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VIBRATIONS DETECTION OF BLDC MOTOR IN AUTOMOTIVE

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***Abstract*--Brushless DC (BLDC) motor fan is one of the most widely used electronic components for thermal management. Failures of fans will cause seriously problems, such as overheat, shut down and even burnt, in their host systems. Thus, anomaly detection of fan gains increasing attention. This investigates into anomaly detection of generalized-roughness bearing faults in BLDC motor fan using current monitoring technique. In the experiment, it was found that there were about 9%changes in current and rotary speed of fan when the BLDC motor behaved unusual. Mathematical modeling of BLDC motor and physics-of-failure analysis was employed to explain the experimental findings**.

Keywords-- BLDC Motor, Electric vehicle, Motor fan etc.

I. INTRODUCTION

BLDC motors, also called Permanent Magnet DC Synchronous motors, are one of the motor types that have more rapidly gained popularity, mainly because of their better characteristics and performance .The control of the BLDC motor is an essential aspect in numerous industrial processes and different control plans are created for enhancing the speed control execution of Brushless DC motor drives. Speed control is accomplished utilizing (PID) controller or other comparable control system.

II .LITERATURE SURVEY

1. *Time-Efficient Fault Diagnosis of a BLDC Motor Drive Deployed in Electric Vehicle Applications*
   Adil Usman1Senior Member, IEEE, and Bharat Singh Rajpurohit1Senior Member, IEEE,
   1School of Computing and Electrical Engineering, Indian Institute of Technology Mandi, Kamand, HP 175075, India
   The major contribution of the proposed research is the elaboration on the vital importance of the Permanent Magnet (PM) based synchronous motor drives for Electric Vehicle (EV) applications

2. *Brushless DC Hub Motor Drive Control for Electric Vehicle Applications*
   Vishnu Sidharthan P Electrical and Electronics Dept National Institute of Technology Surathkal,India
   Yashwant Kashyap Electrical and Electronics Dept National Institute of Technology Surathkal, India,This work proposes the controlling of Brushless dc hub motor which can be used to drive an electric vehicle. Motor modeling is explained with the mathematical equations. MATLAB simulation is done with closed loop speed control of BLDC motor.

3. *Comparison of advance and conventional motors for electric vehicle application*

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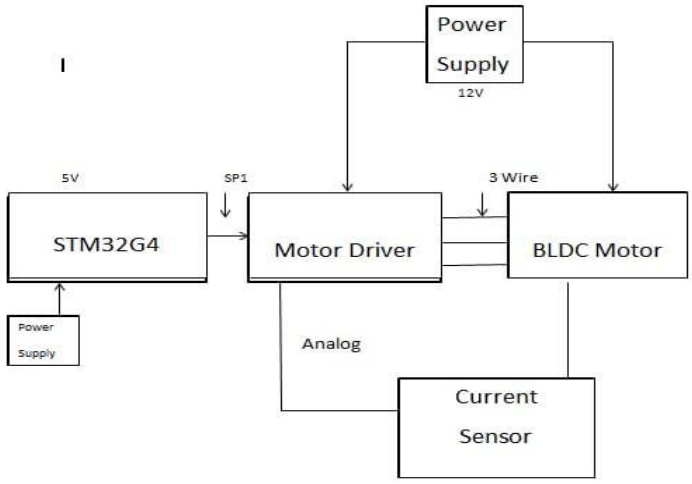
In this paper the comparisons between the advance motors and conventional motors carried out. The fpaper describes the ideal characteristics required for electric vehicle drive. The second part of this paper compare the different conventional electrical drives.In this paper the comparison is carried out between different conventional electric drives used in vehicle application on different criterion like torque-speed characteristics,

III.BLDC MOTOR FUNCTION

- A Brushless DC Electric Motor (BLDC) is an electric motor powered by a direct current voltage supply and commutated electronically instead of by brushes like in conventional DC motors. A brushless DC electric motor (BLDC motor or BL motor), also known as an electronically commutated motor (ECM or EC motor) or synchronous DC motor, is a synchronous motor using a direct current (DC) electric power supply. It uses an electronic closed loop controller to switch DC currents to the motor windings producing magnetic fields which effectively rotate in space and which the permanent magnet rotor follows. The controller adjusts the phase and amplitude of the DC current pulses to control the speed and torque of the motor. This control system is an alternative to the mechanical commutator (brushes) used in many conventional electric motors. A single STM-32 microcontroller is used to run the motor as well as to perform condition based monitoring. This kit includes nuclear board powered by stm32g4 and it also has an x nucleo board which is used to power and drive the motor.

- There are 4 steps to analyze this functioning,. Firstly the motor is being started in a predefined sequence in this sequence the motor starts from a standstill and it accelerates to high speed using two or three seconds long ramp after this the motor keeps on running at this lower speed for a few seconds and then it again decelerates to a standstill position .Once the motor is running we can start performing the learning on the device, learning the training process is very quick and it takes only few seconds on the device. In addition to this AI libraries which we are using here for condition monitoring comes with the possibility of incremental learning that lets you add learning to your previously learned behavior without forgetting pattern to your previously learned patterns without forgetting or overwriting the learning this functionality is very handy when you want to add to new pattern, with this incremental learning we do not have to worry about retraining for the previous we just trained for new pattern and its done. Our project model can switch between learning and condition monitoring.



IV.CONCLUSION

This thesis demonstrates the use of an efficient and lower cost controller to control the speed of BLDC motor Due to the simplistic nature of this control, it has the potential to be implemented in a low cost application. The BLDC motor control based on rotor position sensing scheme has been discussed and successfully implemented .The developed control and power board is functions properly and satisfies the application requirements

V. REFRENCES

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