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readiness

AI Changemakers

Leveraging the promise of
AI for a sustainable tomorrow

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Foreword



Sandra L. Rivera

Executive Vice President
General Manager, Datacenter & AI Group,
Intel Corporation

I am happy to share the first edition of “AI Changemakers”, a compilation of innovative AI impact projects by the next generation of technologists and future developers from around the world. These projects were carefully selected by Intel for their impact, aligned to the United Nation Sustainable Development Goals (SDGs).

With increased digitization of everything, Artificial Intelligence (AI) as a superpower is driving unprecedented transformation of industries and society. We are now in a unique position to address longstanding challenges facing our world and our communities. Be it climate change, social inequity, or pandemics sweeping across the globe, emerging technologies like AI offer hope for real and actionable solutions. Aligned with 17 SDGs, governments, and organizations, like the United Nations, are investing in technology initiatives to drive positive change.

The next generation of technologists, future developers and innovators are tapping into the potential of Artificial Intelligence (AI), Data Science, and 5G to build new solutions for local and global challenges.

Intel’s purpose is to create world changing technology that improves the life of every person on the planet. Intel put the silicon in Silicon Valley. As a leader committed to demystify and democratize emerging technologies, Intel launched AI Global Impact Festival for student developers and young AI innovators with the theme ‘Enriching Lives with AI Innovations’. This festival brings together an incredible showcase of the carefully selected AI ideas and projects from around the world.

I am excited to present the compilation of outstanding projects from Festival 2021, titled “AI Changemakers”, to further catalyze and leverage the promise of AI for a sustainable tomorrow.

All the ideas and solutions shared here are aligned with the UN SDGs and have been developed as part of Intel® Digital Readiness Programs running in more than 25 countries across the globe. You can read more about it at www.intel.com/digitalreadiness. These programs demonstrate Intel’s commitment towards the United Nation’s universal call for shared corporate responsibility to ‘end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.’¹

Happy reading and I hope you are inspired to enrich lives with AI innovations.

¹ <https://www.undp.org/sustainable-development-goals>

About AI Changemakers

Intel® Digital Readiness¹ Programs focus on enabling the next generation with the appropriate skill sets, mindset, toolsets, and offers opportunities required to fulfil their potential. These programs also motivate them to create solutions aligned with the Sustainable Development Goals (SDGs).

To celebrate enriching lives with AI innovation, Intel organized the first annual AI Global Impact Festival² in 2021. With the participation of more than 135 countries, the Impact Festival showcased innovative AI solutions and ideas by next-gen technologists, innovative teaching-learning practices for AI skilling by teachers, coaches, and educators to more than 113,000 visitors from across the globe.

The book is a collection of 159 AI-based solutions and ideas received during the Impact Festival. These 70 cutting-edge solutions and 89 innovative ideas created by students from across the globe highlight the power of AI

in realising the UN SDGs. This gamut of ideas and solutions has the potential to make a lasting impact on the world.

The book has been divided into three sections:

- Top AI solutions and ideas by Grand Award Winners, Intel® AI Global Impact Festival 2021
- Cutting-edge AI solutions in alignment with UN SDGs
- Innovative AI ideas for a better future, based on industry

This book highlights AI-based solutions and ideas created by students and educators. Each of these intends to help meet one or more than one United Nations Sustainable Development Goal.

¹ <https://www.intel.com/content/www/us/en/corporate/artificial-intelligence/digital-readiness-home.html>

² <https://www.intel.com/content/www/us/en/artificial-intelligence/digital-readiness/impact-festival.html>



Leveraging the promise of AI for a sustainable tomorrow

Top AI solutions and ideas by Grand Award Winners, Intel® AI Global Impact Festival 2021

This section is a showcase of AI-driven solutions and ideas that emerged as winners from among the entries received from 20+ countries.

Kishan Know

An AI-powered solution that enables precision agriculture through intelligent evaluations of irrigation conditions in crop fields through the use of thermal and visible imagery.

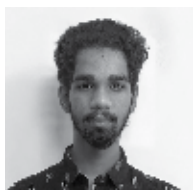
SDG 2 Zero Hunger



**Rishikesh Amit
Nayak**



**Niharika
Haridas**



**Gideon Samuel
Jacob**

Country/Region/Territory - **India**

AI Domain
CV, Data

Industry
Agriculture

AI enables farmers to yield more from the land while using resources more sustainably. Want to know how?

Turn to page [16](#) to discover more such innovations

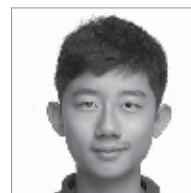
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of project
submitted by
student



CV-based handwashing supervision equipment

This solution can help improve public sanitation and personal hygiene by controlling the spread of the coronavirus with an AI-based monitoring system that ensures the seven steps of hand-washing.

SDG 3 Good Health and Well-being



Shijie Tong

Country/Region/Territory - **People's Republic of China**

AI Domain
CV

Industry
Healthcare

Interested in more innovative healthcare solutions? Check out these exciting ideas on page [19](#)

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student



RadiosegAI assistant for radiotherapy

This AI solution analyzes phone calls for phishing or other scammer activities and warns the recipient of the call, and even alerts law enforcement authorities in case of extreme cases.

SDG 3 Good Health and Well-being



Jun Shi



Minfan Zhao



Ziqi Zhu

Country/Region/Territory - **People's Republic of China**

AI Domain
CV

Industry
Healthcare

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FATIK

An AI solution that can raise a continuous alarm based on information from a snapshot when it detects that a driver's eyes have been closed for longer than a classified blink.

SDG 11 Sustainable Cities and Communities



Maksymilian Paczynski

Country/Region/Territory - **Poland**

AI Domain
CV

Industry
Transportation

Interested in more innovative solutions to build sustainable cities and communities?
Check out these exciting ideas on page [35](#)

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OpenVINO applied to intelligent aquaculture

This AI solution enables intelligent aquaculture through environmental monitoring and gathering of insights on fish behavior to help increase fish survival rates and reduce environmental waste.

