Gprs Controlled Weighing System Of Fruit Sorting And Transportation Gyro Car Based On Arm

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Abstract: The automatic fruit-transportation gyro car works in the economic forest; the designed Gyro car sorting, weighing & obstacle avoidance system based on ARM with GPRS control. Gyro is specially designed in such way that it moves from one station to another in forest. Gyro car has three compartments for three colors of fruit & Gyro car is provided with inbuilt sorting mechanism with a robotic arm with RGB Sensor. Sorting mechanism sort the fruit individually in the same gyro car at each station in forest on the basis of color of fruit. Our gyro car moves from one station to another on path follower mechanism. Gyro car stops at each station for a particular time period. It also provided with overload indication. Whole working is divided in two sections one as control room and another is working area where Gyro car moves. Real time weight of the fruits is seen on the LCD module. Communication between gyro car & control unit takes place through GPRS module. Our gyro car also provided Ultrasonic sensor which is used to avoid accident by obstacle in its path. When obstacle in its path, alert by buzzer in control room.

Key Points: Fruit collection & sorting, weight measurement, Obstacle avoidance, overload indication, communication through GPRS module etc.

Introduction:

Automatic fruit-transportation gyro car, which working in economic forest area, has become a development trend of novel fruit-transportation vehicle. We can also use this mechanism in manufacturing areas to sort and transform different object to different platform. It has many advantages such as sorting ability, safe and steady movement, overload alert, obstacle avoidance in its path. However, the path of the automatic fruit transportation gyro car is settled in the economic forest, so designing a system for avoiding the accident of obstacles such as the falling branches on the path is essential to make the gyro car's safe working. The work described in this paper is mainly concerned with the ultrasonic obstacle avoidance system based on Ultrasonic sensor and ARM of the fruit-transportation gyro car, automatic fruit sorting based on ARM+RGB color sensor. Centralized control mechanism & wireless communication based on ARM and GPRS transmitter & receiver. Weight measurement & appropriate action using load sensor, buzzer, LCD display is implemented. The whole architecture, hardware and software design of the obstacle avoidance system, weight measurement will be discussed in the following system.

Objectives of the project:

1. Monorail Gyro car inside economic forest.
2. Fruit collection and transportation using gyro car
3. Fruit sorting mechanism.
4. Weight measurement indication on LCD display also overloads indication.
5. Obstacle Avoidance
6. Centralized control mechanism

Literature Survey:

There is a range of literature relevant to energy and emissions associated with the production, trade and consumption of fresh fruit and vegetables. This chapter reviews a variety of material concerned with fresh fruit and vegetable production, consumption, transport and trade. The first part of the chapter focuses on several reports that consider greenhouse gas emissions at an aggregate level, either for the EU or country level. These reports provide an indication of the greenhouse gases associated with the food sector and specifically from fruit and vegetables. This section also reviews literature focusing on the supply of fresh produce from developing countries, highlighting the role fruit and vegetable production plays in sub-Saharan African economies. The second part of this chapter reviews studies that focus on a specific product, covering various stages of the supply chain. This part of the chapter begins with several studies which investigate the transport related emissions or energy associated with fruit and vegetable supply chains and then reviews the more comprehensive studies that incorporate wider elements of the supply chain including production.
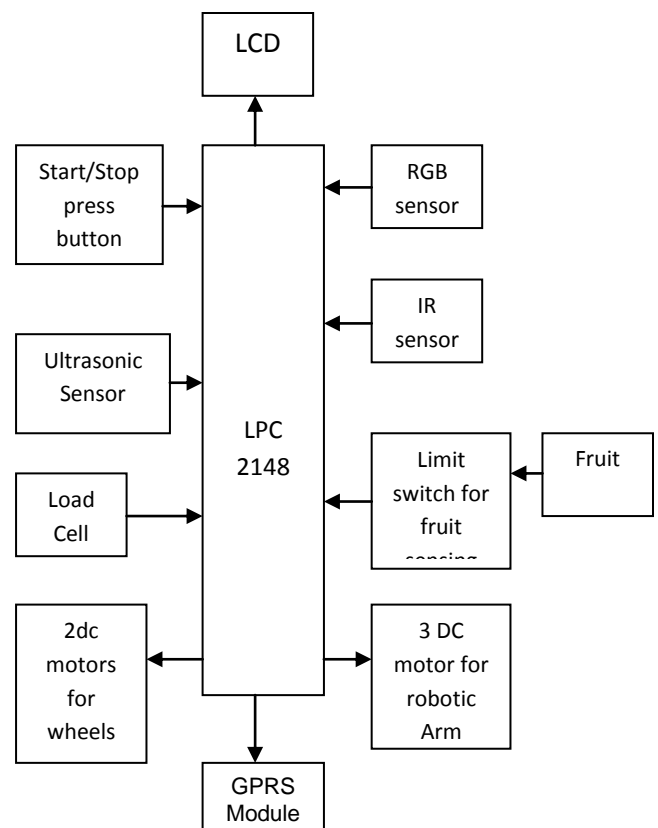
Block Diagram:

