

Design of Smart airfield lighting system based on Arduinio Uno for airport ground lighting

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Abstract- Air terminals around the globe keep on facing weight to extend their abilities to deal with expanding numbers off lights because of increments in aircrafts. Amid day by day air terminal operations the entry and takeoff times of flights may shift contrasted with their unique calendars. For occupied air terminals with high quantities of landings/takeoffs, the task choices must be set aside a few minutes to catch every one of the progressions .Smart Airfield Lighting System (SALS) keeps air terminal runway lighting administration capacities in the view of arduinio uno microcontroller. SALS give a Simple component of exchanging ON the landing strip ground light framework at whatever point the sensors distinguish the movement of inbound and outbound air ship coming towards and leave from the air terminal runway. It gives shrewd ground lighting framework to help enhance the aviation..

Keywords—Smart Environment; Internet of Thing; Runway Lighting System; LED technology;

1. INTRODUCTION

Contemplates in aeronautics businesses demonstrate that observing and controlling landing strip lighting framework builds the air terminal limit and operation proficiency. Also, landing strip lighting framework had enhanced the security in aviation authority and the flying machines at runway of the air terminal [1].Air terminal runway ground lighting (AGL) frameworks are responsible for stressing the runway and giving visual reference of speed and arrangement of air ships inside the last phases of drawing nearer, hallway and taxing operations. The air terminal runway framework is vital for plane to approach and land securely. Smart airfield lighting system is anticipated to control and screen all the airfield ground lighting hardware introduced in the landing strip. In the meantime, with a specific end goal to help the pilots in recognizing the runway of the runways and in addition in giving landing securely rule during the evening, sufficient lighting is essential. SALS gives Simple component of exchanging ON the landing strip ground light framework at whatever point the sensors distinguish the movement of inbound and outbound air ship coming towards and leave from the air terminal runway. Light radiating diode (LED) innovation is as of now the most effective adversary to conventional

glowing lights and utilizes low cost, low power. Air terminals around the globe keep on facing weight to extend their abilities to deal with expanding numbers off lights because of increments in aircrafts. Amid day by day air terminal operations the entry and takeoff times of flights may shift contrasted with their unique calendars. For occupied air terminals with high quantities of landings/takeoffs, the task choices must be set aside a few minutes to catch every one of the progressions. The basic role of ATL Framework is to keep up safe partition of air activity and to deal with the safe and efficient development of air ship and vehicle movement in flying machine development territories to avoid runway and runway incursions.

Objectives:

- It delivers location specific responses.
- Increased visibility, precision docking information.
- Reduces the cost and risk.
- Low power.
- Safety parking.

II. LITERATURE SURVEY

In India, airfield frameworks based on many researches are going on to minimize the power consumption and accidents in the airport. Smart airfield lighting system provides less power and safety parking and information to the pilots. By using this proposed framework considerable amount of power will be saved and safety parking compared to other framework. Single stage thyristor rectifiers are broadly utilized as a part of modem airplane terminal as dc power provide for such many as ventilation systems, correspondence, PCs and air terminal establishing lighting framework. The music created via bunches stages prohibited rectifiers of airplane terminal establishing illumination framework be concentrated in view of test estimation. Symphonious contamination observed designate firmly identified with the heap level of airplane terminal establishing lighting framework. Energy waveform bending on purpose of normal coupling is basically consequence symphonious in progress created by the power gadgets prohibited burdens. Likewise discovered aggregate power sounds bending donot really increment with the expansion of

current twisting. The music and unbalance for consolidated burdens additionally researched [1].

Runway Ground Lighting Control and Monitoring System is utilized to controls and screen all airfield ground lighting hardware introduced landing strip and support the effective and safe moving of all ground movement at a runway. This is regularly accomplished by utilizing a progression of PCs and Programmable Logical Controllers (PLCs) that exchange the ATC administrator's charges to the different gadgets in the field. Screen their status and give the fitting input to the administrator and support staff. [2].

Alcms gives best in class programmable insight for observing of landing strip. The Alcms can naturally control and screen stop bars or runway protects lights as a feature of a surface development direction and control framework. What's more, framework can control and screen ground and grip small frameworks and can be modified to interfacing with consistent present controllers, generators, move toward lighting, different gadgets requiring remote control additionally observing. alcms is unsurpassed in execution, lengthy haul dependability, adaptability amid numerous typical components .extensive variety of creative, practical choices [3].

To address the issues of exact runway identification in remote detecting pictures, while lessening superfluous movable parameters, a productive and parameter free technique is proposed to extricate the straight edge of runway in light of Helmholtz standard. In principle, this proposed strategy can confine the quantity of false alerts and ends up being parameter less.. The consequences of solid surface and pitch surface air terminal demonstrate our technique abstain from instating the sort of runway, and is not touchy to commotion and the dark level distinction amongst air terminal and ground. [4].

smart airfield lighting system gives air terminal runway lighting administration abilities in light of the arduino. SALS give a basic component of exchanging ON the landing strip ground light framework at whatever point the sensors identify the movement of inbound and out bound flying machine coming towards and withdraw from the airplane terminal runway. It gives earth illumination framework toward facilitate enhance aviation authority framework from one end to the next. It conveys area particular reactions, expanded perceive ability, accuracy docking data and ongoing situational mindfulness help to advance the security of staff and traveler. It likewise enhances the airplane terminal framework by insightfully picking up an incorporated view from border for pilot to help and reacting quickly and relieving related effect.