SDG 13 Climate Action



Yen-Hsiang Liao



Jun-Rui Wu



Chun-Hsiang Yan

Country/Region/Territory - **Taiwan**

AI Domain
CV

Industry
Fishery

Interested in more innovative solutions to help tackle climate change?
Check out these exciting ideas on page [39](#)

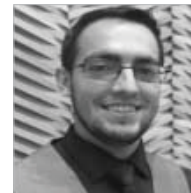
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student



Epilepsy: Predicting seizures

This AI solution aims to help epilepsy patients with a seizure prediction system by reading brainwave data through an electroencephalogram, processed by a device with feature extraction capabilities, and analyzed by deep learning models on a central server.

SDG 3 Good Health and Well-being



Jeremy Pemberton



Arnav Bawa



Wyatt Whitney

Country/Region/Territory - **United States of America**

AI Domain
CV, Data

Industry
Healthcare

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Anti-scam AI for phone calls

This AI solution analyses phone calls for scams like phishing and warns the recipient of the call about the nature of the call. It can also alert law enforcement authorities in case of extreme cases.

SDG 16 Peace, Justice, and Strong Institutions



**Benedikt
Buttenmuller**

Country/Region/Territory - **Germany**

AI Domain
NLP

Industry
Safety & Security

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student



Transforming movement into music

This solution leverages AI to provide differently-abled performers with a tool to create music by sensing their body motions.

SDG 3 Good Health and Well-being



**Tobias
Bruggemann**

Country/Region/Territory - **Germany**

AI Domain
CV, NLP

Industry
Music

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student



Detection depression via tweets

This solution uses AI to analyze tweets for indicators consistent with depression and helps identify sufferers who may be unwilling or unable to seek professional help. This solution can become the key first step to addressing the silent mental health epidemic of depression.

SDG 3 Good Health and Well-being



**Alifais Farrel
Ramdhani**

Country/Region/Territory - **Indonesia**

AI Domain
NLP

Industry
Healthcare

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student



CO mitigation system for automobile

This AI-based solution can help in monitoring and mitigating the risk of in-vehicle CO poisoning. This system can be connected to the user's smartphone or Intel software for data synchronization and emergency services to send out these critical safety alerts and prevent adverse outcomes.

**SDG 11 Sustainable Cities and
Communities**



**Mohd Farith
Ibrahim**

Country/Region/Territory - **Malaysia**

AI Domain
Data

Industry
Automobiles

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student



Your one-on-one Psychologist

The solution is an AI-based virtual psychologist that can detect mental health conditions with insights and training garnered from previous cases and experiences on the internet. It can then diagnose and treat patients after continuous consultation and feedback.

SDG 3 Good Health and Well-being



Leqi Wang

Country/Region/Territory - **People's Republic of China**

AI Domain
NLP

Industry
Healthcare

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student



AI fire evacuation path system

This solution is designed for the early detection of fire incidents and victims' identification through AI-based capabilities. The project can help in the prevention of building fires.

SDG 11 Sustainable Cities and Communities



Junu Park

Country/Region/Territory - **S. Korea**

AI Domain
NLP, Data

Industry
Safety and Security

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student



Cutting-edge AI solutions in alignment with UN SDGs

This section brings cutting-edge solutions built by next-gen technologists and innovators categorised according to the SDGs they address.

2 ZERO HUNGER



Zero Hunger

End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

It is estimated that approximately 690 million people or 8.9% of the world population are hungry. This alarming statistic shows that if no swift action is taken, the number of people affected by hunger would exceed 840 million by 2030. This goal aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

Better farming: Revolution farmers deserved

SDG 2 Zero Hunger

An AI-based chatbot solution that delivers customized suggestions and intelligent insights to farmers based on their requirements.

Created by Mikul Rai, Garvit Sobti

Country/Region/Territory - India

Industry
Agriculture



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FAImily - Sustainable smart farming

SDG 2 Zero Hunger

An IoT-based solution to monitor unsustainable practices, such as the overuse of pesticides, excessive water usage, and poor irrigation, as well as alert farmers about the status of their plants' health.

Created by Jun Liang Goh, Benedict Yeo, Shiva Senthilkumar

Country/Region/Territory - Singapore

Industry
Agriculture



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VEED.IO

SDG 2 Zero Hunger

The solution promotes crop literacy for farmers by scanning crops for diseases using Intel® RealSense™ camera and providing tips for safer crop harvests.

Created by Jerrell Low Yu Zhe, Pujit Vasana, Jing Zhi, Isaac Lee

Country/Region/Territory - Singapore

Industry
Agriculture



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3 GOOD HEALTH AND WELL BEING



Good Health and Well-being

Ensure healthy lives and promote well-being for all at all ages

In 2018, roughly 5.2 million children under 5 years died mostly from preventable and treatable causes. Health crises pose a global risk and have highlighted the importance of having a response strategy. The purpose of this goal is to ensure healthy lives and promote well-being for all at all ages.

FindTheDog!

SDG 3 Good Health and Well-being

This solution aims to help pet owners locate their pets by identifying missing pets through image scanning and database matching.

Created by Robin Kocher

Country/Region/Territory - Germany

Industry
Services



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AllerGenius

SDG 3 Good Health and Well-being

This AI-based solution identifies the presence of an allergen in any edibles displayed on the packing.

Created by Sanchita Kiran

Country/Region/Territory - India

Industry
Healthcare



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MEDBOX

SDG 3 Good Health and Well-being

This solution acts as an intelligent medicine kit for aged citizens living alone and reminds them to take their medication regularly.

Created by Madhav Malik

Country/Region/Territory - India

Industry
Healthcare



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ChatBud

SDG 3 Good Health and Well-being

This solution aims to mitigate rising mental health challenges by providing teenagers with support when they need it the most.

