hey there i am samarth

so, This guy over here is me, and this is my journey of building projects!

I'm an ex Research Associate @ The Perrin Institute at UVA and a student at The Knowledge Society (TKS). I am specializing in CS, Robotics and ethical AI governance frameworks for emerging economies, with a focus on developing meaningful project to address global issues.

Building for Society

TKS

I am building HackSkool

–

it’s a place for builders — not students. not watchers. a dojo where you learn by doing, by shipping, by showing up. you build, you fix. that’s hackerskool. launching this november.

Building for Society

---

www.hackskool.com/

my journey?

It started when i was in my grade 7th i was sitting on the first bench and then i found an opportunity

I got an idea that changed my life it helped me reach my first national competition at new delhi, india.

It was my delusion that worked me!

I made a landmine detector using arduino uno and some micro controllers.


the beginning

Yeah this is Me who grew up with a lot of learnings & projects

i was 13 year old and i started experimenting with opencv and python.

video - link

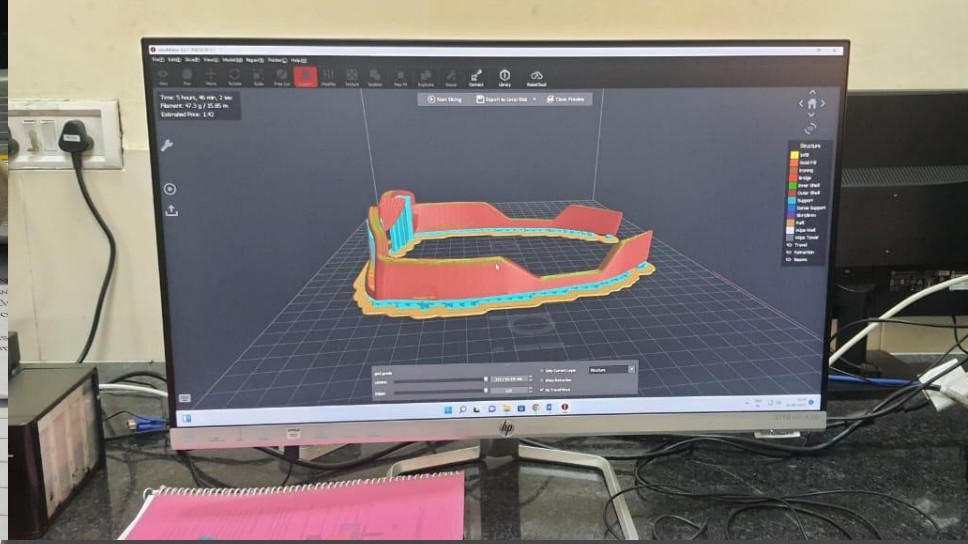
intro paper - paper

then, i did a lot more

I made drones, softwares, products, models, robots,
Eyewear for visually impaired and wut not

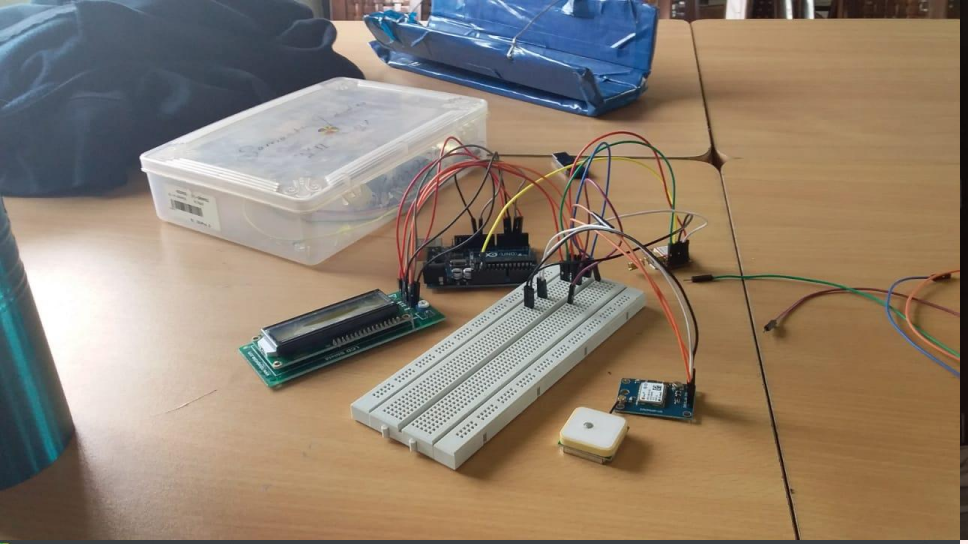
Since 2017 when i was first introduced to the world of research,
Innovation, softwares i finally found my cup of tea and since then
I am a problem solver.


