



डा० ए०पी०जे० अब्दुल कलाम प्राविधिक विश्वविद्यालय

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY

(Formerly UP Technical University)

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Ref. No.: AKTU/IH/2023/61

Date: 04/09/2023

To,

The Directors,
Affiliated Institutions of Dr. A.P.J. Abdul Kalam Technical University

Subject: Nominations invited for the 'National-level Lightning & Thunderstorm Hackathon' under the guidance of the Hon'ble Chief Minister of Uttar Pradesh

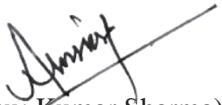
Dear Sir/Madam,

This is to bring to your kind attention that a Hackathon on 'Lightning & Thunderstorm Problem Statement' through the Relief Commissioner Office under the guidance of the Hon'ble Chief Minister Shri Yogi Adityanath, was initiated and the Relief Commissioner Office has affirmed the responsibility to Innovation Hub, Dr. APJ Abdul Kalam Technical University.

With the objective of holistically solving the Lightning & Thunderstorm Problem Statement, Innovation Hub, AKTU is glad to organize and execute this Hackathon at the national level to develop Early Detection and Warning Systems and to ideate the devices further to arrest the Lightning to address the life and property-loss in our State. To take this initiative forward you are requested to kindly circulate the information and ask the students/startups/faculty/innovators/researchers/any individual applicants to apply at <https://ihubup.in>. **A maximum of two registrations from each of the centers can be done.** This event holds significant value and is directly monitored by the CM Office & the Honorable Chief Minister.

The Grand Finale shall be held on 6th October 2023 at Innovation Hub, AKTU. The Hackathon Finalists will receive prize money worth Rs. 5 Lakhs along with a Certificate of Recognition, Incubation Support, Financial Support to Build the Prototypes, and Commercialization Financial and Non-Financial Incentives shall be provided to all the finalists by Innovation Hub, Uttar Pradesh under the UP-Startup Policy. We'd like to ask you to share the information with your students, faculty, and innovators.

For any inquiries, please feel free to reach out to Mr. Mahip, Head of Innovation Hub, at 9582058878 or via email at head.innovationhub@aktu.ac.in.


(Dr. Anuj Kumar Sharma)
Associate Dean, I&SE

Copy To:

1. Staff Officer, Vice Chancellor Office, AKTU, Lucknow
2. Associate Dean, Innovation & Social Entrepreneurship, AKTU


(Dr. Anuj Kumar Sharma)
Associate Dean, I&SE

ABOUT LIGHTNING & THUNDERSTORM HACKATHON

DATE: OCTOBER 6, 2023

VENUE: Innovation Hub, Dr. APJ Abdul Kalam Technical University, Lucknow

With the objective of holistically solving the Thunderstorms Lighting Problem Statement, the Hon'ble Chief Minister of Uttar Pradesh has proposed to execute this Hackathon to build technological solutions to address the life and property-loss in our State. We adhere to the Hon'ble Chief Minister of Uttar Pradesh for providing his visionary guidance and gracing the Grand Finale occasion to be held at Innovation Hub, AKTU.

NATURAL DISASTERS

Natural disasters are catastrophic events with atmospheric, geological, and hydrological origins (e.g., droughts, earthquakes, floods, hurricanes, landslides) that can cause fatalities, property damage and social environmental disruption. The main causes of natural disasters are tectonic shifts, lunar activities, deforestation, soil erosion, air pressure, pollution, ocean currents, global warming, mining, seismic waves, etc. As the world gets warmer due to human activities such as fossil fuel use, as well as worsening air pollution the frequency and intensity of lightning strikes over the Indian subcontinent is also likely to increase, according to a recent study by scientists at the Indian Institute of Tropical Meteorology.

