الايـة

بسم الله الرحمن الرحيم

قال تعالي

هُوَ الَّذِي يُصَوِّرُكُمْ فِي الأَرْحَامِ كَيْفَ يَشَاء لاَ إِلَـهَ إِلاَّ هُوَ الْعَزِيزُ﴿

﴾الْحَكِيمُ

صدق الله العظيم

﴾ صورة ال عمران الاية﴿6

DEDICATION

TO

MY PARENTS, THE POWER OF MY LIFE THEY ARE ALLWAYS CLOSE TO ME

MY BROTHERS AND MY SISTERS, WHO ARE LIVE TO GIVE ME LIFE

MY FAMILY

FRIENDs

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First of all, All praises and glory be to Allah (S.W.A) lord of the world, the most beneficent, and the most merciful. My His blessing be upon His prophet Mohammad (S.W.A) and all those prophets befor Him.

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Abstract

The basic idea of this project is to design and implement video tracking system based on camera field of view (*CFOV*), Otsu's method was used to detect targets such as vehicles and people. Whereas most algorithms were spooned a lot of time to execute the process, we have developed the algorithms to achieve it in a little time. The histogram projection and adaptive gate template matching (AGTM) was used in both directional to get the target from search region, which is robust to various light conditions in *CCD* images and saves computation time.

Our algorithms based on background subtraction, motion detection and normalize cross correlation operation from a series of sequential images can estimate the motion vector. Camera field of view (*CFOV*) was determined and calibrated to find the relation between real distance and image distance.

The digital signal processor board (DSP F1228) was designed to achieve the algorithm of controller. Also the system was interfaced with computer through serial port RS232, the three byte protocol was used to transfer command via RS232 to system.
The system has tow degrees of freedom so U-shape platform was designed to mount the CCD camera and stepper motor.
The system was tested by measuring the real position of object in the lab and compares it with the result of computed one. So these results are promising to develop the system in future.

المستخلص

ان الفكرة الاساسية لهذا البحث هي تصميم وتنفيذ منظومة تتبع بصري باعتماد مجال الرؤية للكاميرا (**CFOV**) حيث استخدمت طريقة ***Otsu*** للكشف عن الاهداف مثل العربات اوالاشخاص.
في هذا البحث تم تطويرخوارزميات التتبع البصري وتنفيذها علي الصورة في اقل زمن ممكن وذلك عن طريق الاسقاط الافقي والراسي وطريقة (AGTM) لمنطقة البحث عن الهدف(*Search Window*) في حين أن معظم خوارزميات التتبع البصري تأخذ كثير من الوقت لتنفيذ هذه العملية .
نفذت ثلاثة خوارزميات من خوارزميات التتبع البصري(*Background Subtraction,* *Motion Detection and Normalize Cross Correlation*) علي سلسلة من الصور المتعاقبة لتحديد موقع الهدف المتحرك.
تم تحديد ومعايرة مجال رؤيةالكاميرا ((CFOVلإيجاد العلاقة بين المسافة التي يقطعها الهدف في الصورة والمسافة الحقيقية.
تم تصميم الدائرة الالكترونية للمعالج (DSP-F1228) لتنفيذ خوارزمية التحكم, كذلك تم ربط المنظومة مع الحاسب خلال منفذ RS232, استخدم بروتكول 3byte لنقل الاوامر الي المنظومة خلاص منفذ RS232.
للمنظومة درجتان حريتان للحركة تم تصميم المنظومة علي شكل U-shape لحمل الكاميرا والموتورات' ومن ثم تم تصميم هذا الشكل لجعل المنظومة ثابته.

ومن ثم اختبرت المنظومة معمليا من خلال قياس الموقع الحقيقي للهدف ومقارنة ذلك مع النتائج المتحصل عليها ,حيث تم الحصول علي نتائج متطابقة الي حد بعيد وتعتبر هذه النتائج واعدة لتطويرالمنظومة في المستقبل.

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Table of abbreviations and parameters name

Objective name	Description
NTSC	National television System Committee
PAL	Phase Alternating Line
SECAM	Sequential Color with A memory
fps	Frame rate per second(PAL=25fps,NTSC=30fps)
spr	number of steps per round
θ	Motor position angle
f_t	Frequency of motor
∂t	Delay time of pulse
α	motor step angle
θ_{Tilt}	Elevation angle (Tilt angle)
θ_{pan}	Azimuth angle (Pan angle)
ω	Motor speed
f	Focal length
rpm	Round per minute
α_{FOV}	Camera field of view
θ_{VFOV}	Vertical field of view

σ_{TR}	Vertical pixel ratio
σ_{PR}	Horizontal pixel ratio
θ_{HFOV}	Horizontal field of view
α	Motor steps