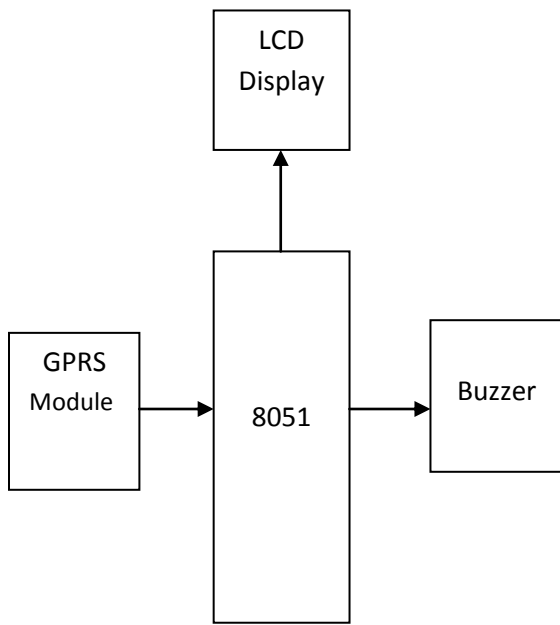**Fig**. Block diagram at working Area on gyro car
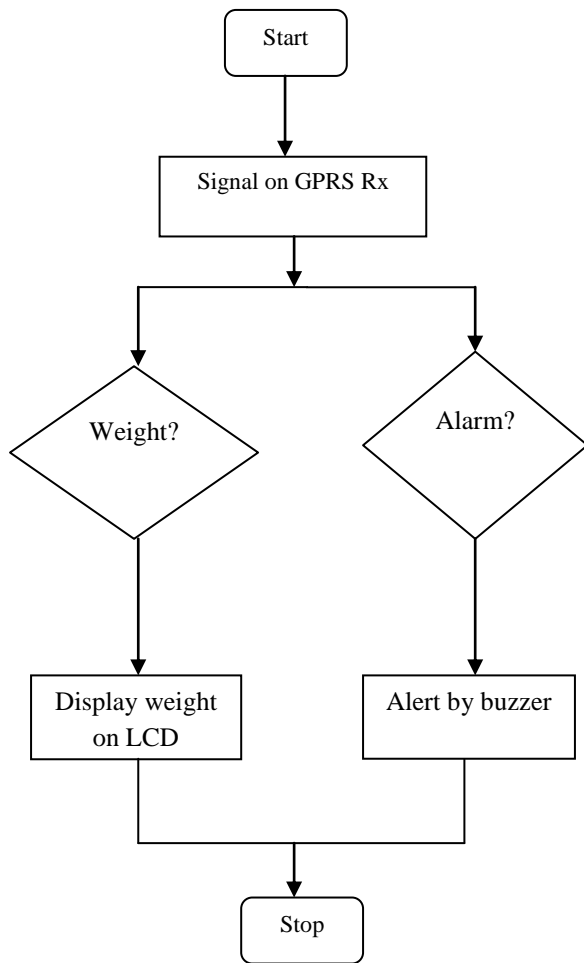
Fig. Block Diagram at control room

Block Diagram Discription:

The core of fruit-transportation gyro car's weighing system is ARM processor and the modules connected to processor include the load sensor, color sensor the GPRS module, the power supply module, the buzzer (alarm), and the display module. All modules constitute the fruit transportation gyro car weighing system. Load sensor passes the analog data to ARM for A / D conversion, then the weight of the fruit is displayed on the LCD and sent to monitoring client through GPRS module. The main function of the whole system is monitoring whether the weight of fruit are overloading or not, and sending the real-time data to the monitoring client in order to record volume and make instructions to the weighing system. Start and stop press button for manual movement of gyro car. For detect obstacle in its path ultrasonic sensor are used. For the movement of gyro car two dc motors are used. Another three dc motor are used for robotic ARM for sorting of fruits with the help of RGB sensor. Limit switch is used to sense the fruit for sorting. Two LCD display one on Gyro car and another one control room to display weight of fruit inside the Gyro car. IR sensors are used to detect station to stop Gyro Car.

Flow chart at working area on gyro car:
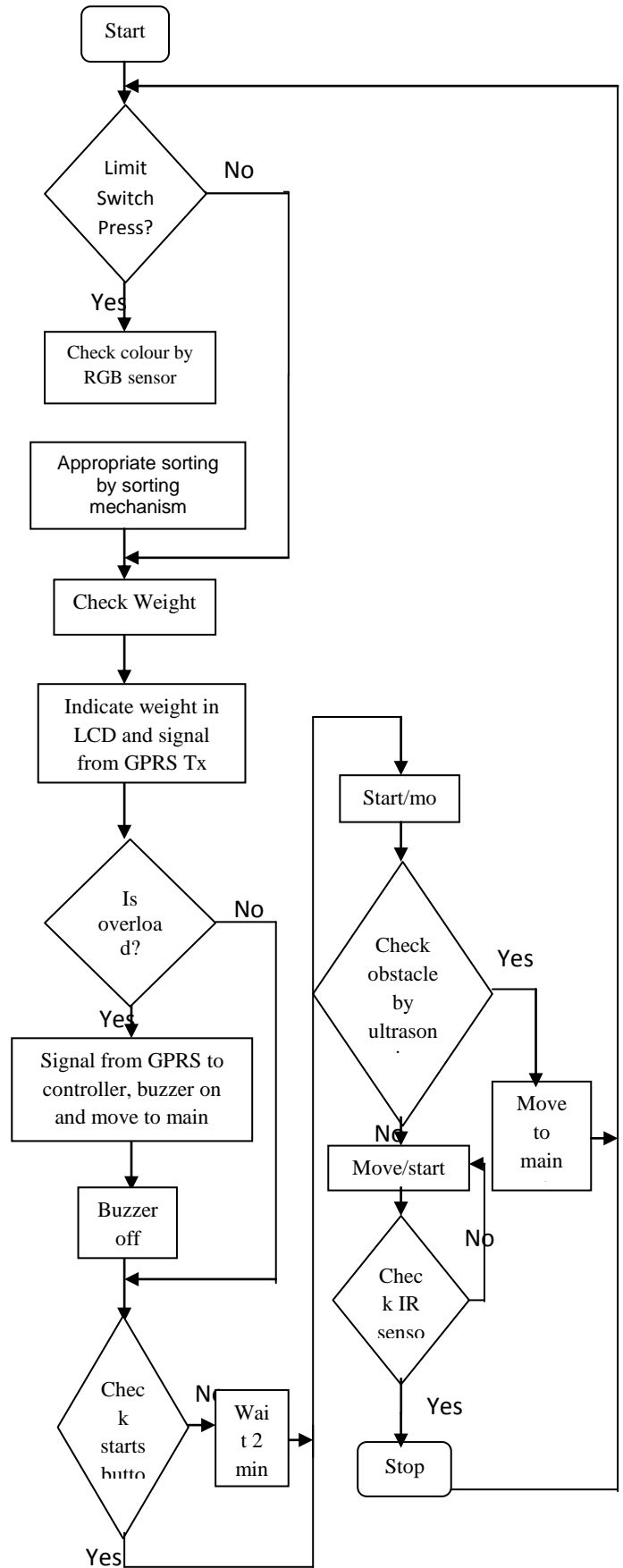
Flow Chart at Control Room:

```
                    ┌──────────┐
                    │  Start   │
                    └────┬─────┘
                         │
                         ▼
              ┌────────────────────┐
              │  Signal on GPRS Rx │
              └─────────┬──────────┘
                        │
            ┌───────────┴───────────┐
            ▼                       ▼
         ◇ Weight? ◇            ◇ Alarm? ◇
            │                       │
            ▼                       ▼
    ┌───────────────┐      ┌────────────────┐
    │ Display weight│      │ Alert by buzzer│
    │   on LCD      │      │                │
    └───────┬───────┘      └────────┬───────┘
            │                       │
            └───────────┬───────────┘
                        ▼
                   ┌─────────┐
                   │  Stop   │
                   └─────────┘
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Working of system:

9.1 Fruit collection & sorting

First of all we take different fruits in trolley, after placing fruits particular limit switch get pressed then RGB sensor for color detection comes into picture. RGB sensor senses the color & then with the help of three DC motor (Robotic Arm) & pick and place spoon fruits are sort in three compartments in car. This sorting mechanism is implemented on gyro car.

9.2 Weight measurement & overload indication

After sorting of fruits weight is being measured by load sensor & display it on LCD. Load sensor & LCD display is connected to ARM processor if the weight is beyond carrying capacity the buzzer is get on at main station & instead of forward moving gyro car return to main station.

9.3 Forward movement of gyro car

After sorting & corresponding weight measurement the gyro car is move forward in order to drive gyro car. Two DC motors are used which is controlled by ARM processor. In order to sense the station IR sensor is provided which indicates the presence of station. When it senses the presence of station it perform it ARM then processor start the movement of gyro car. It waits at station for 2 minutes or initiated by press start /stop button on car& then moves ahead.

