Knee Implant using Embedded System

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Abstract— A knee replacement surgery has become popular worldwide and has a high success rate. In some cases, the degradation of the implant can happen due to the decoration of ultrahigh molecule weight polyethylene (UHMWPE). To overcome these problems the paper describe a possible solution for monitoring implant integrity. An implant material has encased the magneto elastic property of amorphous ribbon with UHMWPE. To stimulate knee insert, they were subject to various tensile stresses by applying AC magnetic field. This resulted in the stress caused to produce an inductance changes nearby magnetizing winding. These implant were designed according to the complexity, durability, biocompatibility and tensile strength, etc. The result obtained describes that the proposed sensor has sufficient sensitivity for measuring stress level, flexibility and weight of the implant associated in tibia inserts.

Key words: UHMWPE, Knee Implant using Embedded System

I. INTRODUCTION

The technological expansion in biomedical field has supplemented the design of the mission knee implant by using embedded system. Emerged from amputation process underwent. The probability exhibited high in the diabetes patient, outlying arterial disease members. To overcome this amputation techniques the total knee implant replacement surgery has been promoted to next level. The related tissues and the placement of the articular surface should be proper. This implant has revealed to risen the life anticipation rate of the amputee people. The toughness of the implant material will last up to 5-10 years. The problem in the knee joint mainly occurs due to foreign debris. This foreign debris will reduce the durability and affect the articular surface. The amorphous ribbon is the con-joint with the UHMWPE (Ultrahigh molecule weight polyethylene) so the material get decayed and it has magnetic property in nature. To measure the flexibility, weight of the implant placed and to find the stress level in the knee implant the principle used and the operation done by the sensors is very sensitive. At present this operation has high graded priority.

II. OBJECTIVE

The main aim of this objective is to increase the durability of the implant material. By according to the stress level dependence then the durability rate is calculated. The advanced technology in knee replacement by this method is very useful in medical field. The flexibility rate depend on the material designed. In every check up their will be different stress level display due to that stress level another replacement of the knee operation is done. So regular checkup to the physician is needed. This give you a good maintenance of the implant material.

III. BLOCK DIAGRAM

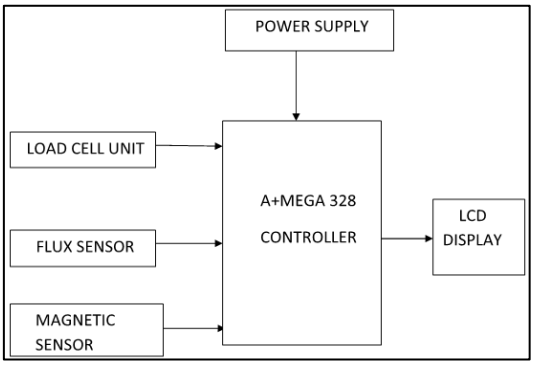

Fig. 1: Block Diagram

IV. TECHNIQUES FOLLOWED

In this paper the systems implemented are elasticity, stress level and heaviness of the implant. This complete set up is attached on the Arduino board. When the density of load is applied then the action takes place to known the flexibility of the graft material the flux sensor is used. Also it shrinks the heat generated. The magnetic sensor are likewise used to find out the stress levels. According to the stress level maintenance the implant stability is calculated. The weight of the implant substantial will change after some days. To calculate the weight of the insert the load cell unit was used. These ideas will give the betterment in the knee replacement practice.

V. CIRCUIT DIAGRAM

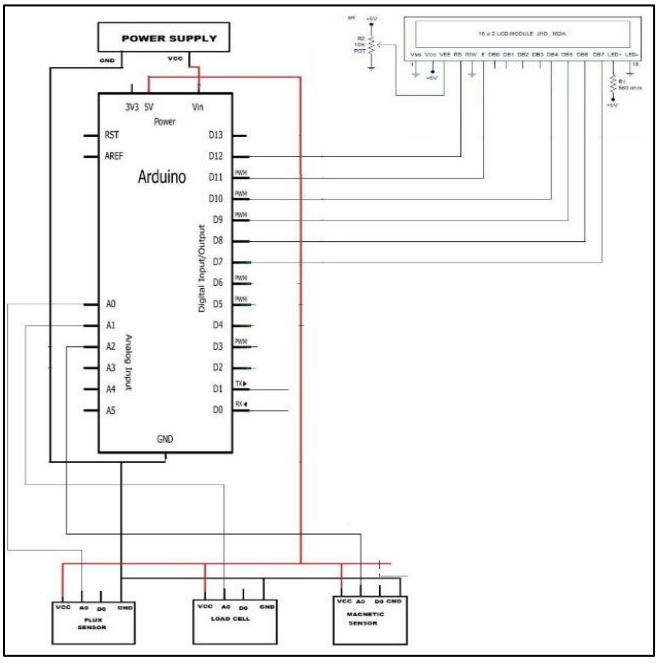

Fig. 2: Circuit diagram

VI. DESCRIPTION

The arduino board is heart of the circuit diagram. Here the flux sensor is more sensitive to measure the flexibility in implant. The magnetic sensor is used to maintain the stress level manner regularly. And the load cell unit is used to calculate the weight of the embedded design.

VII. RESULT

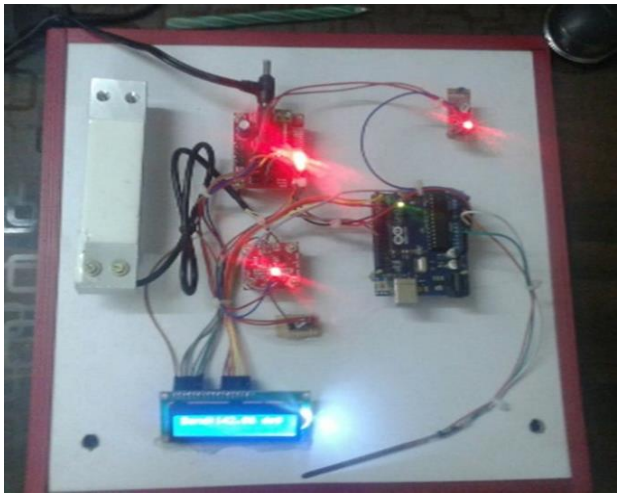

Fig. 3: Result

The advancement in knee replacement surgery has proved to proliferation the strength of implant life up to 10 years. This life expense is enlarged by the usage of amorphous ribbon. The several drawbacks that posed a black mark was overcome by fixing a permanent implant material while identifying the bone density muscle tone level.

VIII. CONCLUSION

The picturesque can be slided way past from supporting nature sticks to poly-supporting material with ultra-properties. Era over era improvisation have been imbibed to one another. So that implant in union can prove to be highly beneficial. The current technology that this model has embellished is including a measure to calculate the stress applied to the implant. As a means to predict the durability of the implant along with their association with bone density.

ACKNOWLEDGMENT

This research was supported by Adhiyamaan College of Engineering. We thank our colleagues from various institutions who provided insight and expertise that greatly assisted the research, although they may not agree with all of the interpretations of this paper.

We thank Dr. T.S. Udhaya Suriya, M.E., Ph.D., Head of the Department of Biomedical Engineering for her most valuable guidance, advice and encouragement.

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