III. METHODOLOGY

The smart airfield lighting system consists of arduino Uno atmeg328p microcontroller and ir sensor and UV sensor and leds and ldr. When the airplane entering into the airfield and it is detected by using an ir sensor so that approaching lights are on. The airplane (runway light) touches the airfield and it is sensed by using an ir sensor.

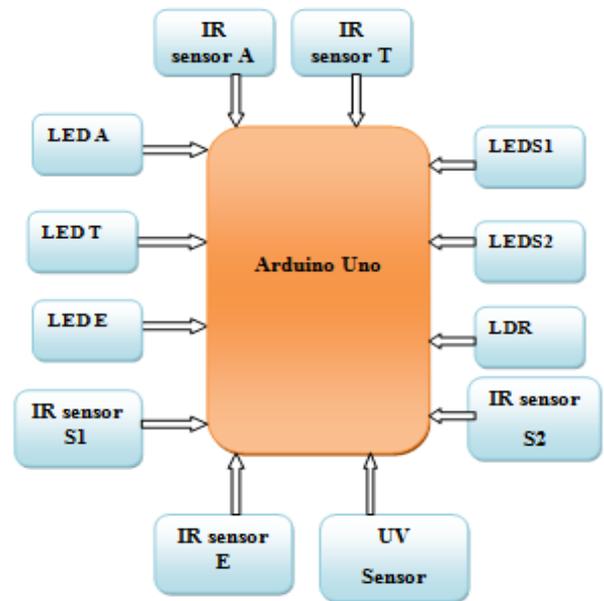


Figure 1. Block diagram of smart airfield lighting system

It has the following parts:

- LEDA -light emitting diode for approaching lights.
- LEDT- light emitting diode for touchdown lights.
- LEDE- light emitting diode for edge lights.
- LEDS1-light emitting diode for slot s1.
- LEDS2-Light emitting diode for slot s2.
- IR Sensor A - IR sensor for approaching lights.
- IR Sensor T –IR sensor for touchdown lights.
- IR Sensor E –IR Sensor for edge lights.
- IR Sensor S1 – IR sensor for slot s1.
- IR Sensor S2 – IR sensor for slot s2.

So that touchdown lights are on. Then the airplane move into the airfield and sensed by using an ir sensor. So that edge lights are on. Then airplane selects parking place for safety parking. Parking place are slot1 and slot2 developed. UV sensors are used for obstacle detection purpose in the slot1 and slot2 parking place of airfield and if any obstacle there in the slots of the airfield and the led lights will be off and otherwise led lights are on. This indicates to inform the pilot to safety parking in the vehicle free slot of the airfield. The vehicle free slot indicates that leds are on and going to park safely. The

LEDs (runway light) be lit stage by stage until the finish of the runway to manage the pilot arrival on the correct landing way. The pilot adjust the flying machine in light of the light given in the runway as the pilot drawing closer to land, other than alluding to the arrange and direction from the control tower[3].Airplane terminal lighting is an essential wellbeing highlight vital at each indicate encourage night flying. Landing strip runway lighting comprises of different sorts of light with their own functionalities[4].air terminal runway light gives light flags to pilot to plane taking off, landing and maneuvering.

RESULT

Once the system is designed and implemented it has to be tested to check its reliability and energy and visibility. The chapter discusses the details of the results obtained for the tests performed on the smart airfield lighting system and it provides a secure safety parking and also energy is saved, provides information, we can save a power approximately 70% of power when we use the led system than the other system.

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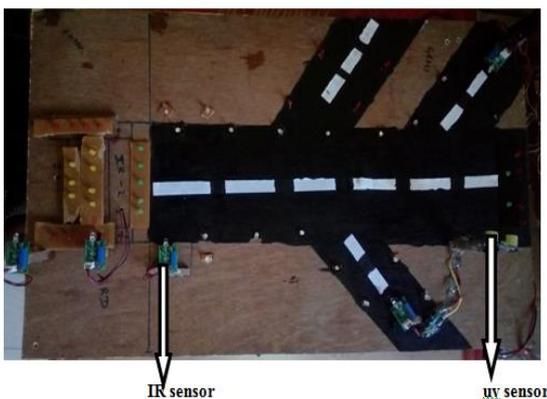


Figure 2: overall model of the proposed system

CONCLUSION

Smart airfield lighting system is projected to control and screen all the airfield ground lighting gear introduced on the landing strip. This is to help proficiency along with furthermore security pointer of every land traffics on the field. It gives ground lighting framework to help enhance the aviation authority framework. It transfer location specific responses; increased visibility, exactness docking data and ongoing situation mindfulness help to advance wellbeing of staff and traveler. The additionally enhances the airplane terminal framework by brilliantly picking up a coordinated view from border for pilot to help and reacting quickly and relieving related effect.