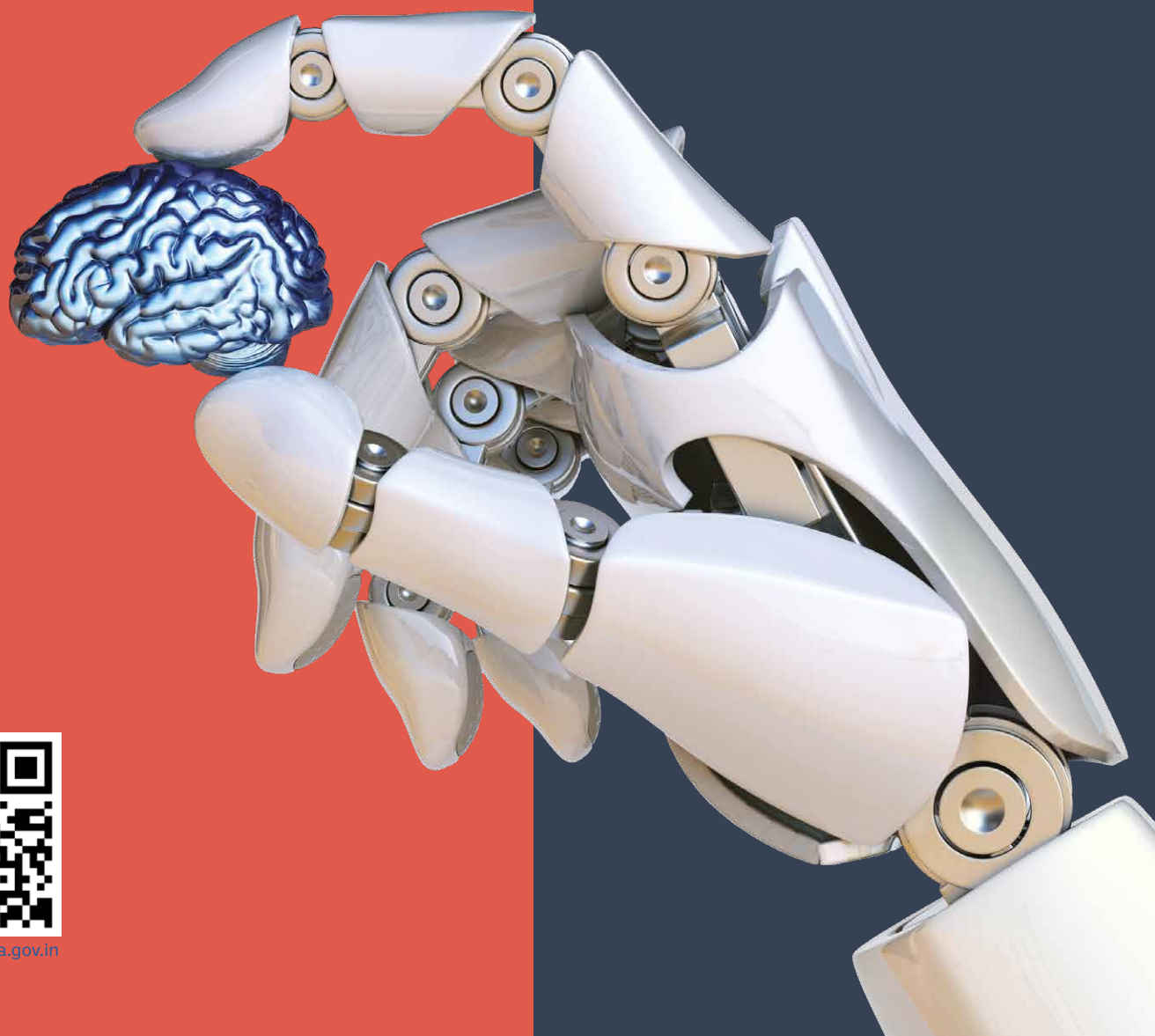
Information Technology Electronics
& Communications Department,
Government of Telangana State.