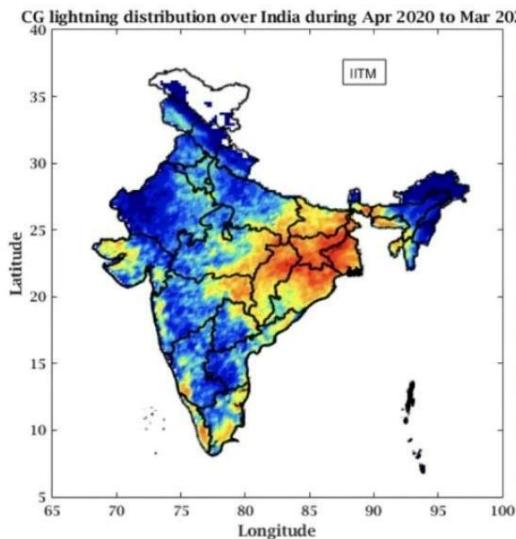
THE INDIA CONTEXT

The eastern and northeastern parts of our country i.e Gangetic plains of India, namely eastern Uttar Pradesh, Jharkahand, Bihar, Orissa, West Bengal, and States in NE India get affected by severe thunderstorms during pre-monsoon months of March to May. These storms usually travel from northwest to southeast direction and are called "Norwesters". Gujarat's Kutch and Odisha's Mayurbhanj Dubbed India's Most Lightning Prone Districts. Bhutan is also recognized as the Land of Thunderbolt due to the extreme and large thunderstorms which wash via the valley from the Himalayas.

Usually, thunderstorms last for only about half an hour. However, the larger kinds of thunderstorms, such as multicell and supercell thunderstorms, can last for much longer. Scattered thunderstorms are also more likely to last longer than single thunderstorms. Severe thunderstorms can, however, cause injury or death and can also result in substantial property damage. Many hazardous weather events are associated with thunderstorms as they also produce hail, tornadoes, Lightning and floods.

IMPACT ON LIFE

Lightning is responsible for several fires around the world each year, as well as causing deaths when people are struck. According to the National Crime Records Bureau (NCRB), in the year 2021, as many as 2,880 people died due to lightning. Though the chance of getting hit by lightning in India remains minuscule – almost 1 in 5,00,678 – at least 2,000 people have died because of lightning strikes in the country in the past couple of years. Only about 10% of people who are struck by lightning are killed, leaving 90% with various degrees of disability, so the atrocity count is nearly 20,000 people. Few information has been provided below.



CITY EXPRESS

Thiruvananthapuram, Friday 13 November, 2020

BE CAUTIOUS DURING LIGHTNING

LARC has issued safety guidelines to the public during the ongoing Northeast Monsoon

PAGE 3

Exercise Caution When Lightning Strikes!

Express News Service

T'Puram: The Lightning Awareness and Research Centre (LARC), which is part of the Central Institute of English Language and Social Science (CIES), has issued safety guidelines to be followed during the ongoing Northeast Monsoon season.

According to LARC, personal protection against lightning can be ensured by avoiding objects and locations which can become live during lightning. All objects with metal components such as telephones, cable TV, wired internet modems and all devices connected to electric power should be disconnected during lightning.

However, public should avoid removing connections of equipment connected to the wall plug when lightning strikes. People should stay away from water pipes and taps, including those in the kitchen, during lightning.

As walls, doors and windows of the house will become live during lightning, it is better to keep away from these frames and stay those objects touching them. Avoid roof tops and open grounds. It is safe to use mobile phones and cordless receivers of



land telephones when one is away

from dangerous objects and locations. Use of metal objects such as scythes, pickaxe and metal poles should be avoided.

Being outside the house, one has to avoid being near trees and large metallic vehicles like trucks and earth movers. If trapped in a vehicle during lightning, one should

move quickly to a concrete

building and be at the centre of the vehicle.

If there is no concrete building, one has to avoid being near trees and large metallic vehicles like trucks and earth movers. While being in open ground, even umbrellas have to be discarded.

Riding bikes and leaning on

cars can be dangerous; but being

inside the car, bus, train and inside a concrete roof building is safe during lightning. Being in water is more serious and can be fatal.

Considering the importance of lightning strikes in one of the needful areas of awareness and training in India, LARC

plans to organise a series of work

shops across all districts in the

state.

The 'lightning season' for the

country has begun with the onset of North East Monsoon in the Monsoon season. This year, it will continue till the onset of the southwest monsoon in June. There is normally a break between mid-November and March.

LARC has issued safety guidelines to the public during the ongoing northeast monsoon

AVOIDING THE DANGER

All objects with cable connections such as land telephones, cable TV, wired internet modems and all devices connected to electric power should be disconnected during lightning.

Public should avoid removing connections of equipments connected to the wall plug when lightning strikes.

People should stay away from water pipes and taps, including those in the kitchen, during lightning.