Question 6

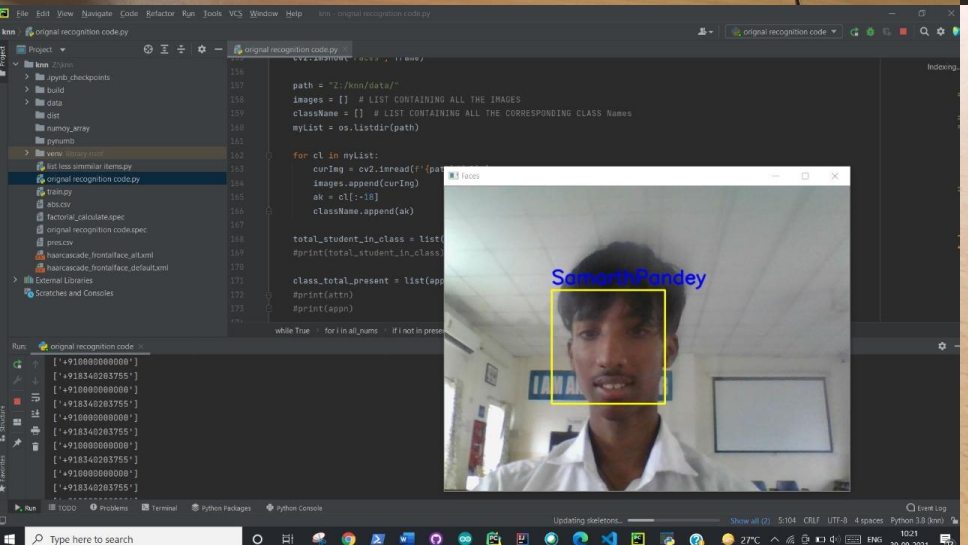


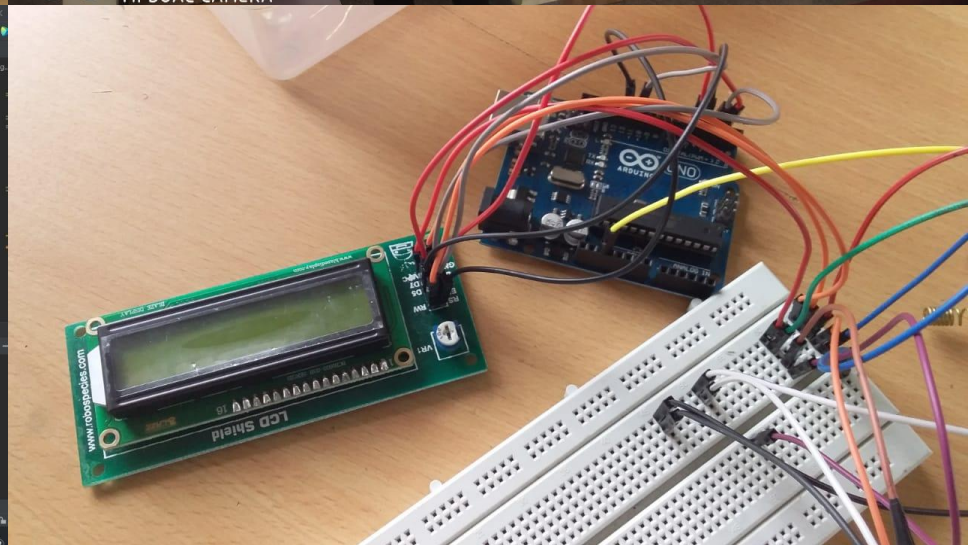

ADVENTURE
REDMI NOTE 5 PRO
MI DUAL CAMERA


GOD VISION




REDMI NOTE 5 PRO
MI DUAL CAMERA


Faces
SamarthPandey


LCD Shield
www.roboticsdojo.com

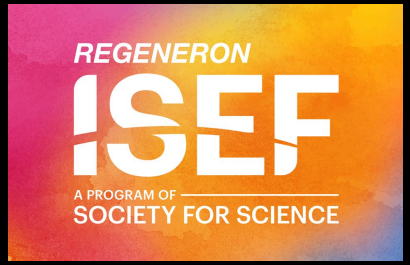
Got Recognised by **Indian Space Research Organization (ISRO)** when i was in my grade 10th back in 2021i, I was working on proposing a solution that involves a swarm of autonomous spacecrafts that use electro dynamic tethers for propulsion and reduce the velocity of the orbiting debris at the same time.

Then comes the year 2023

I won the *Grand Award* at the *IRIS National Fair.*

And i got the ticket to represent my country India at Regeneron International Science and Engineering Fair.

I was working on my project “Brain-Wave Stimulation as a Technique for Preventing and Treating Alzheimer's, Parkinson's and Other Movement Disorders and Improving Cognitive Abilities”. My Abstract Link : Here




REGENERON
ISEF
A PROGRAM OF SOCIETY FOR SCIENCE
DALLAS | 2023
SAMARTH
PANDEY
FINALIST
BEHA014
Fair ID: IND001
JAMSHEDPUR, INDIA
#239
FINALIST


BRAIN-WAVE STIMULATION AS A TECHNIQUE FOR IMPROVEMENT OF COGNITIVE ABILITIES IN PARKINSON'S AND ALZHEIMER'S DISEASE
Background
Aim and objectives
Work Flow
01
02
ISEF
PROF USMAN GHANI
SAMARTH
TEAM INDIA


ISEF
SAMARTH
TEAM INDIA

FUTURE FORWARD

REGENERON ISEF
A PROGRAM OF SOCIETY FOR SCIENCE
DALLAS | 2023

REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR 2023

May 13–19, 2023

Finalist

Samarth Pandey

Brain-Wave Stimulation as a Technique for Preventing and Treating Alzheimer's, Parkinson's and Other Movement Disorders and Improving Cognitive Abilities

BEHA014

DBMS English School
Jamshedpur, India

George Yancopoulos
Co-Founder, President and
Chief Scientific Officer
Regeneron

Maya Ajmera
President and CEO
Society for Science
Executive Publisher, Science News

Year 2023

I was at Regeneron ISEF !

