Control Of Permanent Magnet Chain Driven Drive System of An Electric Four Wheeler

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Abstract- *The electrical drive system is crucial to the drive performance and safety of electric vehicles (EVs). In contrast to the traditional two-wheel driven EVs, the chain drive motor four-wheel- drive system can steer the vehicle by controlling the torque and speed of each wheel independently, yielding a very simple distributed drivetrain with high efficiency and reliability.*

This paper presents a system-level design Optimization method for a permanent magnet chain drive motor drive system for a campus patrol EV based on a practical driving cycle.

An outer rotor permanent magnet synchronous chain drive motor (PMCDM) and an improved model predicate current control are proposed for the drive system. Due to the lack of reducers, the direct-drive PMCDM needs to face more complex working conditions and design constraints. In the implementation, the motor design requirements are obtained through the collection of practical EV driving cycles in the campus. Based on these requirements, two models are proposed as the preliminary designs for the PMCDM.

I. INTRODUCTION

As the environmental issues are on the rise in the automotive industry, the market share of the new energy vehicles, which include hybrid electric vehicles (HEVs) and pure electric vehicles (EVs) that are powered by electric motors as the traction component is getting larger and larger. Modern EVs require high-performance drive motors with high torque density and efficiency.

Many kinds of motors have been studied and developed for this purpose, such as permanent magnet chain drive motors (PMCDMs), switched reluctance motors and induction motors [1-5]. The majority of these EVs, however, are four-wheel drive on either the front or rear axle by a single motor. The dynamic performance of such a two-wheel drivetrain is sub-optimal due to the limited traction, especially when it is riding on roads with snow and/or ice, or off-road on soft grounds or rocks.

The four-wheel-drive drivetrain using four hub/in-wheel motors can overcome this drawback. Since the torque and speed of each wheel can be controlled independently. Different from centralized drive motors, the requirement of light weight is stricter for chain drive motors since the mass of the chain drive motor will affect the unspring mass, which has a significant impact on the ride comfort of the EVs.

Due to the characteristics of low speed stability, high torque density, and low torque ripple, the PMCDM is a good candidate for the EV chain drive motor

II. EXISTING SYSTEM

This project has presented of EVs which are driven by the Permanent magnet Chain Driven drive motor The performance of the EVs' variation of torque and power consuming system has been realized by our control scheme which has been implemented both in the simulation and in the experiments. By combining fuzzy control and PIC control methods which are both sophisticated methods can distribute the mechanical torque force and electrical force dynamically.

III. PROPOSED SYSTEM

The Smart Hybrid Electric Vehicle has two modes, Fuel mode and Electric mode. This bike initially starts in Fuel mode. • One is by solar panel and another one is by 220v AC supply. In electric mode the charging of battery is done in two ways. 1) During day time while running or in rest position, the solar panel on the back of the bike charger the battery. 2) During night time, supply can be provided to the battery.

PROPOSED BLOCK DIAGRAM

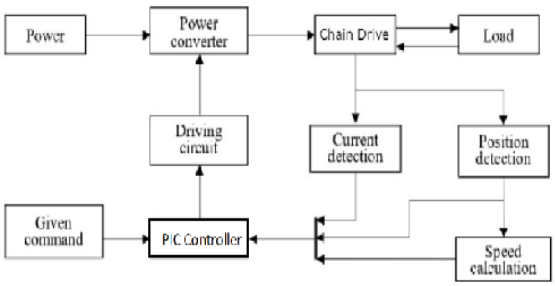

Figure-1.Block Diagram

IV. SYSTEM DESIGN

The rectifier has connected to AC circuit convert into DC Circuit power circuit,And power has connected to motor circuit Chain driven drive system has designed for produce high level torque power and uses as both chain and belt types as gear shifter.

V. EXPERIMENTAL SETUP

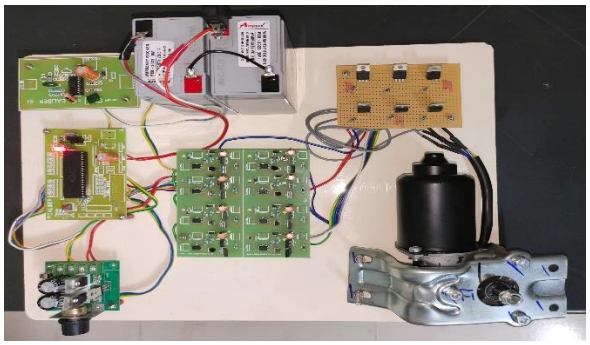

Figure-2.Snapshot of hardware kit

Chain driven drive system technology funnels the energy created by the torque production process back into the system in the form of charging the battery for further use.

In the energy normally lost in the braking process is transferred to the generator from the rotating axel and then transferred to the battery, thus saving energy. The system that drives the vehicle does the majority of the braking.

V. RESULT AND DISCUSSION

Figure-3.Snapshot of output

This output are running Chain Driven drive system of the battery was connected

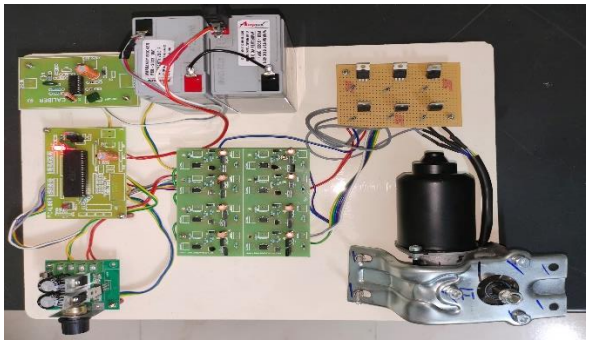

Figure-4.Snapshot of Output

This output shows that Battery Voltage , Voltage by chain driven motor, State of Charging, Kilometer that vehicle can travel.

S.NO	PARAMETERS	EXISTING SYSTEM	PROPOSED SYSTEM
1	EFFICIENCY	80%	90%
2	POWER SUPPLY NEEDED	24 V	12V / 5 V
3	COST	HIGH	LOW
4	CONTROLLER	NORMAL	PIC

VI. FUTURESCOPE

- It has a Pollution free from E-vehicle.
- Produces a world has Green environment.
- Reduce dependance of fossil fuels and economic level from peoples.

Chain driven drive system the efficiency of the generation of power is improved about 20%. Moreover, it is shown that the drive range of the EV is increased about 5 cycles. It can be concluded that the presented scheme is able to capture the braking energy with appropriate efficiency and ensures the safe deceleration of the EV. In future vehicles are mostly used in the EV energy system is mostly comfort for customers and retail workers and supporting for economic saving and production from pollution.

VII. CONCLUSION

In this paper, a new torque based on utilization of HESS is proposed for EVs driven by Permanent magnet chain driven drive motor. During acceleration and/or energy regeneration, the kinetic energy of the vehicle is harvested by the super capacitor using appropriate switching template of the

inverter. Hence, the need to additional power electronics interfaces is eliminated. Moreover, the PI controller is used to control the duty cycle of the PWM in the inverter to realize constant torque braking. In comparison with other similar types of the schemes, the proposed method has the superiorities of being simple and being high-efficient.

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