At walls, doors and windows of the house will become live during lightning, one has to keep away from these frames and stay those objects touching them.

It is safe to use mobile phones and cordless receivers of land telephones when one is away from dangerous objects and locations.

Use of metal objects such as scythes, pickaxe and metal poles should be avoided. While being outside the house, one has to avoid being near trees

- If outdoors, try to get into a building
- If no shelter is available, crouch low with least body contact with ground
- Wait for 30 minutes after last lightning before
- If outdoors, try to get into a building
- Swimming pools, plumbing lines in bathroom, kitchen
- Avoid electronic equipment of all types
- Avoid corded phones. Cordless or cellular phones are safe to use during storm

Minute Mirror

PAKISTAN'S INDEPENDENT DAILY NEWSPAPER

MINUTEMIRROR.COM.PK

Lightning strikes kill nine in Tharparkar

By Hanif Samoon

Lightning strikes killed at least nine people and more than 100 cattle during a downpour in Tharparkar district of Sindh on Saturday.

According to reports, two women, Lali, 25 and Guddi, 16, were killed in Sobharo Shah village near Mithi town, while at least three others of a same family sustained burn injuries when lightning struck them.

Another woman - Murda Samoon - and a

minor boy - Muzamal Samoon - were killed in Kumbhario Sammoa village near Islamkot town.

A teenage girl, Kamla Bheel, 17, was killed in Pade Ral village near Chhachro town. Another four died in different villages of the district.

But rains also brought some respite to the locals, who had been facing the worst drought-like conditions since the start of this year. Most areas of the district turned lush green after the rain, sparking hopes of the locals for better crops yield and enough fodder for their livestock.



WHERE DOES LIGHTNING GENERALLY STRIKE

Tall objects, such as trees and skyscrapers, are the most common targets for lightning

Mountains, therefore, make a good target



What to do in case of a lightning storm

Get out of water, including pools, lakes and waterbodies

Postpone outdoor activities, if indoors

Head indoors once you see lightning and look for proper structures and buildings (pukka houses, pukka buildings or hard top automobiles), ideally staying in for 30 minutes after hearing the last clap of thunder

If out in the open, do not take shelter under a tree

Avoid being near electrical equipment and landline telephone.

If no shelter is available, get into the lightning crouch.

Squat or sit in a tight

ball, arms wrapped around your legs. Keep your feet together (touching), head lowered, ears covered, and eyes closed. This makes you as small a target as possible

Do not lie down, as it increases the surface area

But what is lightning

A giant spark of electricity in the atmosphere between clouds, the air or the ground

Thunderclouds possess millions of volts of electrical charge and different polarities within the cloud itself

In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground

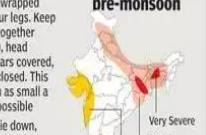
When the opposite charge builds up enough, this insulating capacity of air breaks down and there is a rapid discharge of electricity that we know as lightning