2020
YEAR OF AI

Telangana's Year of AI — 2020 and Beyond



http://ai.telangana.gov.in

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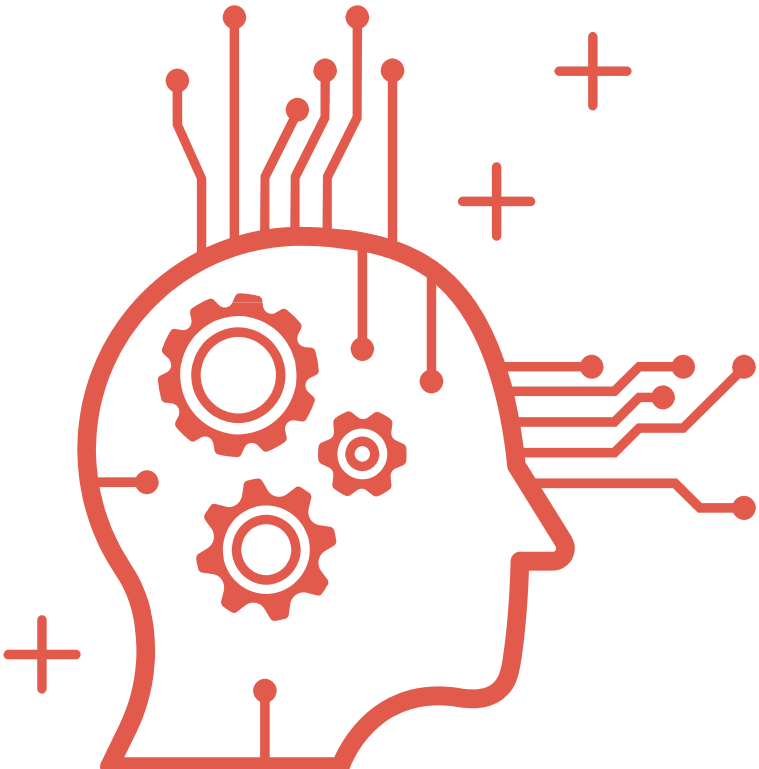


01 Launch of Telangana's Year of AI

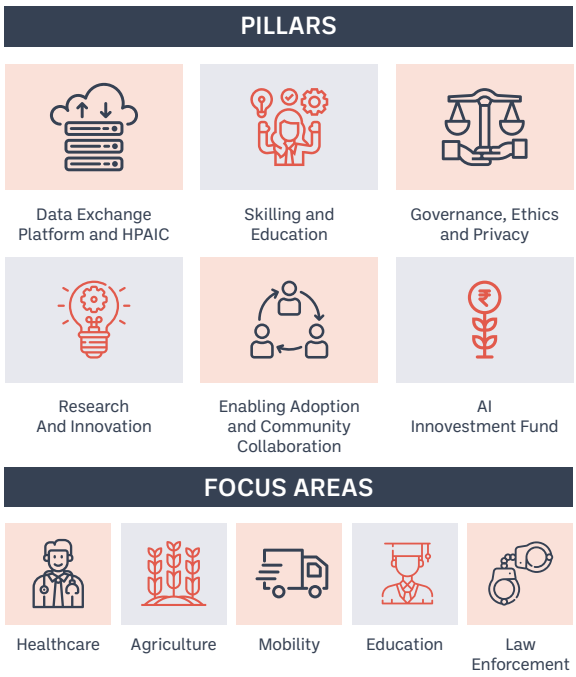
- Leveraging the abundance of data and the ever-increasing computing power, AI is impacting the way we work, the way we interact with the world and the way we live our lives. The AI revolution is already upon us. No business can stay untouched. It is expected to transform the global economy and early adopters will have a first-mover advantage

With a foresight and deep understanding of emerging technology's role in impacting lives,

2020 was declared as Telangana's Year of AI by our Hon'ble IT Minister KT Rama Rao.

Vision: Position Telangana as a global hub of Artificial Intelligence and foster social innovation.

AI FRAMEWORK



> **AI revolution is expected to transform the global economy and early adopters will have first-mover advantage. Therefore, the Telangana government is setting a vision to accelerate AI readiness and develop a conducive ecosystem in the State.**
>
> – KTR, 'Empowering AI Leadership' at Davos 2020.

