Mobile Robot for Tea Leaf Carrying Using Bogie Mechanism

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Abstract - ***The Rocker-Bogie Mobility System was setup to be used at slow speeds. It is able to move over the obstacles that are on the sequence of the size of the wheels. However, when move over the sizable obstacle, the vehicle motion capable to stops while the front wheel climbs the obstacle. The strategy must be put into action to carry the tea leaf from the terrain surface, this will increase the time and reduce the human effort***

Index terms – ***Terrain surface, Camera, DC Motor***

I.Introduction:

Rocker bogie are the combination of a rocker and a bogie where bogie means the wheels of the robot and bogie means the connecting link between the bogies. This allows the robot to move on obstacles which are up to twice the diameter of the wheels. Existing Rocker is either remote controlled or based on artificial intelligence. The main disadvantage of remote-controlled rocker bogies is it needs a human to control it within its nearby range which cannot make human less monitoring possible. The drawback of artificial intelligence-based rocker bogie is it cannot be controlled in desired direction. It makes its automatic moves and cannot be controlled by the person. To overcome all these problems, rocker bogie robot can be design with IoT controlling section which would make the robot to traverse in the user desired direction as well as avoid any steeps present in the moving path

II.Literature review:

[1] In today's world, concentrate mainly on newly emerging technologies for several weight carrying, surveillance and recovery operations. This paper represents the combination of two emerging technologies, which are Robotics and IoT. Most of the weight carrying robots does not have the ability to move on uneven surfaces and on slopes, but the rocker bogies have these features. While the current rocker bogies are remote controlled, it needs a user to be near it to control it. So, to develop a rocker bogie robot that can be controlled via IoT from a distance, which can be done using web page controlling system. The control mechanism is provided with video transmission facility through high-speed image transmission. The robot is fitted with a camera which captures the scene and transfer the images to the server on which the user can control and watch the live feed.

[2] In work, an analysis method to make the rocker-bogie system climb up a stair was attained. In tea estate, the labours carry around 40kg in a long time, to overcome this issue rocker bogie are design. This research paper proposed an intelligent inclined motion control of an amphibious vehicle while moving on uneven terrain surface the mobile smartphone. They mounted the camera to view the live stream in Robot.

[3] This research paper divides up into designing and modelling of obstacle climbing robot which is based on the present rocker bogie mechanism in ANSYS rigid body dynamics module. While climbing obstacles, the robots often undergo from undesired phenomenon slip and floating which may cause the robot to instability. The Taguchi method was chosen as an optimization tool to make the path of the Centre of mass close to a straight line while all wheels keep in contact with the ground during climbing stairs. Due to its easiness and cost effectiveness both in formulating the objective function and satisfying multiple constraints simultaneously, Taguchi method was adopted. In the Optimization, enhancement of Seven kinematic parameters of rocker bogie mechanism was done that also included four link lengths, i.e., Y1, Y2, Y3 and three-wheel radius, i.e., X1, X2, X3. The kinematic Model of proposed mechanism was built, and its simulation was carried out in ANSYS Rigid body dynamics. Three various type shapes of typical stairs were selected as user conditions to consider a robust optimal solution. The result exist shows the variation of Centre of mass position with respect to time, variation of the velocity of joint with respect to time, variation of force with respect to time.

[4] The world market for mobile robotics was estimated to increase substantially in the next twenty years, exceeding the market of industrial robotics regarding units and sales. The important fields where the robot are used as homeland security, weight carrying surveillance, demining, dangerous situations, and agriculture field. For uneven environments, the setup of the

locomotion systems of mobile robots was normally complex, particularly when they were required to move on rough or soft terrains or to climb obstacles. The main categories of locomotion systems are wheeled, tracked and legged and other hybrid categories that can be derived by combining these main locomotion systems were discussed with reference to maximum speed, obstacle-crossing capability, obstacle climbing capability, slope climbing capability, walking ability on soft as well as rough terrain, energy efficiency, mechanical complexity, control complexity and technology readiness.