9.4 Obstacle detection

In order to detect any obstacle on its path such as falling of branches of trees is sense by Ultrasonic sensor. If there is any obstacle then ultrasonic sensor performed it to processor which stops the movement of car.

9.5 Communication between gyro car & control unit

The control is provided at main station which has GPRS transmitter & receiver, LCD display & buzzer the communication between gyro car in working area & control unit is take place through GPRS which is better for obstacle avoidance, overload indication.

Expected Results:

1. Load sensor should properly sense the weight for reliable operation and overload indication.
2. Gyro car should return to main station after overloading.
3. RGB sensor inelegantly senses the colour for effective sorting.
4. Gyro car should return to main station when obstacle detects on the rail.
5. Gyro car should stop at station when signal from IR sensor interrupted.
6. Serial communication between arm and GPRS module must be reliable.
7. ARM should able to monitored live data.
8. LCD display should able to display live data, buzzer should be on and off according to weight.
9. Movement of car should be smooth with proper speed.

Advantages-

1. Low cost.
2. Easy to implement.
3. Easy to Handle.
4. User friendly.
5. Obstacle Detection.
6. Accident avoidance by detecting obstacle in path
7. Less human interaction.
8. Reduces human Error.
9. Effective Sorting of fruits.
10. Centralized control.

Conclusion:-

New weighing system of fruit- transportation gyro car meets the requirement of dynamic weighing in range 0~5kg. With the advantages of high processing speed, processing capacity , simple component and capacity of achieving more complex functions , it meets the requirements of the actual production. It is of practical value to improve the automatic technology of the economic forest fruit transportation gyro car. In forest there may be a large variety of fruits so we can easily sort fruits one from another and we can also measure the weight of fruits after every sorting. We can also avoid the accident by any obstacle. System is also capable to detect overload if overload it take appropriate action by alarm. Gyro car also transport fruits from one place to other place and its movement is totally automated. Gyro car wait at each station for 2 minute for

sorting and loading gyro car is totally user friendly. It has full control of user.

Future Scope:-

While transportation we can preserve the fruits by using different chemical processes it is possible hence for long-lasting fruit storage is possible. Same type of system we can used in mining areas to automatic sort of precious object and transport them one area to another. In Docks Areas we also used this mechanism where Gyro car is replaced by ships to sort large container and to transport them to one area to another. In manufacturing areas or in large factories there required to sort different component, objects and transport them to required area where we can used this mechanism. By using satellite and GPRS system we can identify the location of car in dense economic forest.

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