LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Virtual reality simulation of fire fighting robot dynamic and motion		
Jumlah Penulis	:	3 orang (**Joga D. Setiawan**, M. Subchan, A. Budiyono)		
Status Pengusul	:	Penulis ke-1		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Studies in Computational Intelligence
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		c. Vol, No., Bln Thn	:	Volume 192, 2009
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		e. DOI artikel (jika ada)	:	10.1007/978-3-642-00264-9_12
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2. **Ruang lingkup dan kedalaman pembahasan:**
   Artikel ini mengusulkan tentang pengembangan algoritme pada firefighting robot untuk memadamkan api. Hasil dan pembahasan telah disajikan dengan runtut dan detail.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
   Artikel ini mempunyai tingkat kemutakhiran yang sudah cukup baik ditinjau dari segi pengembangan algoritme dan simulasi untuk memadamkan api yang memerlukan waktu yang relative pendek. Hasil dari algoritme yang diterapkan pada fire fighting robot untuk memadamkan api dapat dijadikan tool oleh mahasiswa untuk Menyusun strategi yang optimum untuk memadamkan api dengan waktu yang relative cepat.
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   Artikel dipublikasikan pada penerbit yang berkualitas yaitu Springer. Artikel ini juga terindeks oleh Scopus.

Semarang, 1 Juni 2021
Reviewer 1

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Catatan Penilaian artikel oleh Reviewer :

1. **Kesesuaian dan kelengkapan unsur isi jurnal:**
   Materi yang ditulis dalam artikel sudah sesuai dengan minat dan bidang keahlian dari pengusul yaitu robotika. Penulisan artikel sudah lengkap dan mengikuti template dari penerbit Springer.
2. **Ruang lingkup dan kedalaman pembahasan:**
   Artikel membahas tentang algoritme dan simulasi untuk strategi yang terbaik pada firefighting robot. Hasil studi dibahas dengan lengkap dalam bentuk plot dan mudah untuk dipahami. Simulasi disajikan dalam bentuk 3D menggunakan virtual reality dalam MATLAB/Simulink.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
   Artikel yang diusulkan sudah mempunyai tingkat novelty yang baik. Hasil dari penelitian berhasil menunjukkan algoritme yang dikembangkan dapat meningkatkan efisiensi dan strategi yang optimum. Hasil studi dari artikel ini dapat dijadikan sebagai alat/metode pembelajaran bagi mahasiswa yang berlomba di firefighting robot untuk Menyusun strategi yang optimum.
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Virtual reality simulation of fire fighting robot dynamic and motion

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Save all to author list

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Abstract

This paper presents one approach in designing a Fire Fighting Robot which has been contested annually in a robotic student competition in many countries following the rules initiated at the Trinity College. The approach makes use of computer simulation and animation in a virtual reality environment. In the simulation , the amount of time, starting from home until the flame is destroyed, can be confirmed. The efficacy of algorithms and parameter values employed can be easily evaluated. Rather than spending time building the real robot in a trial and error fashion, now students can explore more variation of algorithm, parameter and sensor-actuator configuration in the early stage of design. Besides providing additional excitement during learning process and enhancing students

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Virtual Reality Simulation of Fire Fighting Robot Dynamic and Motion

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Abstract. This paper presents one approach in designing a Fire Fighting Robot which has been contested annually in a robotic student competition in many countries following the rules initiated at the Trinity College. The approach makes use of computer simulation and animation in a virtual reality environment. In the simulation, the amount of time, starting from home until the flame is destroyed, can be confirmed. The efficacy of algorithms and parameter values employed can be easily evaluated. Rather than spending time building the real robot in a trial and error fashion, now students can explore more variation of algorithm, parameter and sensor-actuator configuration in the early stage of design. Besides providing additional excitement during learning process and enhancing students understanding to the engineering aspects of the design, this approach could become a useful tool to increase the chance of winning the contest.

1 Introduction

Fire fighting robot (FFR) is an autonomous ground vehicle that has been popularly known to engineering students around the world. It has been contested annually in a robotic student competition in many countries following the rules initiated at the Trinity College, USA. The contest requires advanced mechatronics technology and knowledge using a handy robot as an educational tool [2].

The task of an FFR is to simulate a real-world operation of an autonomous robot performing a fire protection function in a real house. Starting from a home noted by "H" circle, an FFR has to find its way through an arena that represents a model house, find a lit candle that represents a fire in the house, extinguish the fire in the shortest time, and return to its home within a specified time.