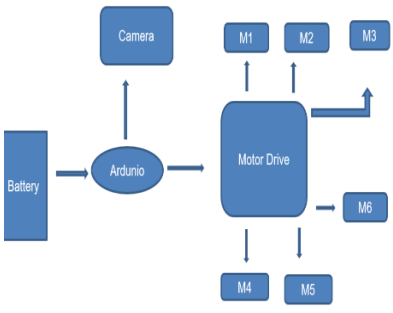
[5] The bogie mechanism for our Mars Rover is known as the optimization of a separate suspension system. This type of mechanism has been used on most of the rovers in in the space research purposes. It has demonstrated a simple and fine design. A Genetic Algorithm was implemented and used to optimize the kinematic and geometry of the rover's wheel suspension system subjected to the well-defined performance metrics. This work shows the potency of the optimization of a rocker bogie system using a Genetic Algorithm. It also discloses that the resulting system meets all constraints and that considerably decrease the fault of individual performance metrics and the overall system. It was shown that the total fitness of the rover suspension system could be increased by an average of 28% after 100 iterations compared to an initial guess. All performance metrics defined were upgrade importantly throughout the optimization. This method can be applied to various types of rovers to optimize the wheel suspension mechanism's geometry

III.Objective of the project:

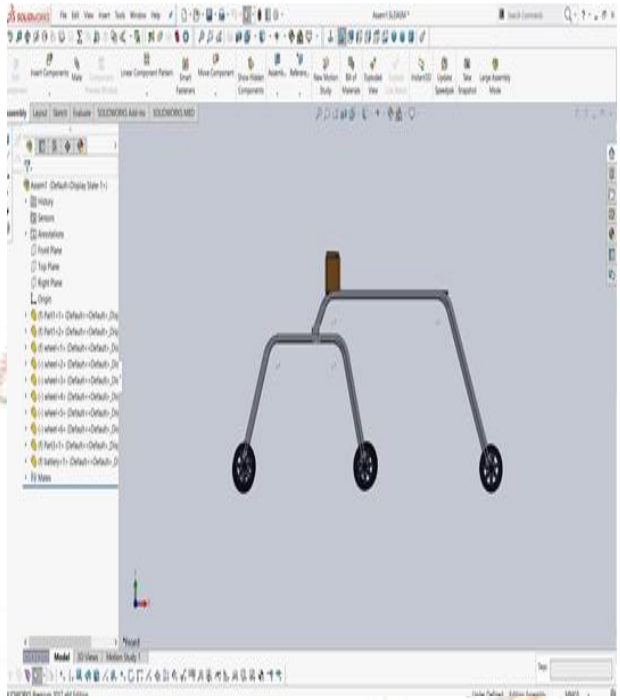
The primary objective of this project is to carry the tea leaf from the uneven surface(or) terrain surface.

1. This project intends to provide a workable design for constructing a simpler version of a rocker bogie robot that must be active in catastrophe zones where the workers doing a particular work in a long duration
2. It is preferable to utilize some high-tech equipment to reach that task swiftly and effectively by finding, searching the victims in such circumstances, when there is a risk of a hazardous environment.

IV.Block Diagrams:



Design:



V.Hardware and Software Requirements:

Hardware components required for this robot:

- Arduino Uno
- Motor Driver - L293D
- Gear Motor
- Battery
- Camera
- Mobile App
- Wheels

Software components required for this robot:

- ARDUINO IDE

VI.Applications:

This robot can be used in Tea leaf carrying.

- Space research
- Recovery field
- Surveillance
- Military uses
- War Field

VII.Conclusion:

This project helped us to know the periodic steps in completing a project work. Thus, we have completed the project successfully. This project is made with pre planned and it provides more flexibility in operation. This innovation made the more desirable and economical. This project "MOBILE ROBOT FOR TEA LEAF CARRYING USING BOGIE MECHANISM" is designed with the hope that it is very much economical and This robot can move 45-degree slope

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VIII.References

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