



# Automated Gate of Animal Cage Using Arduino Mega 2560

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## Abstract:

Condition monitoring of electromechanical machines is a procedure of increasing importance, It is mandatory in many applications as a fault tolerance system. Our system contains an animal cage and an electronic system which makes the cage system automated which reducing the manually controlling of door and reduce the risk of the person by using arduino system.

## I. INTRODUCTION:

The use of technology has become a major advantage for this generation been from various applications so, using the technology this project intent to propose automated gate of animal cage by using arguing mega 2560. Automatic gate is widely used in public places such as transportation stations, malls, etc. but this is specially design for animal cage to eliminate the need of manually opening and closing the gate. Now-a-days what happen while leaving the animals in forest a particular person goes manually from the upside of cage and control the motion of opening and closing the gate but sometimes it may be dangerous if the animal is aggressive he may attack on him. Contemporary sensor based mechanically animal cage gate is available using pressure detector, infrared and other wire-less sensing technique but it fails when the animals are light weighted. In this paper this system is broadly divided in two parts hardware and software. so hardware part consist of gears, motors etc which will helps to controlling the gate and software part consist of arduino kit, camera which will be interfaced with arduino kit and gives the live footage of near about area of the cage on the display.

## II. HARDWARE IMPLEMENTATION:

The materials and components that are used in automated gate of animal cage will be discussed in the following. As in normal control design, system can be roughly divided as input, output and processing sections.

### The main components of system are:

#### 1. Arduino Mega2560

Arduino is used as a main control unit to control the process of the whole system.

#### 2. Gears:

Here we are using rack and pinion. It is a type of linear actuator that comprises a pair of gears which convert rotational motion into linear motion. A circular gear called "the pinion" engages teeth on a linear "gear" bar called "the rack"; rotational motion applied to the pinion causes the rack to move relative to the pinion, thereby translating the rotational

motion of the pinion into linear motion.

#### 3. Motor Driver:

The motor driver is placed at two sides of gate. They are used to rotate forward or reverse direction of DC motor for opening and closing the gate.

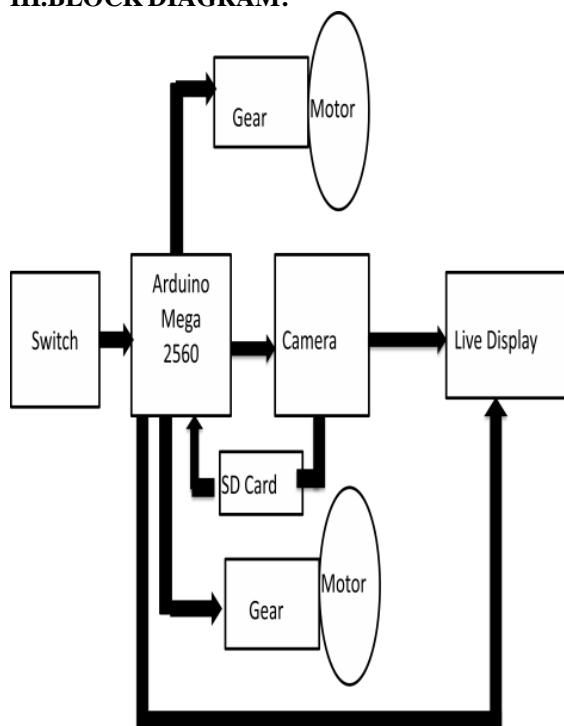
#### 4. TFT Display:

It displays the cage gate open or close section and live footage of the near around area of cage.

#### 5. Power Supply:

It is needed to provide 5V DC to microcontroller and 12V DC for motor.

## III.BLOCK DIAGRAM:



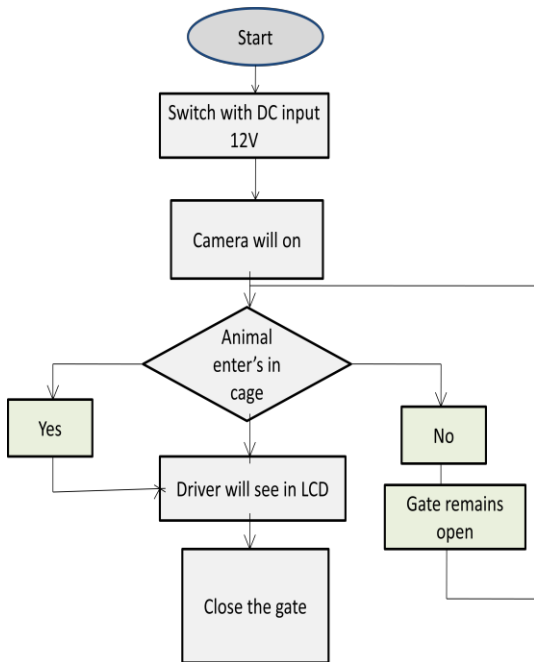
**Figure1. Block diagram of automated door of animal cage.**

Fig 1 shows over all block diagrams for automated door of animal cage by using Arduino mega2560. So, Arduino

mega2560 is used to operate the following function of the automated door of animal cage:

1. Display the live footage of entering and stepping down of animal from the cage with TFT display a motor driver circuit is used to drive the gate motor for opening and closing gate. The Arduino Mega2560 controls all the system. The main program of the automated door of animal cage is written in Arduino IDE which is created by C and C++ Programming Language.
2. To open and close the cage gate automatically by using two dc motor.

