Metal Micro And Magnet Sensor (Detector) For Radio Therapy Instrument

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Abstract- Earlier metal micro detectors used to treat the patients cancer cells. But the major disadvantage is that the high radiation deposition on the healthy tissues. Also they are not reliable in particular to treat the patients with accuracy and also the main Backlaws are their time delay and the inability of the solid state detectors to recognize the patient . So, In this implemented a project which uses a simple micro controller(Atmega 328)which recognize the patient with accuracy by using a magnet and control the radiation exposure which use low dose radiation to treat the patient.The circuit has metal sensor, which control the radiation exposure and magnetic detector. The output indicated by using buzzer along with LED.

Keywords: ATMEGA 328, metal sensor, magnet sensor arduino UNO.

I . INTRODUCTION

The main aim of radiotherapy in our experiment is to deposit low dose of ionizing radiation in a tumour while keeping the absorbed dose in the surrounding healthy tissue at a tolerant level.An original method for Mini beam Radiation Therapy (MBRT) is based on the idea that the smaller beam size provides higher protection of healthy tissue has been developed at the European Synchrotron Radiation Facility (ESRF).To measure the dose profile Gafchromic HD-81O films are usually used. The main drawback of these films is that they provide no online dose monitoring and the dose distribution is only known 24 hours after the treatment. Existing position sensitive gaseous or solid state detectors cannot operate reliably in real time at high the radiation fluxes exploited for the MBRT. However, metal detectors may provide an interesting alternative.

II . PROPOSED SYSTEM

Metal Micro Detectors:

Radiation therapy is one of the part of radiation medicine associated with cancer treatment. Today almost half of cancer patients aretreated by radiation. Clinical outcome of radiation therapy depends on accurate delivery of radiation to the tumour while sparing the normal tissue. Detectors for in vivo real time radiation dosimetry and understanding of radiobiological properties of radiation are crucial for improvement of clinical outcome of treatment Semiconductor based Metal detectors help in deciding the dosimetry in radiation.

Working:

Incident particles on the strips initiate secondary electron emission as they pass through the nearly transparent medium. When this happens, a positive charge appears at the integrator end is measured. To improve the extraction of secondary electrons an accelerating electric field is applied around the strip. This technology works with x-rays, protons and ion beams. Additionally, the strips are nearly transparent to beams. Significantly reducing degradation that is experienced by absorbing detectors. The obtained positive charge at integrator is given to a comparator and is compared with the reference charge based on which further analysis is done.

Magnetic Sensor (Detector):

Accurate positioning of a patient during a course of external radiotherapy is important if one is to avoid insufficient dosage in the target volume or high doses in organs at risk. There is a trend in modern 3D conformal radiotherapy toward using smaller mar- gins, but a reduced margin will. At the same time, make the treatment more susceptible to displacement errors.

Working:

The positioning system used in the study consists of three magnetic implants. Three magnetic field sensors mounted on anXYboard and a control unit with a monitor, multiplexer. Analog to digital converters and a high accuracy power supply.The magnetic field sensors make use of the Hall effect for magnetic field detection. The output signal of the units is directly proportional to the magnetic field applied to the sensor.The sensor is placed in close proximity to the magnet. By scanning the area above each magnet in steps of 1 mm, it is possible to find the position with the strongest signal and to determine the position with 1 mm resolution.

This position is compared by using a comparator with reference value and the result is displayed for judgement and possible correction.

III . BLOCK DIAGRAM

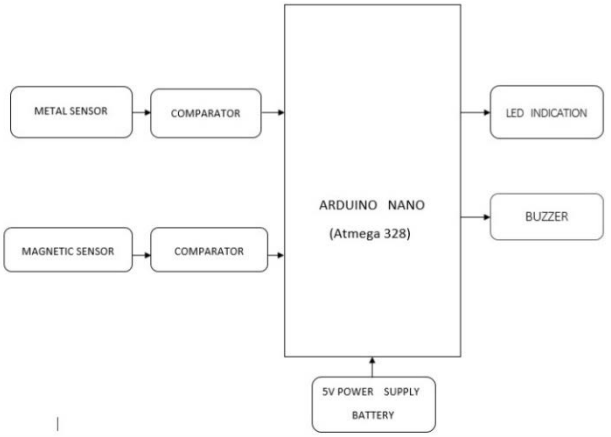

FIG: 1. Block Diagram of MM&MS (D) Radio Therapy

Description

Initially, The magnetic sensor senses the patient recognition and the metal sensor senses the patient dose levels and the both the values are being checked along with the reference value using comparator and the resulting value is being gives to the Arduino Nano Microcontroller(Atmega 328). It can be used as a open source hard ware this is used in communications and in the controlling or operating many other devices,It consists of two memory program memory and the data memory which is being worked by 5v power supply and the output is LED indicators checks for the lightning and sounds.

IV. RESULT

Thus, developed a project which detects the patient using a magnetic sensor indicates the radiation exposure with accuracy. Which avoids the over dosage of radiation.

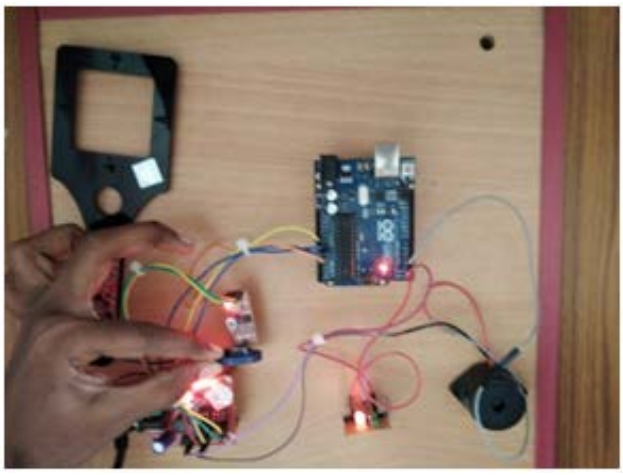

Fig: 2. Output of MS (D) Radio Therapy

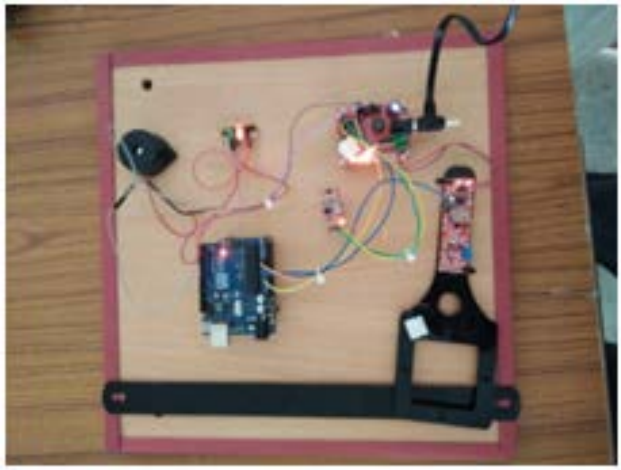

Fig: 3. Output of MM (D) Radio Therapy

V. CONCLUSION

Advantages of metal micro and magnetic sensor(detector)allow to create a reliable radiation system for radio therapy application is developed with a circuit with less expenditure. Which is very much useful in the radio therapy field in hospital and laboratories.

REFERENCES

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