2020
YEAR OF AI

- **2020 and Beyond:** We believe this is the decade of AI – not just for Telangana, but globally. The Year of AI initiative has been a catalyst, which has catapulted Telangana to the forefront of the AI race to excellence, and we will roll out several marquee initiatives to capture the global AI opportunity.

Telangana AI Ecosystem Partners






02 Telangana's AI Framework

Vision: To position Telangana as a global hub for Artificial Intelligence and foster social innovation

- Telangana became the first state in India to launch an actionable policy framework for Artificial Intelligence in June 2020 - in consultation with industry, academia, startups and civil society.

Datasets and HPCAI

Availability of quality datasets and computing infra is critical for AI innovation.

Skilling

We need a thriving talent pool to attract leading AI companies

Governance, Ethics & Privacy

Government is a custodian of citizen's rights and will shape the regulations to accommodate for a new AI paradigm

Adoption and Collaboration

Government and industry adoption of AI to solve pain-points, increase efficiencies and improve citizen's lives, in partnership with the right experts.

Research and Innovation

Research is the core of AI ecosystem, and the resulting innovations impact lives

AI Innovestment Fund

A humanitarian investment fund dedicated to AI Innovation for Social Impact in Telangana's focus sectors.

Focus Sectors

Agriculture, Healthcare, Education, Law Enforcement and Mobility. In 2020, Agriculture Sector was our priority.

To view the full document, **scan QR code:**

Or visit:

https://it.telangana.gov.in/wp-content/uploads/2020/07/Govt-of-Telangana-Artificial-Intelligence-Framework-2020.pdf

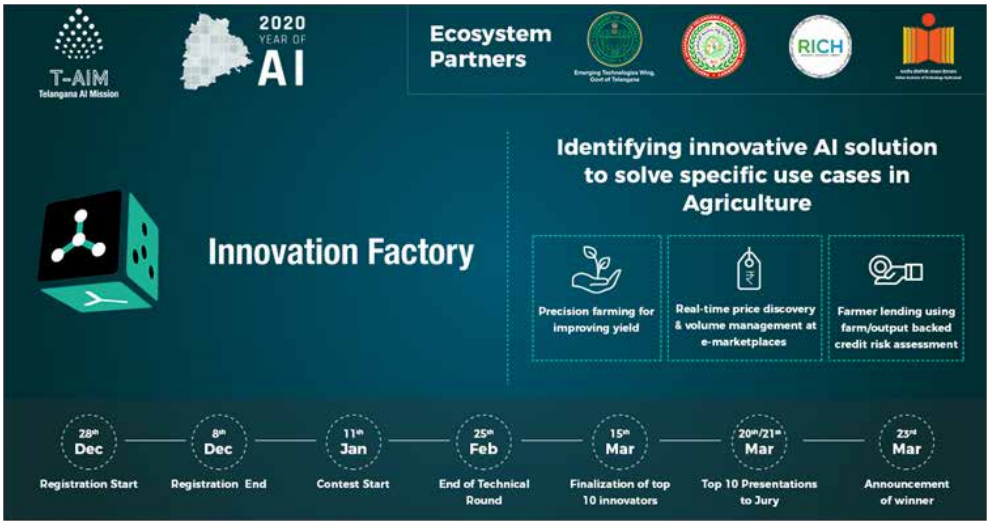
03 Telangana's AI Initiatives

T-AIM
Telangana AI Mission

- ## Telangana AI Mission (T-AIM)

Telangana AI Mission (T-AIM) was the logical next step after launching the state's AI policy framework. The centre houses a dedicated team of experts to turn our vision into reality. It is a new AI-specific organization established in partnership with NASSCOM, driving execution of each of the six pillars of Telangana's AI Framework.

