor Command Interface for Next Generation 3D SOKUIKI Sensor

Activity of the Special Interest Group on Command System

三次元測域センサコマンドシステム研究会、油田信一 (筑波大)、梅田和昇 (中央大)、飯島純一 (明星大)、藤瀬弘樹 (総合警備保障)、桃井康行 (日立製作所)、塚田敏彦 (豊田中央研究所)、西沢俊広 (NEC)、村井亮介 (松下電工)、吉見卓 (東芝)、林浩一郎 (石川島播磨重工業)、嶋地直広 (北陽電機)、吉田智章 (千葉工大)、永谷圭司、大野和則 (東北大)、前山祥一 (岡山大)、大矢晃久、川田浩彦、原祥堯 (筑波大) SIG, YUTA Shin'ichi (Univ. of Tsukuba), UMEMA Kazunori (Chuo Univ), IJIJIMA Junichi (Meisei Univ), FUJISE Hiroki (ALSOK Co., Ltd.), MOMOI Yasuyuki (Hitachi, Ltd.), TSUKADA Toshihiko (Toyota Central R&D Labs., Inc.), NISHIZAWA Toshihiro (NEC Corp.), MURAI Ryosuke (Matsushita Electric Works, Ltd.), YOSHIMI Takashi (Toshiba Corp.), HAYASHI Koichiro (IHI Co., Ltd.), SHIMAJI Naohiro (Hokuyo Automatic Co., Ltd.), YOSHIDA Tomoaki (Chiba Inst. of Tech.), NAGATANI Keiji, OHNO Kazunori (Tohoku Univ), MAEYAMA Shoichi (Okayama Univ), OHYA Akihisa, KAWATA Hirohiko, HARA Yoshitaka (Univ. of Tsukuba)

We have meetings for the discussion on the function and interface of next generation area sensor (SOKUIKI sensor). The purpose of these meetings is to discuss on how to use the area sensor for service robots and expected specifications of the next generation sensor. The basic designs of the command interface for such a kind of sensor are also discussed. This paper reports the activity of our group, considered enough to measure examinees' skill for now. In this paper, we propose a method to measure examinees' skill taking putt swing for example. We got motion data using a motion capture system. And we analyzed the motion data.



1P1-L02

CORE TIME
14:45 ~ 15:30

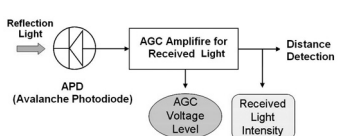
測域センサの受光強度の応用に関する研究 AGC 情報を用いた強度の復元

A Study on Received Light Intensity of SOKUIKI Sensor

Restoration of Intensity Using Data of AGC

宮地晃平, 原祥堯, 川田浩彦, 大矢晃久, 油田信一 (筑波大) Kohei MIYACHI, Yoshitaka HARA, Hirohiko KAWATA, Akihisa OHYA, Shin'ichi YUTA(Univ. of Tsukuba)

SOKUIKI sensor "URG-04LX" can take distances by measurement. And by using special mode of the firmware, Received Light Intensity and AGC Voltage Level can be obtained. This paper describes a method to estimate Gray Level of scanned objects by using Received Light Intensity, and the method uses AGC Voltage Level to accurate estimation.



1P1-L03

CORE TIME
14:00 ~ 14:45

可変焦点ミラーを用いたはんだボール列 実時間 3次元計測システム

Real-time System for Measuring Three-dimensional Shape of Solder Bump Array

田井悠, 石井明 (立命館大)、光藤淳 (キャノンマシナリー) Haruka Tai, Akira Ishii(Ritsumei univ.), Jun Mitsudo(Canon Machinery)

This paper describes a real-time system for measuring the three-dimensional shape of solder bumps arrayed on an LSI chip-size-package (CSP) board presented for inspection based on the shape-from-focus technique. It used a copper-alloy mirror deformed by a piezoelectric actuator as a varifocal mirror to build a simple yet fast focusing-mechanism. A practical measuring speed of 1.7 s for a small CSP (4 x 4 mm²) was achieved by incorporating an exclusive FPGA processor.