**IV. FLOW CHART:**



**Figure.2. Flow chart of the System**

**V. ALGORITHM:**

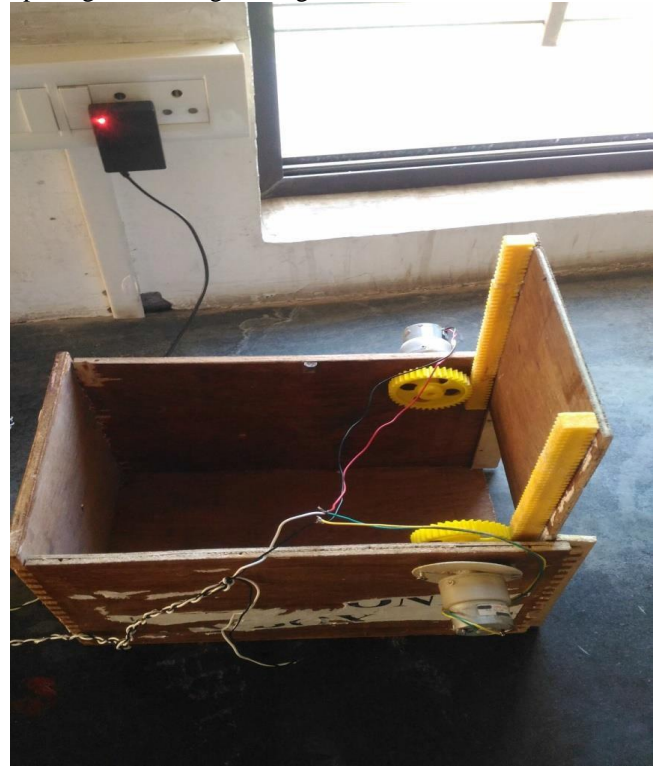
The algorithms used in the flow chart in Fig.2 are described in steps.

- STEP 1: Start.
- STEP 2: Set the switch with DC input of 12V.
- STEP 3: Camera will be ON.
- STEP 4: If the animal enter in the cage. Go to step 4 and step 5 otherwise gate remains open and go to step 3.
- STEP 5: Close the gate.

**VI. CIRCUIT DESCRIPTION:**

The Automatic door of animal cage by using arduino mega2560 is accomplished to use various electronic components. This system can be simply divided into two main parts: the cabin and the cabinet. The detail circuit diagram of the automated door of animal cage is shown. This system composed of switch, Arduino mega2560, motor driver, Rack and pinon, TFT display and power supply. The main control unit of this system is Arduino mega2560 and it can manage the control process of all input and output units. The TFT display is used to show the live footage of the surrounding area of the

cage. Motor driver is use to drive the DC motor for gate open and close control. Alarm unit is utilized for controlling the opening and closing of the gate.



**Figure 3. proposed model.**

Fig3. Shows the proposed model of the system. The gate control system consists of two rack and pinon gears. The gears are fixed at the certain distance on both sides of the gate, that is for controlling the door before the animal is arrive and after the animal step down. As the switch is ON the arduino gives command to the motor and it gear will rotate and the door of cage will open as well as camera will also ON which will give us the live footage on the TFT screen.

**VII. ADVANTAGES:**

- Reduces the man power, time consuming
- Ease in handling
- Safe for human as well as animal.

**VIII. DISCUSSION:**

The live footage will display in the TFT screen the sensors sense the input and sends to the arduino, where if responds and gives command to the particular component with predefined algorithm. The timing condition for the cage gate control system must be set base on the timing of the stepping down of the animal the background algorithm which can be easily changed and modified using arduino. The DC motor is also controlled by the arduino for rotations by calculating the code of proper delay in to the arduino. This system, a scaled down model attempts to mimic the real time door of animal cage control. This can be realized in real time with the higher horse power motors, controlled by Programmable Logic Controllers and through several Distributed Control Systems (DCS). Employing the automatic door of animal care system may offer several advantages for rescue centers and forest departments.

Since, the operation is automatic; error due to manual operation is prevented.

#### **IX. APPLICATIONS:**

- Used in zoo, rescue center and forest for shifting animals.
- In any transportation trucks.

#### **X. REFERENCES:**

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