Created by Shafira Izza, Ayudya Nugroho

Country/Region/Territory - Indonesia

Industry
Healthcare



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Face mask detector

SDG 3 Good Health and Well-being

This solution helps curb the spread of contagious diseases by analyzing people's faces and detecting if a person is wearing a mask or not.

Created by Muhammad Hakim

Country/Region/Territory - Indonesia

Industry
Healthcare



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Face recognition attendance system

SDG 3 Good Health and Well-being

This solution enables fingerless interaction to record employee attendance by automatically marking attendance by analyzing their faces.

Created by Muhammad Hafizh Auliansyah,
Muhammad Gani Ilham

Country/Region/Territory - Indonesia

Industry
Services



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Healthcare chatbot for COVID-19 patient

SDG 3 Good Health and Well-being

This chatbot solution encourages people with mild COVID-19 symptoms to stay home and receive treatment by providing health analysis reports, diet tips, and more.

Created by Saci Rani

Country/Region/Territory - Indonesia

Industry
Healthcare



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I Log U: COVID spread tracker

SDG 3 Good Health and Well-being

This AI-based solution monitors student activity and analyzes the history of those diagnosed with COVID-19, helping contain the spread of coronavirus.

Created by Rusman Siregar, Muhammad Nurul Karim

Country/Region/Territory - Indonesia

Industry
Healthcare



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Netra

SDG 3 Good Health and Well-being

This solution utilizes AI to assist individuals with visual impairment in comprehending their environment.

Created by Dhifan Razaqa

Country/Region/Territory - Indonesia

Industry
Services



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Social distance app

SDG 3 Good Health and Well-being

To prevent the spread of infectious diseases, this solution uses AI to issue alerts about overcrowding by sharing the number of people present.

Created by Maiko Inayama, Yihao Yang

Country/Region/Territory - Japan

Industry
Healthcare



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AI early screening for ASD

SDG 3 Good Health and Well-being

This technology uses AI to enable the early detection of autism while also addressing the shortage of psychologists.

Created by Yueming Lang, Ziyu Sher

Country/Region/Territory - People's Republic of China

Industry
Healthcare



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An intelligent device for TPD

SDG 3 Good Health and Well-being

This intelligent device enhances the efficiency and data visibility of TPD devices in hospitals.

Created by Xinge Pu

Country/Region/Territory - People's Republic of China

Industry
Healthcare



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BreedSelector

SDG 3 Good Health and Well-being

The solution helps select an appropriate dog breed by matching each breed with the specific requirements of a potential buyer.

Created by Dominik Plachta, Jan Sikon, Mateusz Nalepka

Country/Region/Territory - Poland

Industry
Services



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Bike4Map

SDG 3 Good Health and Well-being

This AI solution is a platform targeted at bicycle tourists for recommending cycling routes that suit users' preferences.

Created by Jakub Brzozowski, Maciej Lewandowski

Country/Region/Territory - Poland

Industry
Automobile



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Mike the glove

SDG 3 Good Health and Well-being

This solution, which can be integrated with wearables, utilizes a temporal convolutional neural network for biometric authentication based on heart activity.

Created by Eryk Piasecki, Jakub Laczkowski, Bartosz Ignaczak

Country/Region/Territory - Poland

Industry
Services



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Mental holter (Psychodiagnostics)

SDG 3 Good Health and Well-being

This solution helps doctors detect signs of hallucination in mentally unstable patients.

Created by Stepan Tleubaev

Country/Region/Territory - Russia

Industry
Healthcare



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AI blind assistant

SDG 3 Good Health and Well-being

This AI-driven application reads texts or describes the situation in an image using the mobile's camera to enable smoother interaction between man and machine.

Created by Heejun Shin, Insoo Pyo, Jisoo Han

Country/Region/Territory - S. Korea

Industry
Services



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AI-Mentor

SDG 3 Good Health and Well-being

This solution can analyze a handwritten document to identify and provide a user advice without any prejudice about their particular situation.

Created by Junha Park, Yongjae Jo

Country/Region/Territory - S. Korea

Industry
Services



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AI Mood Lamp

SDG 3 Good Health and Well-being

This solution aims to relieve individuals fighting the emotional impact of COVID-19 by automatically changing the color temperature of a room to suit their emotional state.

Created by Gijun Hong, Sihyeon Son, Bonhee Cho

Country/Region/Territory - S. Korea

Industry
Healthcare



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A clinical assessment application

SDG 3 Good Health and Well-being

This application enables self-diagnosis by providing users with various features, including self-reporting medical events, tracking status, and more.

Created by Song Xin Jie, Arivazhagan Sivani, Fong Shao You

Country/Region/Territory - Singapore

Industry
Healthcare



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AI Art

SDG 3 Good Health and Well-being

This AI-powered solution helps children, adolescents, and adults relieve stress and improve symptoms of anxiety and depression through appreciation of art.

Created by Ho Wei Zhe

Country/Region/Territory - Singapore

Industry
Healthcare



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Smart safe

SDG 3 Good Health and Well-being

This AI solution influences crowd behavior, and encourages people to wear masks and maintain safe distances. It also automatically detects an individual's temperature to ensure safety.

Created by Go Si Wei, Tileron Levi Jan Lacang

Country/Region/Territory - Singapore

Industry
Healthcare



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Better job at Pepper's lab

SDG 3 Good Health and Well-being

These robotic solutions minimize human-to-human interactions in vaccine centres by using NLP to simplify the vaccination process for both individuals and the centres.

Created by Jeremy Chan, Anicia Lah

Country/Region/Territory - Singapore

Industry
Healthcare



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Visual assistance for Visually Impaired

SDG 3 Good Health and Well-being

A computer vision and NLP-enabled solution, empowers visually impaired people by offering users a sense of their surroundings.