Lightning deaths in India

1,771 2019



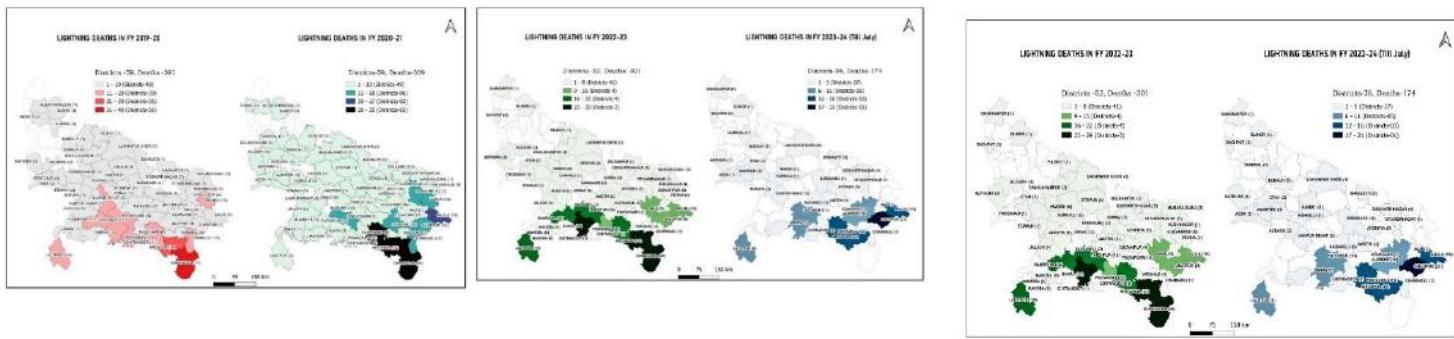
Lightning strikes pre-monsoon



AFFECTED AREAS IN UTTAR PRADESH

In Uttar Pradesh, 301 Lightning Deaths occurred during FY 2022-23 with Sonbhadra and Banda being most effected districts in UP with 29 and 24 casualties. Except a few cities almost every district has casualties due to Thunderstorm Lighting. The Poorvanchal (Sonbhadra, Mau, Ballia, Ghazipur, Varanasi and Chandauli) and Bundelkhand regions (Banda, Chitrakoot, Prayagraj, Mirzapur, Hamirpur and Lalitpur) have the maximum deaths witnessed during FY 2022-23. Only about 10% of people who are struck by lightning are killed, leaving 90% with various degrees of disability, so the atrocity count is 10 times.

The state data is represented through map.



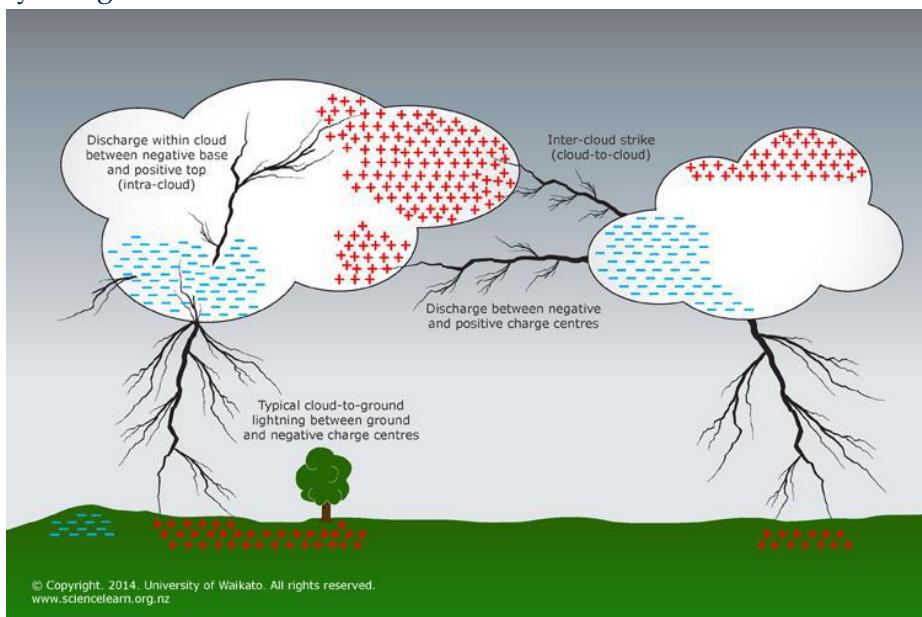
THE SCIENCE BEHIND!

A thunderstorm, is also known as an electrical storm or a lightning storm, which is characterized by the presence of lightning and its acoustic effect on the Earth's atmosphere, known as thunder. Relatively weak thunderstorms are sometimes called thundershowers. When lightning strikes the shock travels from the clouds to the Earth's surface and then back again. With that return path, the air surrounding the bolt heats up so much it explodes outwards, compressing the other air only to expand, cool and contract again creating a loud shock we can hear from the ground is known as thunder. Three basic ingredients are required for a thunderstorm to form: moisture, rising unstable air (air that keeps rising when given a nudge), and a lifting mechanism to provide the "nudge." The sun heats the surface of the earth, which warms the air above it.

Lightning is a giant spark of electricity in the atmosphere or between the atmosphere and the ground. In the initial stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground; however, when the differences in charges becomes too great, this insulating capacity of the air breaks down and there is a rapid discharge of electricity that we know as lightning.

Lightning is technically both AC (alternating current) and DC (direct current). During the initial stage of a lightning strike, a large current, flows as a discharge of electricity, and this current flow is in the form of AC. There are 3 types of lightning which are as follows:

1. Cloud to Cloud: Lightning that occurs between two or more separate clouds.
2. Cloud to Ground: Lightning that occurs between the cloud and the ground.
3. Cloud to Air: Lightning that occurs when the air around a positively charged cloud top reaches out to the negatively charged air around it.