The Pain point ~ ⚠️

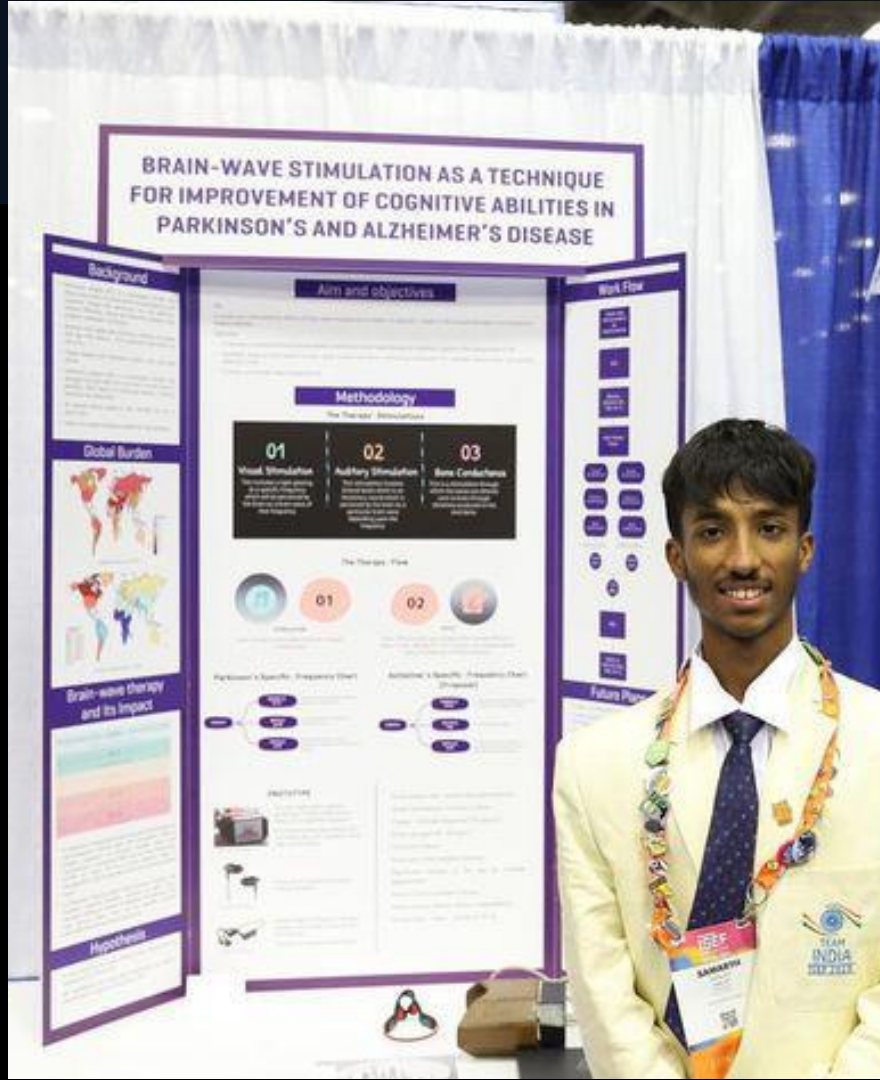
1. Neurodegenerative diseases like Alzheimer's and Parkinson's cause severe cognitive and behavioral decline.
2. Current treatments do not cure these diseases and only manage symptoms.
3. Patients face a significant drop in quality of life and independence.

The therapy / Solution ~ 🌱

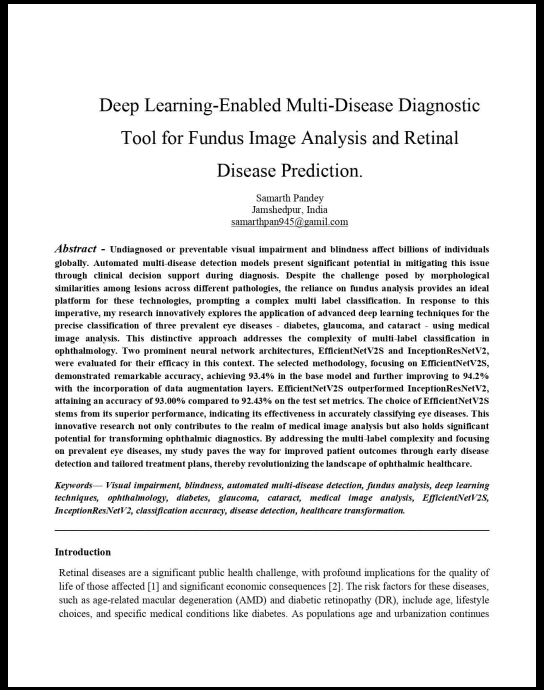
1. Designed a brain-wave stimulation prototype (Brain ReWireo) using auditory, visual, and bone conduction.
2. Used specific frequency waves (Delta, Theta, Gamma, Beta) to target sleep, memory, and anxiety.