Created by Olivia Thorburn, Robert Williamson

Country/Region/Territory - United States of America

Industry
Healthcare



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4 QUALITY EDUCATION



Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

It was projected that more than 200 million children would be out of school, and only 60% of young people would be completing upper secondary education in 2030. This was before the COVID-19 pandemic hit. Education has the power to enable upward socioeconomic mobility and escape poverty. Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all is what this goal is all about.

AI-based question paper

SDG 4 Quality Education

This solution harnesses AI capabilities to create a customized question paper based on difficulty and the type of question entered as an input.

Created by Vibhavas Bhardwaj

Country/Region/Territory - India

Industry
Education



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AI reading assistant

SDG 4 Quality Education

This CV and NLP-based solution eliminates the need for a screen and helps advance reading skills in children with minimal setup.

Created by Varun Arora

Country/Region/Territory - India

Industry
Education



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Student emotion tracker

SDG 4 Quality Education

This innovation enables students to join online classes, track their EQ, and share live feedback on a lecture while providing teachers with attendance records and other insights on students' participation.

Created by Parth Ankolikar

Country/Region/Territory - India

Industry
Education



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LAOD (Library Automatic Object detection)

SDG 4 Quality Education

This solution automates the book borrowing process by enabling auto-detection of the borrower's face and book cover.

Created by Dafa Fauziansyah, Ilham Shiddiq

Country/Region/Territory - Indonesia

Industry
Education



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Warning system for student's performance

SDG 4 Quality Education

The solution addresses the problem of school grades by analyzing students' performance and profile data and predicting future grades.

Created by Anang Purwanto, M. Raditya Bagas

Country/Region/Territory - Indonesia

Industry
Education



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Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Through industrialization, innovation and infrastructure, the world can open a new horizon of economic opportunities that generate employment and income. However, this can only be achieved when the world is inclusive in its progress because 16% of the global population does not have access to mobile broadband networks. Least developed countries, in particular, need to accelerate the development of their manufacturing sector if they are to scale up investment in scientific research and innovation. This goal's objective is to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Drone controlled by gestures

SDG 9 Industry, Innovation and Infrastructure

This solution uses gesture controls to help drones record and process image data to help firefighters.

Created by Michael Jager, Maximilian Diepold

Country/Region/Territory - Germany

Industry
Electronics System Design & Manufacturing (ESDM)



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Storganizer

SDG 9 Industry, Innovation and Infrastructure

This software solution can sort and organize clothes and other stockroom items depending on their colour, type, and storage place.

Created by Michael Volodarsky, Segev Ben Dayan, Elay Aizenberg

Country/Region/Territory - Israel

Industry
Textile



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VITO: Virtual Meeting Auto Mute

SDG 9 Industry, Innovation and Infrastructure

This solution scans the environment for unwanted noise in virtual meetings and mutes the source automatically.

Created by Abiyu Kiesly, Azlan Al-Isyraq

Country/Region/Territory - Indonesia

Industry
Services



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StreetBytes: Intelligent food itinerary planning

SDG 9 Industry, Innovation and Infrastructure

Powered by AI, this mobile app personalizes street food vendor recommendations and tour itinerary planning in Penang.

Created by Lim Chee Wei

Country/Region/Territory - Malaysia

Industry
Food



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3D finger vein identification system

SDG 9 Industry, Innovation and Infrastructure

This identification system combats the security concerns of biometrics by using a 3D image of the blood vessels from under the skin of the fingers, to prevent hacking via fingerprints.

Created by Changqing Ouyang

Country/Region/Territory - People's Republic of China

Industry
Safety and Security



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Intelligent shuttlecock-picking Robot

SDG 9 Industry, Innovation and Infrastructure

This solution combines multi-sensor data fusion technology and enables automatic pick up of badminton shuttles off the ground.

Created by Jiayi Wu, Hang Liu, Xinxin Huang

Country/Region/Territory - People's Republic of China

Industry
Sports



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Eliminating background noise

SDG 9 Industry, Innovation and Infrastructure

This solution combines image and deep learning methods to eliminate background noise in a call, ensure voice quality, and optimize costs.

Created by Youwen Zhang, YunTian Zhang, Xiaohan Peng

Country/Region/Territory - People's Republic of China

Industry
Services



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Intelligent-searching Robot

SDG 9 Industry, Innovation and Infrastructure

This solution accelerates object detection with the help of edge calculation and automatic control technology.

Created by Heran Zhu, Lifun Wei, Tianxiang Zhang

Country/Region/Territory - People's Republic of China

Industry
Science and Technology



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Navigating service Robot like Human

SDG 9 Industry, Innovation and Infrastructure

This solution uses a high-performance neural compute engine, allowing robots to function in large areas, filling the market gap for service robots with reduced storage and computational burden.

Created by Haoning Lan, Haoyuan Hu, Shiyi Deng

Country/Region/Territory - People's Republic of China

Industry
Automation



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ECG Biometrics

SDG 9 Industry, Innovation and Infrastructure

This solution utilizes a temporal convolutional neural network based on heart activity for biometric authentication.

Created by Jakub Blizniuk

Country/Region/Territory - Poland

Industry
Safety and Security



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The-SHIELD (AI fraud prevention & investment prediction)

SDG 9 Industry, Innovation and Infrastructure

This solution prevents online fraud and improves e-commerce security by providing investment prediction and financial analysis for small businesses.

Created by Yuxin Fan, Zean Wan, Haochen Ding

Country/Region/Territory - People's Republic of China

Industry
Banking



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AI Elevator

SDG 9 Industry, Innovation and Infrastructure

This AI-powered solution simplifies the task of pushing an elevator button by automatically selecting the floor for an individual using face scanning and voice commands.

Created by Sihyeon Kim, Shin Heo, Songha Jang

Country/Region/Territory - S. Korea

Industry
Automation



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AI Glass

SDG 9 Industry, Innovation and Infrastructure

This solution helps individuals suffering from facial recognition disorders to recognize faces and identify facial expressions with a minimum of 70% accuracy.