This paper presents one approach in designing an FFR using computer animation in a virtual reality environment including one configuration example that consists of the mechanical design of the vehicle, the choice and arrangement of sensors and actuators, and the artificial intelligence of its controller.

The FFR has been developed to meet contest rules in [2]. As shown in Fig. 1, it is designed as a tracked vehicle with differential drive controlled by a unique algorithm embedded in its microcontroller. The control system the FFR shown in Fig. 2 will be mathematically modeled including its environment, which is the arena used in the competition shown in Fig 3.

A. Budiyono, B. Riyanto, E. Joelianto (Eds.): Intel. Unmanned Systems, SCI 192, pp. 191 – 203.
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Image Processing in Optical Guidance for Autonomous Landing of Lunar Probe

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Abstract. Because of the communication delay between earth and moon, the GNC technology of lunar probe is becoming more important than ever. Current navigation technology is not able to provide precise motion estimation for probe landing control system Computer vision offers a new approach to solve this problem. In this paper, the authors introduce an image process algorithm of computer vision navigation for autonomous landing of lunar probe. The purpose of the algorithm is to detect and track feature points which are factors of navigation. Firstly, fixation areas are detected as sub-images and matched. Secondly, feature points are extracted from sub-images and tracked. Computer simulation demonstrates the result of algorithm takes less computation and fulfils requests of navigation algorithm.

Keywords: Fixation Area, Feature Point, Template Match, FPs Tracking.

1 Introduction

In paper[1], the status of China's deep space exploration plan is introduced including CE-1 lunar orbiter, the china's subsequent Lunar Exploration Program. It is an important purpose in the second stage of China lunar exploration to land accurately of probe on the moon's surface.

The guidance-navigation-control(GNC) technology of moon probe is becoming more important than ever. Because of the communication delay induced by the large distances between the earth and moon, human kinds are hardly able to guide probe to landing safely on the moon. Probe will have to use on-board sensors and algorithms. However, current navigation technology can't provide precision motion estimation for

[*] Ding Meng received B.E. and M.E degrees in School of Automatic Engineering of NanJing University of Aeronautics and Astronautics in 2003 and 2006. He is cuurently working toward Ph.D. in the same university. His interests are Computer Vision and Pattern Classification. Phone: 86-025-84890902.

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A. Budiyono, B. Riyanto, E. Joelianto (Eds.): Intel. Unmanned Systems, SCI 192, pp. 1 – 10.
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Discontinuous Control and Backstepping Method for the Underactuated Control of VTOL Aerial Robots with Four Rotors

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Kensaku Okamura[1], and Rafiuddin Syam[2]

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Abstract. A control strategy is proposed here for four-rotor vertical take-off and landing (VTOL) aerial robot called X4-flyer. Since the X4-flyer has underactuated and nonholonomic features, a kinematics control law is first derived using Astolfi's discontinuous control. A backstepping method that is one of adaptive control methods based on Lyapunov methods, then provides the kinematic based inputs, to construct the torque control of X4-flyer. Finally, computer simulations are given to demonstrate the effectiveness of our approach.

1 Introduction

Unmanned vehicles are important when it comes to performing a desired task in a dangerous and/or inaccessible environment. Unmanned indoor and outdoor mobile robots have been successfully used for some decades. More recently, a growing interest in unmanned aerial vehicles (UAVs) has been shown among the research community. Being able to design a vertical takeoff and landing (VTOL)-UAV, which is highly maneuverable and extremely stable, is an important contribution to the field of aerial robotics since potential applications are tremendous (e.g., high buildings and monuments investigation, rescue missions, film making, etc.).

In practical applications, the position in space of the UAV is generally controlled by an operator through a remote-control system using a visual feedback from an onboard camera, while the attitude is automatically stabilized via an onboard controller. The attitude controller is an important feature since it allows the vehicle to maintain a desired orientation and, hence, prevents the vehicle from flipping over and crashing when the pilot performs the desired maneuvers.

Recently, in Europe, USA, and Australia, the study on VTOL type aerial robot attracts the attention of researchers, in which the robot is called "Draganflyer," "Quattrocopter," "X-4 Flyer," or "Quadrotor" and has four rotors in general [1], [2], [3].

As one reason for this research trend, the authors had pointed out [4] that such VTOL aerial robots with four rotors outperform in controllability and maneuverability over other VTOL vehicles with different rotor allocations, when controlling the rotor type VTOL vehicle by only increasing and decreasing the rotational speed of each rotor.

A. Budiyono, B. Riyanto, E. Joelianto (Eds.): Intel. Unmanned Systems, SCI 192, pp. 83–100.
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