Impact of this work ~ 🚀

1. Can improve memory, reasoning, and overall cognitive abilities in patients.
2. Offers a potential therapeutic approach to enhance daily living and well-being.
3. Opens new avenues for non-pharmaceutical, accessible treatments for neurodegenerative disorders.



After this I again represented India at African Young Science Busker festival.



Deep Learning-Enabled Multi-Disease Diagnostic Tool for Fundus Image Analysis and Retinal Disease Prediction.

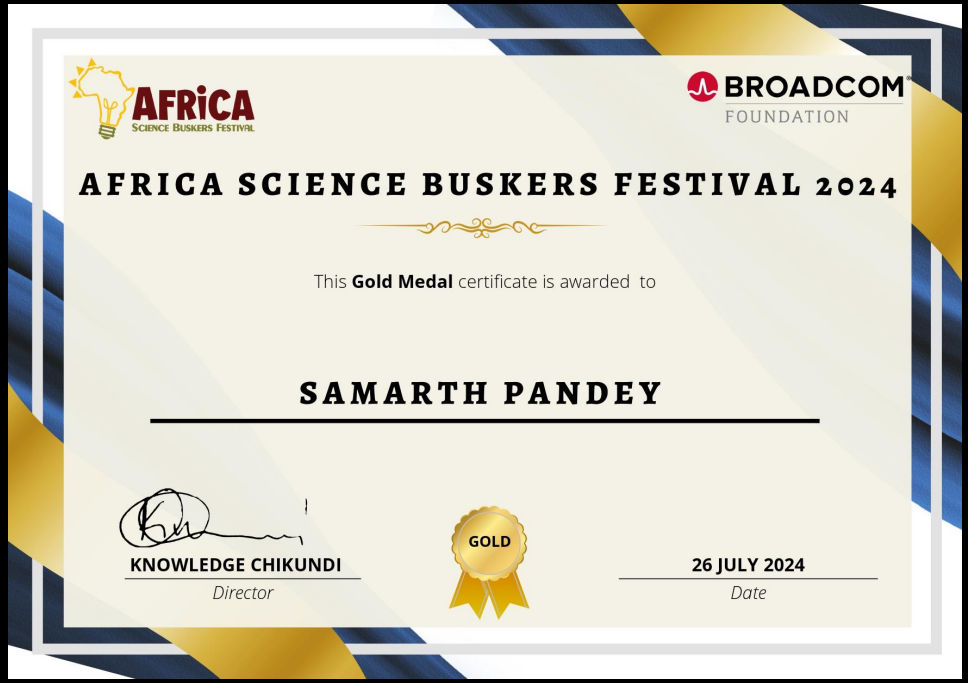
Samarth Pandey
Jamshedpur, India
samarthpan945@gamil.com

Abstract **- Undiagnosed or preventable visual impairment and blindness affect billions of individuals globally. Automated multi-disease detection models present significant potential in mitigating this issue through clinical decision support during diagnosis. Despite the challenge posed by morphological similarities among lesions across different pathologies, the reliance on fundus analysis provides an ideal platform for these technologies, prompting a complex multi label classification. In response to this imperative, my research innovatively explores the application of advanced deep learning techniques for the precise classification of three prevalent eye diseases - diabetes, glaucoma, and cataract - using medical image analysis. This distinctive approach addresses the complexity of multi-label classification in ophthalmology. Two prominent neural network architectures, EfficientNetV2S and InceptionResNetV2, were evaluated for their efficacy in this context. The selected methodology, focusing on EfficientNetV2S, demonstrated remarkable accuracy, achieving 93.4% in the base model and further improving to 94.2% with the incorporation of data augmentation layers. EfficientNetV2S outperformed InceptionResNetV2, attaining an accuracy of 93.00% compared to 92.43% on the test set metrics. The choice of EfficientNetV2S stems from its superior performance, indicating its effectiveness in accurately classifying eye diseases. This innovative research not only contributes to the realm of medical image analysis but also holds significant potential for transforming ophthalmic diagnostics. By addressing the multi-label complexity and focusing on prevalent eye diseases, my study paves the way for improved patient outcomes through early disease detection and tailored treatment plans, thereby revolutionizing the landscape of ophthalmic healthcare.**

Keywords— Visual impairment, blindness, automated multi-disease detection, fundus analysis, deep learning techniques, ophthalmology, diabetes, glaucoma, cataract, medical image analysis, EfficientNetV2S, InceptionResNetV2, classification accuracy, disease detection, healthcare transformation.