Created by Endong Kim, Jeong-eun Bae, Jisung Jeon

Country/Region/Territory - S. Korea

Industry
Services



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No-more lost in translation

SDG 9 Industry, Innovation and Infrastructure

This NFC-powered universal translator assists people with hearing impairment by translating any language to a language of their choice and presenting the translated text during a conversation.

Created by Aashish Alagendran, Trilochan Aidan Singh, Daryl Kwek

Country/Region/Territory - Singapore

Industry
Services



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Head pose AI wheelchair

SDG 9 Industry, Innovation and Infrastructure

This solution makes transportation for disabled people easier by helping users control the wheelchair through placement of their face at an angle.

Created by Ohgyeom Kwon, Wonho Lee

Country/Region/Territory - S. Korea

Industry
Healthcare



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RUSTBUSTERS.AI

SDG 9 Industry, Innovation and Infrastructure

This IoT-enabled AI solution makes the human-intensive process of transporting oil smoother by acting as an illuminated rig to detect rust/corrosion and isolate rusty products.

Created by Willoughby Niki Lee, Lionel Chong

Country/Region/Territory - Singapore

Industry
Automation



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AI Inspector for Ocean Wind-Turbines

SDG 9 Industry, Innovation and Infrastructure

This solution makes manual wind turbine inspection less risky through a self-stabilizing device equipped with a camera and a highly sensitive recorder.

Created by Chien-Hung Lai

Country/Region/Territory - Taiwan

Industry
Automation



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Monodepth obstacle avoidance and navigation

SDG 9 Industry, Innovation and Infrastructure

This solution creates a mono-depth grayscale image with pixel intensity inversely representing the distance to help navigators in uncharted waters.

Created by William Glover, Robert Raphael del Popolo

Country/Region/Territory - United States of America

Industry
Services



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by student



Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable

Even though cities and metropolitan areas are powerhouses of economic growth—contributing about 60% of global GDP, they also account for about 70% of global carbon emissions and over 60% of resource use. Rapid urbanization is increasing the number of slum dwellers, inadequate and overburdened infrastructure and services, worsening air pollution and unplanned urban sprawl. This goal targets making cities and human settlements inclusive, safe, resilient and sustainable.

PAMELA

SDG 11 Sustainable Cities and Communities

This solution leverages AI to classify and sort items automatically depending on their visual characteristics, thus minimize the harmful environmental impacts caused by these products.

Created by Liane Marina Messmer, Christian Reser

Country/Region/Territory - Germany

Industry
FMCG



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Distributed city surveillance system

SDG 11 Sustainable Cities and Communities

This solution enables surveillance systems to detect crime incidents, track location and alert concerned authorities, thereby helping authorities maintain law and order.

Created by Kaushal Patil, Raj Desai, Pratyush Panda

Country/Region/Territory - India

Industry
Safety and Security



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Swarm flight with drones

SDG 11 Sustainable Cities and Communities

A solution using AI-powered drones to display light shows as a safer and an environmental-friendly alternative to fireworks.

Created by Petar Marinovic, Pia Ackermann

Country/Region/Territory - Germany

Industry
Safety and security



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Green: Reuse to reduce

SDG 11 Sustainable Cities and Communities

This solution, using computer vision models, assists in reducing the amount of municipal solid waste generated worldwide and using resources efficiently.

Created by Abhinav M Hari

Country/Region/Territory - India

Industry
Services



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Fake news detection AI

SDG 11 Sustainable Cities and Communities

This solution curbs fake news by filtering out specific topics by training itself against that text.

Created by Rifky Bisri, Aikyo Dzaki Aroef

Country/Region/Territory - Indonesia

Industry
Media and Entertainment



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AI EG (Energy Guard)

SDG 11 Sustainable Cities and Communities

This solution automatically manages power by counting the number of people in a specific space in real-time, ensuring efficient electrical usage.

Created by Jidong Kim

Country/Region/Territory - S. Korea

Industry
Services



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FaceCyber: Cyber-aggression detection on facebook

SDG 11 Sustainable Cities and Communities

This web application can detect cyberbullying on Facebook by analyzing the behaviour of a user.

Created by Tong Yong Hang

Country/Region/Territory - Malaysia

Industry
Safety and Security



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AI Interphone

SDG 11 Sustainable Cities and Communities

An AI-based solution that can help the visually-impaired to identify potential intruders by detecting if a visitor is a familiar acquaintance or a stranger.

Created by Jiseok Jungg

Country/Region/Territory - S. Korea

Industry
Services



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Artificial seeing eye dog

SDG 11 Sustainable Cities and Communities

This solution uses AI and acts as a walking assistant by measuring the depth of an obstacle, delivering improved quality of living for visually challenged individuals.

Created by Yejin Kim, Hyeri Park, Byungchul Jang

Country/Region/Territory - S. Korea

Industry
Services



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SAI (Global Sign Language Translator)

SDG 11 Sustainable Cities and Communities

This AI-based program can translate voice into sign language, empowering individuals with speech disabilities.

Created by Hansang Lee, Jaehyeon Heo, Hoseok Han

Country/Region/Territory - S. Korea

Industry
Healthcare



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Smart AI sign language

SDG 11 Sustainable Cities and Communities

The solution leverages AI to lower the communication barrier for specially-abled individuals by recognizing hand gestures and translating sign gestures to text and speech.

Created by Amrey Lee

Country/Region/Territory - Singapore

Industry
Services



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Traffic management using Machine Learning

SDG 11 Sustainable Cities and Communities

An intelligent traffic management system driven by AI, optimizing the usage of traffic lights and helping curb pollution as well wastage of time and fuel.

