ABSTRACT

One form of technology's role in facilitating human work was begun with many restaurants that use food waiter robots to replace humans in serving food to customers. So that, the robot can serve well, there are many things to be considered in the making of this robot . One of the things that should be planned carefully is the balance of the food brought by the robot on the tray. Balance of these foods can improve the quality of care for food or drinks on a tray that is not mixed or spilled, so that customers are satisfied with the existing services.

This research is intended to design a system that is able to improve the balance on a tray that is carried by a robot waiter at the restaurant. The system works based on the slope of the robot body that is detected by the tilt sensor module gyroscope L3G4200D and accelerometer ADXL345 that are filtered using a complementary filter. After that, the main controller module which using the Arduino Uno which has been programmed using the Arduino compiler software called Arduino IDE (Integrated Development Environtment) will restore the balance to the tray by adjusting the angle of turn two servo motors on two different axis which moves in the opposite direction towards the direction of displacement caused by the tilt angle of body tilt as the robot using fuzzy logic controller .

This research success create a complementary filters system that is able to reduce the noise that is caused by the readings of gyroscope and accelerometer sensor, but the update time signal turn to 40ms. Fuzzy logic that is realized able to restore the position of the tray to a balanced position, however, the system performance is still not good because it can only be used for loads that have a mass of less than 200 grams and tolerance of balanced position is still quite large, those are 17.565^o and -15.5325^o for angle x movement and 14.613^o and -13.932^o for angle y movement.

Keywords : Waiter Robot, Complementary filter, Fuzzy logic, Gyroscope, Accelerometer, Arduino, Servo motor.