Introduction

Retinal diseases are a significant public health challenge, with profound implications for the quality of life of those affected [1] and significant economic consequences [2]. The risk factors for these diseases, such as age-related macular degeneration (AMD) and diabetic retinopathy (DR), include age, lifestyle choices, and specific medical conditions like diabetes. As populations age and urbanization continues



AFRICA SCIENCE BUSKERS FESTIVAL

BROADCOM FOUNDATION

AFRICA SCIENCE BUSKERS FESTIVAL 2024

This **Gold Medal** certificate is awarded to

SAMARTH PANDEY

KNOWLEDGE CHIKUNDI
Director

GOLD

26 JULY 2024
Date

Got accepted as a Research Associate from a highly competitive pool of 3,500+ global applicants, with only 30 selected. My expert profile : [Here]

RE: Acceptance as Research Associate

Dear All,

It is with great excitement that I write to officially welcome you to the **Perrin Research Institution** as a **Research Associate**.

This year, we received over **3,500 applications** from an extraordinary pool of candidates across the globe. With only **30 spots** available, the selection process was both rigorous and highly competitive. The incoming cohort reflects that excellence—with an **average ACT score of 34** and an **average SAT score of 1560**. Your acceptance places you among the most promising young researchers in the world.

As a Research Associate, you will play a vital role in producing original research that informs **federal agencies**, **foreign ministries**, and global institutions. Your work will be positioned to make a direct impact on public policy, including the potential to be showcased at international forums/orgs/events such as the **United Nations General Assembly** in NYC and the **Coalition for Inclusive AI's AI Safety Summit** in Geneva.

This is more than a research position—it is a platform to shape real-world decisions, drive innovation, and build a legacy of meaningful contribution.

We are honored to have you join us and look forward to seeing your work in action.

Warm regards,

Mr. Samuel Riverson
Chief Marketing Officer
Perrin Research Institution
rqf9kk@virginia.edu | University of Virginia
Contracted Independent Organization (CIO)

TKS

Another turning point was

When i got full ride at “The Knowledge Society (TKS)” which is a global teen accelerator program - https://www.tks.world/

CERTIFICATE *of* COMPLETION

This certifies that

Samarth Pandey

has completed the

TKS Innovate Program

demonstrating curiosity, dedication, and bold thinking — and building the skills, mindset, and drive to solve the world's most important problems.

Presented on
25 June 2025

Shea Tough
Program Director, TKS

My Research Works.

Published papers

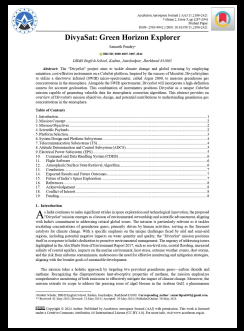
Technical Papers and Policy Papers

01.

Optimizing UAV: Assisted Relaying through Split Learning for Enhanced Distributed Inference in IoT-Based Ecological Monitoring - Link

This study bridges the gap between UAV-based relaying and distributed machine learning by introducing a novel split learning framework that optimizes IoT inference workloads across ecological monitoring networks. The paper demonstrates 30% faster convergence and 47% reduced energy consumption compared to traditional approaches.

02.



DivyaSat: Green Horizon Explorer - Link

This groundbreaking paper presents the DivyaSat platform, a low-cost, high-efficiency nanosatellite designed for environmental monitoring. Using quantum-resistant cryptography and edge-based computer vision, DivyaSat analyzes deforestation patterns and biodiversity metrics in real-time with 93% accuracy at 1/8th the power consumption of conventional satellites.

IMPACT FACTOR: 2023-2024
5.4

ACCELERON AEROSPACE JOURNAL

Certificate of Publication

Authored By

Samarth Pandey

in recognition of the publication of the work titled

Optimizing UAV-Assisted Relaying through Split Learning for Enhanced Distributed Inference in IoT-Based Ecological Monitoring

Published in: Volume 3 (Issue 3) 2024 | Date of Publication: 30-08-2024

DOI: 10.61359/2106-2446

Editor-In-Chief
www.acceleron.org.in

ACCELERON AEROSPACE JOURNAL (AAJ) BANGALORE

ISSN ROAD doi Foundation Crossref

Policy papers
Authored at Perrin

03.

This standard white paper aims to explain the significance of the Baltic Way in an economic, political, historical, and philosophical context.

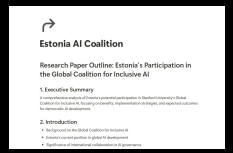
introduces a novel dual-partition AVF method that reduces HPC energy consumption by 50% while maintaining numerical accaccuracy in quantum simulations through explicit, parallelizable computations optimized for GPU architectures using checkerboard grid patterns.

04.

YIP Paper: AI as a strategic trade asset, Designing export controls for the next generation of Semiconductors

This paper explores the strategic importance of semiconductors, especially in the US-China context. It reviews current export control laws, China's efforts to build its own chip industry, and the global economic impact. Finally, it suggests policies to protect national security and strengthen international cooperation.

05.

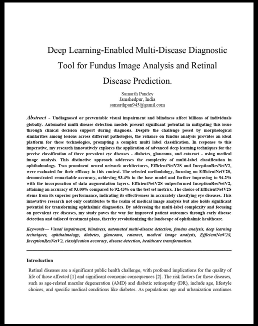


Paper : Estonia's Participation in the Global Coalition for Inclusive AI

A comprehensive analysis of Estonia's potential participation in Stanford University's Global Coalition for Inclusive AI, focusing on benefits, implementation strategies, and expected outcomes for democratic AI development.

