

## Development of trajectory prediction program for a moving object in 3D environment = Pengembangan program trajectory prediction dalam koordinat 3 dimensi

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### Abstrak

[Teknologi robot yang berkembang pesat sekarang ini menyebabkan naiknya kebutuhan akan teknik pengolahan citra dan teknik memprediksi gerak objek. Salah satu cara yang paling umum dalam mendeteksi suatu benda adalah dengan menggunakan filter warna dan sensor untuk mendeteksi jarak. Namun, kelemahan metode tersebut terletak pada rentannya filter warna terhadap gangguan luar, serta lambatnya sensor dalam mengukur jarak. Dalam penelitian ini, digunakan sebuah Kalman Filter yang berfungsi untuk mengurangi efek gangguan dalam filter warna, serta membuat program tetap dapat memprediksi lokasi bola ketika bola hilang dari pandangan. Sebuah algoritma yang dapat memprediksi jarak dan koordinat bola tanpa menggunakan sensor juga dikembangkan demi mempercepat waktu proses. Setelah lokasi bola diketahui, sebuah algoritma untuk memprediksi koordinat jatuh bola juga dikembangkan. Koordinat jatuh ini nantinya dapat dimasukkan ke sistem penggerak robot yang mampu mengarahkan robot ke lokasi jatuhnya benda.;Image processing and trajectory prediction play an important role in today's

robotic technology and its applications are limitless. The most common method of detecting an object is through the use of colour filter and a sensor to measure its distance. However, most of the time, colour filter is very vulnerable to noise and the robot would consume a huge chunk of processing time using distance sensor. In this paper, a Kalman Filter is developed base on a constant velocity model. This Kalman Filter will provide a better estimator on the object's position and estimate the position of the object when there are occlusions. In addition to the Kalman Filter, a novel sensorless approach to measure an object's distance is also developed in order to improve processing time. After the coordinates of the object are obtained, an algorithm that could predict its landing coordinates is also developed by using MATLAB. This landing coordinates could then be fed into a motor system in a robot which will then move towards the predicted coordinates., Image processing and trajectory prediction play an important role in today's

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