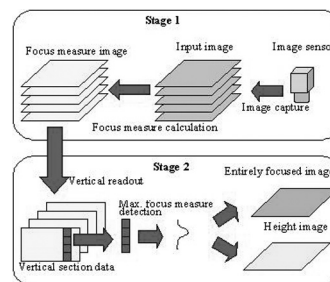


Fig. 1 Flow of height data detection.

1A1 (11日-午前1) 1A2 (11日-午前2) 1P1 (11日-午後1) 2A1 (12日-午前1) 2A2 (12日-午前2) 2P1 (12日-午後1)

3次元計測／センサフュージョン／ Three Dimension Measurement/Sensor Fusion

1P1-M01

CORE TIME
14:00 ~ 14:45

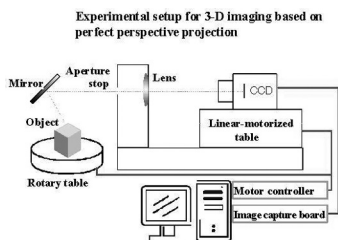
完全透視投影型合焦点法による全周物体計測

Measurement of whole object shape by focus based on perfect perspective projection

呉韜、石井明 (立命館大)

Tao Wu(Ritsumeikan univ.), Akira Ishii(Ritsumeikan Univ.)

An imaging system with a focusing mechanism based on perfect perspective projection was constructed to achieve precise measurement of shapes in close range based on the shape from focus technique. An object was rotated to be observed from all directions. A method of identifying the rotation axis was presented to ensure that range data obtained at different observation angles could be combined at a precision of 0.01 mm.



1P1-M02

CORE TIME
14:45 ~ 15:30

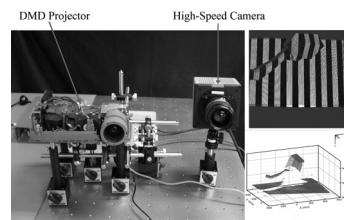
高速プロジェクタを用いた 3,000 フレーム毎秒の三次元画像計測システムの開発

Development of a 3,000-fps 3D Imaging System Using a High-Speed Projector

武井文治、鏡慎吾、橋本浩一 (東北大)

Joji Takei, Shingo Kagami, Koichi Hashimoto(Tohoku univ.)

A high frame rate 3D imaging system based on structural light projection. Over 6,000 frames/s operation of a DMD (Digital Micromirror Device) projector and a high-speed camera. Frame-by-frame 3D image measurement algorithms of detecting and tracking the projected light patterns. Experimental results of the 3D imaging at 3,350 frames/s and the effectiveness of the proposed algorithms are shown.



1P1-M03

CORE TIME
14:00 ~ 14:45

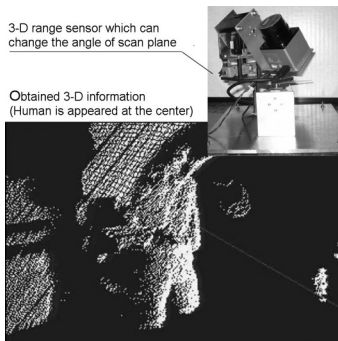
二次元スキャン面の角度を変更可能な三次元測域センサの開発

Development of 3-D range sensor which can change the angle of its 2-D scan plane

吉田和哉、永谷圭司、徳永直木 (東北大)

KAZUYA YOSHIDA, KEIJI NAGATANI, NAOKI TOKUNAGA(Tohoku Univ.)

To obtain 3-D environment information by sensor, one of conventional methods is to rotate two-dimensional laser-range-finder. However, the method has disadvantages of slow-scan speed and existence of limit point. To improve them, we propose a novel scanning method, which a scanning plane is not perpendicular to revolving plane of the sensor. To verify the validity of the method, we performed basic experiments using three-dimensional range sensor whose scanning angle can be changed.



1A1 (11日-午前1)

1A2 (11日-午前2)

1P1 (11日-午後1)

2A1 (12日-午前1)

2A2 (12日-午前2)

2P1 (12日-午後1)