Created by Kevin Goldsmith, Krisha Waghela, Joshua Sinnott

Country/Region/Territory - United States of America

Industry
Transportation



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Climate Action

Take urgent action to combat climate change and its impacts

2019 was the second warmest year to date in which carbon dioxide levels and other greenhouse gases in the atmosphere rose to new records. Climate change is having adverse effects on every country on every continent. It is unsettling national economies and disturbing lives. Weather patterns are fluctuating, sea levels are growing, and weather events are becoming more extreme. This goal promotes taking urgent action to combat climate change and its impacts.

Climate change home tracker

SDG 13 Climate Action

This AI solution predicts Earth's climate transformation, monitors and identifies root causes, and identifies sources of pollution to help fight climate change.

Created by Arnav Suman

Country/Region/Territory - India

Industry
Science and Technology



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WATERY - Water pollution detection sensors

SDG 13 Climate Action

This solution uses sensors to detect trash in the ocean and raise an alert to help solve the issue of water pollution and marine life death.

Created by Xuan Le Tan, Phoebe Gabrielle Jonaidy, Jayden Oh

Country/Region/Territory - Singapore

Industry
Healthcare



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Innovative AI ideas for a better future, based on industry

This section includes innovative ideas categorized according to the industry they may help transform to make the world a better place.

Student name Country/Region/Territory	Innovative AI ideas
Agriculture Industry	
Srivan Reddy Kommera India	Accessible tech for farmers, based on Chlorophyll Fluorescence This model detects factors affecting crop health by observing chlorophyll fluorescence with smartphone sensors and suggests appropriate corrective measures if needed.
Jadden Yee Singapore	AI Rainfall This solution helps to improve crop yield by using satellite data to make predictions and decisions on areas with a rainfall deficit.
Automation Industry	
Sara Serrano Portugal	Avoid distribution of deformed products This program helps factories with product quality by scanning and inspecting an object for any deformities.
Fazla Maula Dani Indonesia	Drive-thru AI self service This solution reduces wait time at a drive-thru by using speech recognition to take orders and print thereceipt automatically.
Markus Unterburger Germany	Resource saving quality check This helps in a faster quality check at the production line level, speeding up the production process, thus saving resources and energy.
Automobiles Industry	
Teoh Sun Yi Malaysia	Smart Driving Assistant This solution classifies whether a driver is drowsy or drunk.
Derwin Akbar Nugroho Indonesia	Traffic Density Detection This smart solution overcomes traffic congestion with a traffic light priority system and assesses the queue length of vehicles at an intersection.

Student name Country/Region/Territory	Innovative AI ideas
Education Industry	
Dhif'an Razaqa Indonesia	AI study monitor This AI solution monitors students during study sessions, identifies their engagement levels, and tracks time spent in studying productively.
Suen Kee Xian Malaysia	Cody-Your Best Coding Q&A Companion This chatbot is designed to answer programming questions 24/7 interactively to assist students to learn programming.
Tang Wen Shuen Malaysia	CSBot- Novice Coding Tutor Chatbot This chatbot helps beginners to learn coding by providing tutorials and recommending modules based on each learner's progress. It also provides appropriate feedback based on their performance.
Xiaoxiao Liu People's Republic of China	"Double Reduction" policy for Chinese teachers This AI program helps in marking the exam paper by recognizing vague handwriting.
Mohamed Zifni Mohamed Nifaal Singapore	GOKUL - Revision Helper for Students This solution can detect topics that students might need more help with and prompts them with questions on that topic to ensure impactful learning, while helping to refine cognitive thinking.
Hokuto Uchida Japan	KAO PASS This walk-through automatic confirmation system automates the attendance process by harnessing face recognition technology.
Agustin Espinosa Spain	Pertra 360° This educational tool focuses on improving students academically and leads them on the right path according to their abilities, while also considering the level of their education as well as emotional situation.
Adam Seno Murti Indonesia	Room capacity limiter and mask detector This automatic mask detector and room capacity limiter system helps teachers focus on lessons while ensuring that prescribed health protocols are followed.
Marika Saracino Italy	StemGirls This AI-based chatbot can help manage the public library by keeping in touch with readers all through the day.

Student name Country/Region/Territory	Innovative AI ideas
Education Industry	
Shwetha Karthik Singapore	StudyAI This AI-powered solution helps students in learning time management by monitoring their lifestyles to find a balance between schoolwork and recreation.
Ryan Mirza Ang Singapore	StudyBuddy: App for learning This app helps students to study effectively through reinforced learning by generating test papers that adapt to the student's current level of performance.
Zhangyitao Chen People's Republic of China	Teachers' assistants This software helps reduce the burden on teachers by automating the tedious task of correcting homework.
Sergei Polipovich Russia	Teaching the basics of AI to high school students The elective course designed for high school students helps increase awareness about AI and gives a deeper dive into the subject.
Yunhan Jiang People's Republic of China	Visualizing poems with AI-generated images This AI solution monitors students during study sessions, identifies their engagement levels, and tracks time spent in studying productively. This solution is for pre-schoolers to help make the learning process fun and engaging by
Education Industry	
Hoyoung Lee S. Korea	AI Cook The solution helps to search for food recipes and guides the user in the cooking process.
Shrijan Maram Malaysia	OmniChef This AI-based solution helps in cooking by suggesting recipes according to the ingredients available.
Svyatoslav Ivanov Russia	Recognition of dairy products This program recognizes dairy products based on their manufacturer, determines the composition, production and expiration dates, and helps the buyer make a healthy choice in the marketplace.