Competition papers

06.



Deep Learning-Enabled Multi-Disease Diagnostic Tool for Fundus Image Analysis and Retinal Disease Prediction.

Samarth Pandey
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***Abstract* - Undiagnosed or preventable visual impairment and blindness affect billions of individuals globally. Automated multi-disease detection models present significant potential in mitigating this issue through clinical decision support during diagnosis. Despite the challenge posed by morphological similarities among lesions across different pathologies, the reliance on fundus analysis provides an ideal platform for these technologies, prompting a complex multi label classification. In response to this imperative, my research innovatively explores the application of advanced deep learning techniques for the precise classification of three prevalent eye diseases - diabetes, glaucoma, and cataract - using medical image analysis. This distinctive approach addresses the complexity of multi-label classification in ophthalmology. Two prominent neural network architectures, EfficientNetV2S and InceptionResNetV2, were evaluated for their efficacy in this context. The selected methodology, focusing on EfficientNetV2S, demonstrated remarkable accuracy, achieving 93.4% in the base model and further improving to 94.2% with the incorporation of data augmentation layers. EfficientNetV2S outperformed InceptionResNetV2, attaining an accuracy of 93.00% compared to 92.43% on the test set metrics. The choice of EfficientNetV2S stems from its superior performance, indicating its effectiveness in accurately classifying eye diseases. This innovative research not only contributes to the realm of medical image analysis but also holds significant potential for transforming ophthalmic diagnostics. By addressing the multi-label complexity and focusing on prevalent eye diseases, my study paves the way for improved patient outcomes through early disease detection and tailored treatment plans, thereby revolutionizing the landscape of ophthalmic healthcare.**

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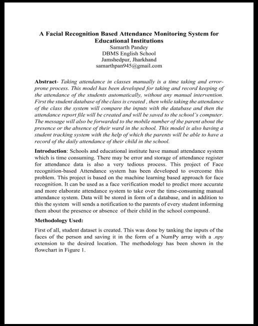
Introduction

Retinal diseases are a significant public health challenge, with profound implications for the quality of life of those affected [1] and significant economic consequences [2]. The risk factors for these diseases, such as age-related macular degeneration (AMD) and diabetic retinopathy (DR), include age, lifestyle choices, and specific medical conditions like diabetes. As populations age and urbanization continues

Deep Learning-Enabled Multi-Disease Diagnostic Tool for Fundus Image Analysis and Retinal Disease Prediction. Link

This research uses deep learning (EfficientNetV2S) to accurately detect diabetes, glaucoma, and cataract from eye images, achieving up to 94.2% accuracy. It tackles complex multi-disease classification and shows strong potential to improve early diagnosis and eye care.

07.



A Facial Recognition Based Attendance Monitoring System for Educational Institutions

Samarth Pandey
DBMS English School
Jamshedpur, Jharkhand
samarthpan945@gmail.com

Abstract- *Taking attendance in classes manually is a time taking and error-prone process. This model has been developed for taking and record keeping of the attendance of the students automatically, without any manual intervention. First the student database of the class is created , then while taking the attendance of the class the system will compare the inputs with the database and then the attendance report file will be created and will be saved to the school's computer. The message will also be forwarded to the mobile number of the parent about the presence or the absence of their ward in the school. This model is also having a student tracking system with the help of which the parents will be able to have a record of the daily attendance of their child in the school.*

Introduction: Schools and educational institute have manual attendance system which is time consuming. There may be error and storage of attendance register for attendance data is also a very tedious process. This project of Face recognition-based Attendance system has been developed to overcome this problem. This project is based on the machine learning based approach for face recognition. It can be used as a face verification model to predict more accurate and more elaborate attendance system to take over the time-consuming manual attendance system. Data will be stored in form of a database, and in addition to this the system will sends a notification to the parents of every student informing them about the presence or absence of their child in the school compound.

Methodology Used:

First of all, student dataset is created. This was done by tanking the inputs of the faces of the person and saving it in the form of a NumPy array with a *.npy* extension to the desired location. The methodology has been shown in the flowchart in Figure 1.

A Facial Recognition Based Attendance Monitoring System for Educational Institutions. Link

This project presents a facial recognition–based attendance system that automatically records student attendance and notifies parents about their child's presence or absence. Using a k-nearest neighbor (kNN) algorithm and Twilio API, the system achieves 95% accuracy in recognizing faces, creating attendance records, and sending messages. It aims to replace time-consuming manual methods, improve accuracy, and provide real-time updates to parents.

TKS Moonshot Project – Major Project !

A Next-Generation Graphene and Joule-Heating Air Purifier

Aeroshield can help us fight back.

