



# Development of Monitoring System of a Wheelchair Using a Quadrotor

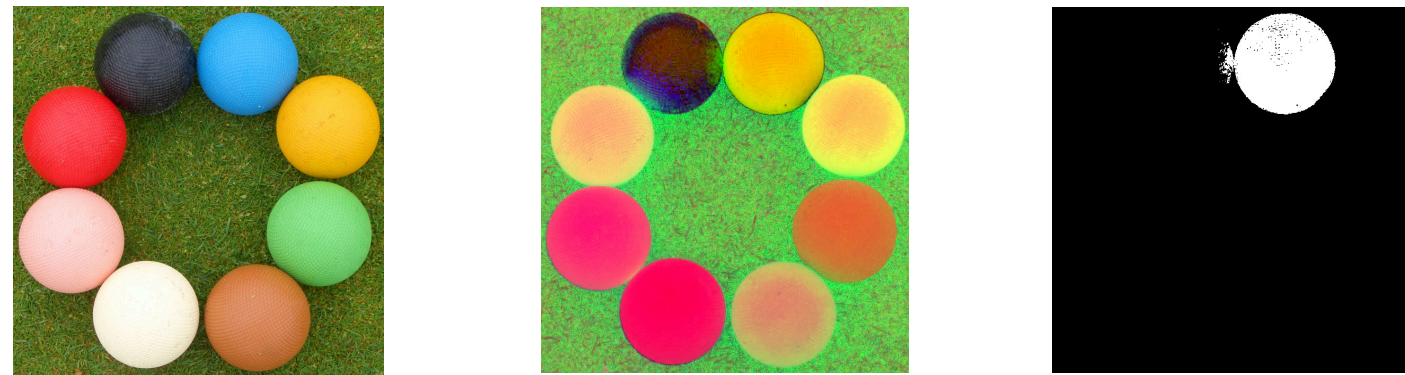
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## Abstract

The adoption of Image Processing concepts associated to robotic applications has been showing as efficient solutions for quotidian issues. The Quadrotor is an equipment that has been used largely for monitoring objects. Considering the stable flight control of a quadrotor, this project presents the development of a system to monitor a specific wheelchair. The system is composed of the camera attached to the quadrotor. The camera sends images to a computer, which will process the wheelchair movement through the algorithm developed. By applying the main concepts of Image Processing, respecting physical limits between the equipment and the wheelchair user, it is possible to monitor the target securely.

## Implementation

The implementation of this project was divided in two parts: wheelchair recognition and quadrotor flying. The first step was developed by use an algorithms to recognize a rectangle that is attached in the chair. The algorithms used was made by the adoption of the library OpenCV to make treatment of the image recognized by in the camera, as is shown in the image below:



The second step, the quadrotor flying, was implemented by adopting the program to control the quadrotor's flight. Related to the guarantying the user's security, it was defined a size pattern of the rectangle, maintaining the distance between the wheelchair and the quadrotor. Following is the drone used in the project:



## Conclusion

The software makes the life for guests with disabilities and the people around them easier. The quad rotor involved transmit images in real time to a specific laptop allowing the person who is watching to monitor carefully and be aware of the situation. The software is safe against interferences, being essential for those who want a modern electronic babysitter.

## Introduction

We decided to develop a system that safely monitors a wheelchair user and gives feedback for another person. It is like a "flying babysitter". The whole system is divided in two main parts: the hardware part, and the software part. The hardware part is composed by a quad-rotor controlled by an Arduino Mega board, while the software part is composed by a Computer Vision/Image Processing system developed in Java language with the OpenCV library. The software is going to be running and processing in real time the images sent by the camera attached to the quad-rotor. Then, the quad-rotor is controlled according to the images processed by the computer. The control itself consists in defining the height of the quad-rotor from the ground, as well as the distance between the quad-rotor and the wheel chair.

## References

Arifin, Futuhal, Ricky Arifandi Daniel, and Didit Widiyanto. "AUTONOMOUS DETECTION AND TRACKING OF AN OBJECT AUTONOMOUSLY USING AR. DRONE QUADCOPTER." *Jurnal Ilmu Komputer dan Informasi* 7.1 (2014): 11-17.

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