Student name Country/Region/Territory	Innovative AI ideas
Gaming and Entertainment Industry	
Kai Wen Nichelle Tan Singapore	AI Music The solution helps the user to compose innovative or personalized music and also aids in relieving stress.
Ragupathy Santhosh Singapore	DIS - Gaming for Disabled This solution aids students with disabilities in gaming by using eye trackers for the cursor movement and vocal commands for the movement of the character.
Zicheng Gong People's Republic of China	Steam game recommendation system This program can suggest games of interest to the user based on recommendations and reviews of Steam games.
Jee Sung Kim S. Korea	Virtual Online KPOP idol avatar This AI-based solution enables natural and realistic interaction between K-pop idol avatars and fans.
Healthcare Industry	
Jingyu Li People's Republic of China	AI Diagnosis System for COVID-19 This helps to rapidly diagnose COVID-19 infection with the computed tomography image of a patient's chest and their clinical information.
Liang Qiao People's Republic of China	AI for Automatic COVID-19 Diagnosis An AI-based solution that will provide an error-free and automatic diagnosis of COVID-19, helping rapid and accurate virus detection.
Alsu Gumerova Russia	AI project: Blind assistant This AI-fueled solution acts as a reliable assistant for the visually impaired by helping them avoid obstacles like cars, tree branches, potholes and more.
Hyoseok Jang S. Korea	AI Virtual Reality Psychotherapy This AI-based solution uses virtual reality technologies to help people cope with COVID-19 related loneliness through realistic projection.

Student name Country/Region/Territory	Innovative AI ideas
Healthcare Industry	
Hernadhif Rafif Wirayawan Indonesia	Cataract and Glaucoma detector An AI solution that can help reduce the number of blindness and vision loss cases through early detection of its onset.
Parth Parmar India	Characterising mental disorders using AI This helps to rapidly diagnose COVID-19 infection with the computed tomography image of a patient's chest and their clinical information.
Jevfen Fernando Indonesia	Doctor AI This solution helps healthcare professionals diagnose medical conditions and suggest an appropriate course of treatment according to the patients' external symptoms.
Olga Demidovich Russia	Gesture calculator for disabled people This solution helps people with disabilities to interact with public terminals without directly touching them and maintain health safety.
Thomas Rietschel Germany	Open Bot for human rescue This solution searches disaster sites like buildings on fire to identify trapped people and helps emergency rescue operations.
Vanshika Pandey India	PDCheck - Early detection of Parkinson's disease This vision-based software assists users with early-stage PD (Parkinson's disease) detection and late-stage PD management by analyzing shaky voice, hand tremors, and other biomarkers.
Sashineswary Chanthran Malaysia	Proposal of Astbox An AI-driven solution to help tackle any unforeseen medical emergency among asthmatic children by tracking a child's condition and alerting parents and guardians of any changes in health condition well in advance.
Jingyu LAira Azalea Hazril Izani Malaysia	The Neuron Project An AI-powered solution to help manage stress-related health threats by monitoring an individual's stress level based on their heart rate fluctuations.

Student name Country/Region/Territory	Innovative AI ideas
Infrastructure Industry	
Samridhi Narwade India	Aqua-Dig This system predicts the likelihood of waterlogging and its severity in different areas, and generates alerts accordingly, enabling civic authorities to evacuate at-risk communities.
Fadel Muhammad Indonesia	Real-time natural disaster prediction alarm This solution for natural calamities collects and disseminates verified information to at-risk populations, and has a real-time warning alert to aid safe and timely evacuation.
Information Technology Industry	
Changqing Ouyang People's Republic of China	Bionic FPGA algorithm This solution enables FPGA to keep pace with the GPU in deep learning by proposing a bionic FPGA algorithm that replaces all neurons with LUTs.
Power Industry	
Karen Suhaedi Indonesia	Automatic energy saver This automatic power saver system detects the presence of people in a room, and shuts off every electronic device in an unoccupied room, thereby saving energy and costs.
Muhammad Naufal Khoirul Imamilhaq Indonesia	Smart Street Lighting This system classifies street conditions based on the objects detected on CCTV and helps in automating street lighting.
Khush Shah India	REC governance using AI This AI solution utilizes a blockchain mechanism to provide a secure interface and streamline the trading process, making governance or trading simpler, faster, and more secure.
Safety and Security Industry	
Khaung Paing Ye Singapore	AI Animal Recognition This AI-based solution helps campers and hikers identify various animals in the vicinity of their trail or camping site, to minimize the probability of any life-threatening encounters.
Jihye Moon S. Korea	AI Lifeline This AI-based solution aids in the quick rescue of trapped firefighters during fire suppression by analyzing movement patterns and data to predict a route to safety.

Student name Country/Region/Territory	Innovative AI ideas
Safety and Security Industry	
Eundong Kim S. Korea	AI Safety Rescue team This solution is to keep indoor pools safe for use by scanning for signs of all potential hazards and communicating the situation to the lifeguard.
Kartik Krishnan Germany	Crime identifying camera It analyzes live feeds from cameras deployed citywide for signs of potential hazards or crime, and alerts law enforcement authorities whenever necessary.
Sriharsha Maram Malaysia	EyeSpy - Fraud Detection with AI This AI-based solution analyzes online interactions and conversations in real-time to identify if a product is fake or a person is a fraud.
Felix Ixmeier Germany	Hazard detection by a drone This AI-based solution monitors construction sites aerially to help prevent any mishappenings and aid worker safety.
Astrid Neubauer S. Korea	Home Security AI This solution automates home security and access by using facial recognition via camera, to reduce the usage of plastic keycards or physical keys.
Chloe Poon Rou Yi Malaysia	IntelliSS This AI-based home surveillance system, leverages face recognition to identify and prosecute intruders.
Ruijie Wang People's Republic of China	Real-time handwriting character generation This is a tool to ensure privacy protection when it comes to handwriting. It harnesses computer vision to recreate original handwriting in real-time.
Ishaan Shaurya Chamoli India	Refugee relocation through AI mapping This project guides refugees to safety by informing a user about safe regions and shows safe routes to help international relief organizations plan evacuations effectively.