Problem

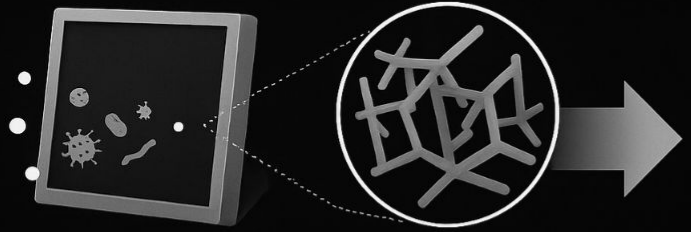
Since **2023**, hospital infections have killed over a **million people** each year, with 30% of ICU cases linked to germs in the air (CDC, 2023). Crowded places like hospitals, airports, and clinics let dangerous germs move from person to person. Old air filters only trap these germs, letting them spread again and costing over **$100 billion** in extra care.

Solution

AeroShield kills over **99%** of germs in the air, stopping them from spreading in hospitals, clinics, and airports. It keeps the air safe and clean, so infections can’t return.

AeroShield uses a special filter made from graphene nanofibers.

FILTRATION



POLLUTED AIR FILTERED AIR

The filter uses a porous 3D network of graphene-coated ZnO tetrapods to trap airborne pollutants, As air flows through, particles larger than 1 µm (like dust, pollen, and microbes) are captured via size exclusion, impaction and adsorption—achieving >95% efficlency for microbes and PM2.5.

SELF-CLEANING

When the filter accumulates organic pollutants (bacteria, mold, VOCs), an electric current is applied, Joule-heating the graphene layer to 300°C+ within seconds.
This thermal decomposition burns away trappel organics, sterilizing the filter and restoring airflow.


~10,000,000
clinics
~165,000
hospitals
~50,000
airports

Lets see it in action !

Hit me 🔗

My other projects!

1.

TKS Challenge : A recommendation to Microsoft titled “Triple-Stack Optimization: Frequency-Aware GPU Scheduling, Algorithmic Energy Minimization, and Lightweight AI Models Enabling $3.8B Annual Reductions

Link

Triple-Stack Optimization: Frequency-Aware GPU Scheduling, Algorithmic Energy Minimization, and Lightweight AI Models Enabling $3.8B Annual Reductions

Saving Billions Sustainably

Microsoft × TKS

2.

An AI mentor capable of real-time screen analysis, video feed interpretation, and web-integrated tutoring. Sheero dynamically generates graphs, critiques LinkedIn profiles, detects book titles from video feeds, and acts as a therapist/tutor.

Link

Hit here for a demo

3.

A revolutionary data structure inspired by DNA's compact storage that encodes information into synthetic nucleotide pairs. The double-helix architecture enables bidirectional data access, self-replication nodes, and biological-inspired error handling.

Link

Genomic Hyper-structure Framework → (GHF)

The Genesis ~

The DNA Chronicles: A Race Against Time 🧬💻

In a neon-lit future, the city's digital systems were crumbling. Blockchain, once the hero, had become a slow, power-hungry beast, suffocating under the weight of its inefficiency. But three brilliant minds were on the brink of a revolution: **Dr. Samarth** 🧠, the visionary behind a game-

4.

Vision E Sense - CNN-based tool detecting diabetic retinopathy, glaucoma, and cataracts from fundus images with 92% accuracy. Identifies biomarkers up to 2 years before symptom onset. Reduced diagnostic delays by 60% in pilot clinics.

Link

VizionE-Sense

A Deep learning based multiple disease diagnosing tool for efficient diagnosis, screening and progression monitoring using potential biomarkers from human fundus images

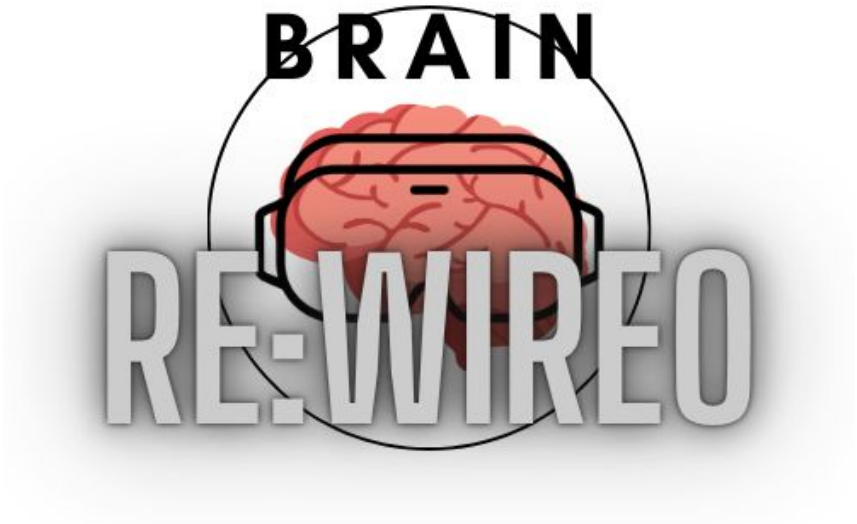
Samarth Pandey

DBMS English School, Jamshedpur, Jharkhand

5.

Regeneron ISEF Project: Brain-Wave Stimulation as a Technique for Preventing and Treating Alzheimer's, Parkinson's and Other Movement Disorders and Improving Cognitive Abilities

Link


BRAIN
RE:WIREO

Have been recognised by NCERT stands for the National Council of Educational Research and Training, Vivo Mobile India Pvt. Ltd.,
CIET-NCERT, IIT Madras Pravartak Foundation Technologies, and
UN Global Compact Network India, Government Of India for my various projects.

vivo Ignite
Technology & Innovation Initiative

3rd EDITION

CERTIFICATE

OF RECOGNITION

Congratulations! You are among the Top 200.