THE SOUND, HEAT & SPEED

The resultant outward-moving pulse is a shock wave, similar in principle to the shock wave formed by an explosion, or at the front of a supersonic aircraft. Near the source, the sound pressure level of thunder is usually 165 to 180 dB, but can exceed 200 dB in some cases. While the flashes we see as a result of a lightning strike travel at the speed of light (670,000,000 mph) an actual lightning strike travels at a comparatively gentle 270,000 mph. This means it would take about 55 minutes to travel to the moon, or around 1.5 seconds to get from Lucknow to Gorakhpur. In fact, the lightning can heat the air it passes through to 50,000 degrees Fahrenheit (5 times hotter than the surface of the sun). A typical lightning flash is about 300 million Volts and about 30,000 Amps.

ATMOSPHERIC BENEFITS

Without thunderstorms and lightning, the earth-atmosphere electrical balance would disappear in few minutes. Lightning also makes ozone-producing chemicals. Lightning and subvisible discharges produce molecules that clean the atmosphere. Lightning bolts break apart nitrogen and oxygen molecules in the atmosphere and create reactive chemicals that affect greenhouse gases. Lightning can also fix nitrogen. The high temperature of a lightning bolt can break the bonds of atmospheric nitrogen molecules. Free nitrogen atoms in the air bond with oxygen in the air to create nitrogen oxides, which dissolve in moisture to form nitrates that are carried to Earth's surface by precipitation.

SCIENTIFIC INTERVANTIONS

Satellites take pictures of Earth at regular intervals from space, telling us where clouds are located. Meteorologists watch these pictures over time to watch for rapidly growing clouds, a clue to a possible thunderstorm. Satellites also can tell us the temperature of the clouds. Humanity has been contemplating the idea of capturing lightning in a bottle but thus far we have got very little success. Each strike would force about fifty thousand amps of current into a battery in just microseconds. No existing battery could survive this blitz; batteries need to charge up more slowly. Lightning can travel through plumbing. It is best to avoid all water during a thunderstorm. Do not shower, bathe, wash dishes, or wash your hands. The risk of lightning travelling through plumbing might be less with plastic pipes than with metal pipes.

THE LIGHTNING & THUNDERSTORM HACKATHON

Calling Weather Enthusiasts & Ideators, and Coding Maestros!

The Government of Uttar Pradesh and Innovation Hub, Uttar Pradesh are excited to be teaming up to bring you the most exciting Hackathon of the Year - Harness the Thunderstorm Hackathon! This isn't just a fun event; it's a creative Thunderstorm of Ideas where the Love for Environment & Weather meets the Love for Code. Throughout the #ThunderstormHackathon, you'll have the opportunity to dive into NDRF's & Metrological Dept. vast weather data to develop, ideate, predict and forecast on Thunderstorms and thus save Lives!

The Thunderstorm Challenge

Submit ideas that fundamentally transforms how weather data can solve real-world problems like Thunderstorms and what are the effective ways using the Thunderstorm Methodology to draw scientific interventions from it to for a healthier environment ecosystem.

Hackathon Run-Time

Application Submission: From 17th August till September 10th 2023

Evaluation of application: 10th to 18th September 2023

Round 1 Results Announcement: 19th September 2023

Round 2 Online Screening: 25-27 September 2023

Round 2 Result announcement: 29 September 2023

Grand Finale: 06th October 2023

Hackathon Venue: Innovation Hub, Dr. APJ Abdul Kalam Technical University, Lucknow

Participation

Any Student, Startup or an Individual who wishes to participate can Register on the Innovation Hub website and learn about the Idea/MVP Submission Guidelines.

Prizemoney

Prize money worth 5:00 Lakhs INR.

Winner: Rs. 2.00 Lakh

1st Renner up: Rs. 1.50 Lakh

2nd Runner up: Rs. 1.00 Lakh

Consolations (1): Rs. 50,000

Certificate of Recognition, Incubation Support, Financial Support to Build Prototype, for Commercialization and Travel to Annual #ClimateTech Conference, and much more!

For register visit at

<https://ihubup.in>

or scan the QR



For any inquiries, please feel free to reach out to Mr. Mahip, Head of Innovation Hub, at 9582058878 or via email

at head.innovationhub@aktu.ac.in.