Student name Country/Region/Territory	Innovative AI ideas
Services Industry	
Mikul Bhandoria India	A step closer to reality in the virtual world This solution creates virtual 3D simulations for users to experience a close-to-real feeling of one's friend or family member being physically present with them even when they are not.
Rejey, Ezekiel Jeyakumar Singapore	AI Calligraphy This project generates calligraphy-styled characters from a user's handwriting.
Artem Osintsev Russia	AI project for IoT This application creates a list of recommendations for a smart city resident in accordance with the user's interests and status.
Hyeongju Park S. Korea	AI Puppy Butler This app divides pet care responsibilities like pet walking, feeding, and medication equally among family members.
Benedita Carrelo Portugal	Animal Recognition This solution helps identify animals in videos through facial recognition.
Paulo Tavares Portugal	Animal recognition (Dog\Cat) This AI solution detects if it is a dog or a cat with the help of images and/or videos of the animals based on their breed, colour, type, etc.
Zhi Hao, Chris Choo Singapore	Cash Recognition For Visually Impaired This AI-based solution for visually impaired people recognizes the denomination on notes, allowing them to independently make transactions with sound-enabled support.
Jose Rocha Portugal	Face Attendance This solution performs high accuracy facial recognition, by first mapping the face, and then, comparing the data with familiar faces to determine a person's name.
Daniel Silva Portugal	Finger Counter This solution helps to count fingers through the computer by first tracking the hands, and then analyzing the hand's landmarks.
Timofey Plotnikov Russia	Implementation of "Motion detection" This project for school children uses a quadcopter camera to develop a motion detector to examine footfall in a room and ensure there is no wastage of electricity and other resources.

Student name Country/Region/Territory	Innovative AI ideas
Services Industry	
Vineet Kumar Sinha India	Language of the voice This solution helps speech-impaired users communicate by converting facial expressions and mouth vibrations into a voice output. It also includes smart spectacles with sensors that can detect the blinking of eyes to take confirmation inputs frequently.
Eduardo Teixeira Portugal	Object Detection This solution helps to detect objects, initially with a camera frame, and at an enhanced level, with a bounding box that displays the name and percentage of accuracy of each object.
Lukas Schmitt Germany	Object Detection for the Visually Impaired This AI-based solution helps those with vision impairments by reading best-before labels and identifying if a food item is past its consumption date.
Goncalo Cardoso Portugal	Object Size Measurement This solution measures objects with computer vision by integrating a white background as the guide and calculating the width and height of objects placed in that region.
Filipe Vicente Portugal	People Recognition This AI-based program will identify and classify a person whether they are part of a group or alone in a video so they can be recognized in a gathering.
Goncalo Benvindo Portugal	Person Recognition This program uses facial recognition technology to scan a person's face based on a group selfie. It can be used to identify specific individuals in a crowd.
Rahul Jagetia India	Robotic AI Butler This solution can help manage and run a home autonomously by controlling its security and access. It can even remind the user to refill groceries when the need arises.
Seonwoo Kim S. Korea	Shout out my story This helps to make an avatar of the user and translate what is said and written in real-time into speech.
Liew Yu Liang Malaysia	Smart Product Purchasing Selection Consultant This solution helps avoid advertising trickery by statistically analyzing product attributes and users' reviews to present product suitability scores to consumers.

Student name Country/Region/Territory	Innovative AI ideas
Services Industry	
Luis Hungerberg Germany	Your Face, Your Wallet This solution stores all critical information of a user encrypted on a blockchain-based cloud server with the help of their face ID to keep it secure.
Jaeung Lee S. Korea	Personal asset management AI The solution helps users manage their financial assets better, by analyzing their income and other financial information.
Kanak Tekwani India	Virtual fitting room This solution generates a virtual avatar of online shoppers to try out various outfits virtually and identify what suits them the best, based on body shape, skin tone, etc.
Transportation Industry	
Yecheng Gong People's Republic of China	AI Model for image identification This system uses algorithms and pictures for image identification, targeting the traffic signs, and also identifying possible dangerous items and vehicles on roads.
Songju Kim S. Korea	AI Traffic Accident Prediction System This solution helps prevent road accidents by analyzing specific patterns from previous data and predicting the chances of an accident based on the current traffic flow on a road segment.
Kirill Antonov Russia	Public transport passenger classification This program has been developed for keeping track of incoming and outgoing passengers using public transport.
Alexander Stuhrowoldt Germany	Smart traffic light system This smart solution helps reduce traffic congestion and accidents and identifies and activates flashes to go off in case of traffic violations thus helping civic authorities guide traffic movement efficiently.
Zi Yang, Kenneth Foo Singapore	Solving Public Transport Priority Seating With the help of cameras and trigger alarms, this AI-based solution helps avoid monopolizing priority seating in public transport by distinguishing the types of people sitting in specific categories.

Annexure

Acknowledgement

The efforts to equip the youth with the right skill set and mindset in AI have succeeded due to the active cooperation of all our partners. We extend our sincerest gratitude to our collaborators in government, academia, and civil society. Without them the Intel® AI Global Impact Festival 2021 and this resulting book would not have been possible.

We would like to thank students, who shared their innovative solutions and ideas leveraging AI. In these, we see the potential to create world-changing technology that improves the life of every person on the planet. We take this opportunity to acknowledge the contribution of the parents, teachers, and academic institutions who have supported the students during this journey.

We look forward to further strengthening our engagement with all the stakeholders in 2022 and beyond, as we continue to build an AI-ready generation aware of and aligned with UN SDGs.

Apart from the thought-provoking submissions received from independent innovators, we are proud to share that the first edition of the Intel® AI Global Impact Festival 2021 brought together a showcase of as many as 20+ global best practice submissions from government organizations representing 10 countries, regions, and territories.

Know more about UN SDGs

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others and that development must balance social, economic and environmental sustainability.

Countries have committed to prioritizing progress for those who're furthest behind. The SDGs are designed to end poverty, hunger, AIDS, and discrimination against women and girls.

The creativity, know-how, technology and financial resources from all of society is necessary to achieve the SDGs in every context.



Source: <https://www.undp.org/sustainable-development-goals>

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