This certificate is proudly presented to

SAMARTH PANDEY

of **Grade** 12th , from The Knowledge Society

for his/her groundbreaking innovation, **AeroShield - Graphene + CRISPR = Revolutionizing Air Purification.**, submitted as part of the 3rd edition of the **vivo Ignite: Technology & Innovation Initiative**.
In recognition of your outstanding creativity and innovative thinking, your idea has distinguished itself and inspired us all.

Sumit Kumar,
CSR Lead,
vivo Mobile India Pvt. Ltd.

Dr. Amarendra P. Behera,
Joint Director,
CIET-NCERT

Dr. MJ Shankar Raman,
CEO
IITM Pravartak Foundation Technologies

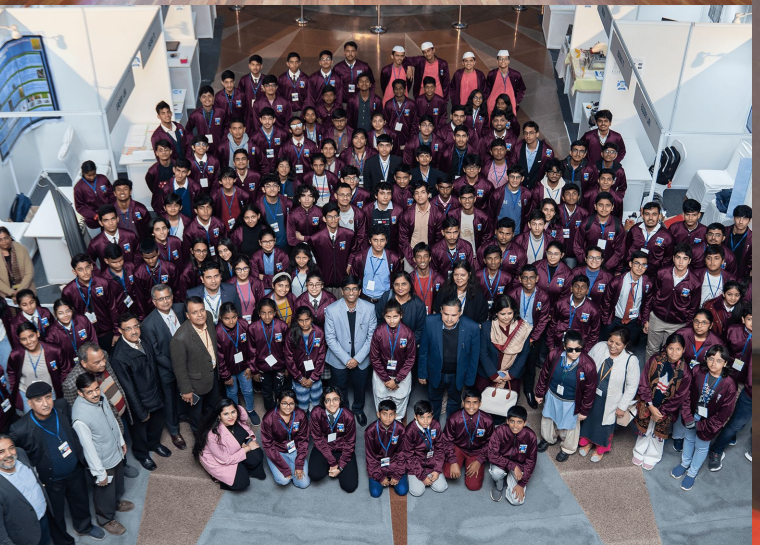
Ratnesh Jha,
Executive Director
UN Global Compact Network India

vivo for India: Igniting Innovation

SOF OLYMPIADS SCHOOL OUTREACH PARTNER

A vivo India CSR Initiative


BROADCOM
IRIS National Fair 2023




OMAR • SIDDHANT SHAH
• SOHAN TARIGOPULA
AL • SUMER MURTHY
• SWASTIKA KATH • SYED
T SINDHUJA • TEJASHREE
SWINI SA NTA • TVESHA
RIJA • VA DEVANG N •
IA • VANYA VARUN
N PATEL •
• YASHITA
NGHVI • YUV
• M. MURSAL
A • NEEL ARJ
• PRANAV
• RADHIKA
K SAPRA
PANDEY SAMA
H GUPTA • SHOR

Then comes the year 2025

I won got an invitation to be a speaker at TEDx Bistupur.

I did so many cool things that i didn't know i was being noticed by people And i discovered when i got an invitation to speak.

I gave a 12 min talk around my journey and what being curious means to me? my talk titled “The Neuroscience and Soul of Human Curiosity” is live here.

TEDx


Questions -> Human.
TEDx
Bistupur
?
X

I have been recognised by the following organizations for my different works.


REGENERON
ISEF
SOCIETY FOR SCIENCE

AFRICA

SIGMA XI

DASSAULT SYSTEMES

HACK CLUB


intel

roote

IRIS
NATIONAL FAIR

Tinkering India

IIT BOMBAY

IKEA

इसरो isro

MIT

विज्ञान एवं
प्रौद्योगिकी मंत्रालय
MINISTRY OF
SCIENCE AND
TECHNOLOGY

TKS


एन सी ई आर टी
NCERT


AIM
G20


SPRING

TEDx


vivo

XLRI


amrita tbi


inspire

Ongoing research work (into Ai and CS)

1. **Causal Representation Learning for Robust Decision-Making**: Integrating causal inference with deep learning to uncover cause-effect relationships in high-dimensional data, enabling reliable predictions beyond correlations.

2. **Neuro-Symbolic Hybrid Architectures for Interpretable AI**: Merging neural networks with **symbolic reasoning** to bridge the gap between data-driven learning and human-understandable logic.

3. **Self-Supervised Learning with Minimal Data Dependency**: Advancing AI models that learn from unlabeled data, reducing reliance on costly annotated datasets while maintaining high performance.

Thank You so much!

1. My Personal Portfolio can be found here - https://www.samarthpandey.com/

2. The Link to my social where i post about my wins and Happenings - https://www.linkedin.com/in/samarthpandeyyy/

3. My Medium where is post my long form contents - https://medium.com/@samarthpan945/

4. My semantic scholar can be found here - https://www.semanticscholar.org/author/Samarth-Pandey/2305121440


Thankyou!
Again :)