— Agritech Grand Challenge



— XperienceAI

Highlights of Sessions

Strategic Scaling AI Adoption for accelerating Digital India

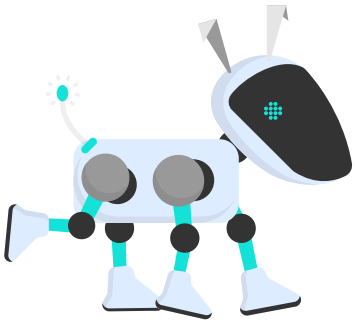
AI-fueled India: From POC to Implementation

Unlocking value at scale & simplifying AI journey for enterprises

Reimagining innovation in the COVID world

- ## Applied AI Research Centre

  A global applied AI research centre was launched with a focus on healthcare and mobility domains. Intel, IIITH and PHFI are the other co-founding partners. Research areas of focus:



Healthcare	Mobility
Diagnostics	Advanced Safety
Proactive Public Health	Autonomous Navigation
Health Services Optimization	Traffic Management and Smart Cities
Evidence based Social Strategy & Policy	Sensing and Communication
Treatment protocols discovery	Delivery and Supply Chain Automation

- ## CRDET

Centre for Responsible Deployment of Emerging Technologies (CRDET) is a virtual multidisciplinary centre established in collaboration with Centre for Fourth Industrial Revolution, India, World Economic Forum. With an initial focus on agriculture and law enforcement, the centre will:

01. Address key scaling challenges by developing evidence-based recommendations on policy and commercial deployment of identified use cases.

02. Identify the key AI ethical concerns - Accountability, Bias, Transparency, Privacy, Security and Safety - and develop guidelines for specific AI use cases.

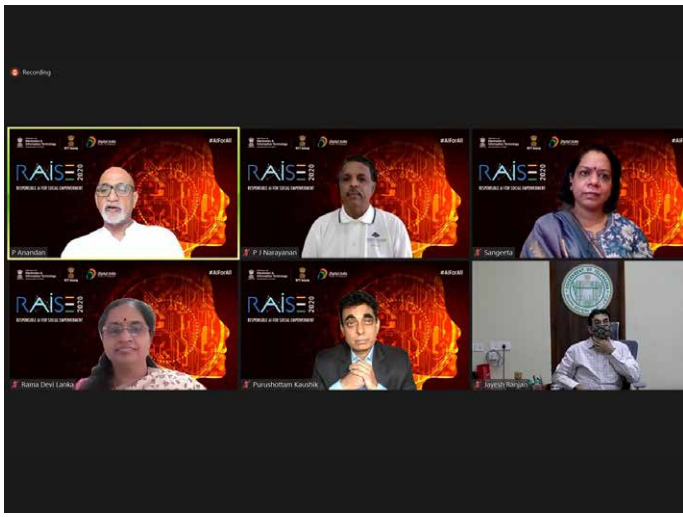
- ## Telangana Showcase at RAISE 2020

Telangana Story

- Shared the success of Telangana's Year of AI program, and
- Organized a panel discussion among eminent partners of Telangana's Year of AI program
- Organized demonstrations of cutting-edge solutions developed by Telangana-based startups.

Panel Discussion on AI Governance and Institutional Mechanism:

Our Principal Secretary spoke about Telangana's unique network of innovation institutions, and moderated a session attended by eminent international personalities - French Ambassador for Digital Affairs (Government of France), Director of HPC, AI and Quantum Life Sciences Center of Excellence(Cambridge UK), Head of GPAI Secretariat (OECD), Director of Research & Head (Digital And Tech Innovation, Reform UK).



3.1 Telangana Agritech

- Agriculture is a priority sector for Telangana and we are focusing on developing AI-based solutions to benefit the farmer and policymakers of the agriculture department.

We envision Telangana as a prototype state to bring a digital revolution in India's Agri-sector

Pilots as Catalysts

↓

Digital Strategy

An evidence-based comprehensive digital strategy for agriculture

↓

Productivity

Boost farmer productivity towards achieving the national goal of Doubling Farmer's Income

Sustainability

Ensure judicious and sustainable use of natural resources and farm inputs

Inclusivity

Promote tech & financial inclusion, especially for the 55% landless farmers in Telangana

Efficiency

Build robust decision support systems for govt, to help them design targeted schemes

Agritech is a priority sector for Telangana

AI4AI

Working with WEF to implement high impact AI use cases for agricultural innovation

Status: Pilot Stage

Agritech Innovation Pilots (AIPs)

state's Agricultural University is mentoring 11 cutting edge agritech startups.

Agri-DataHub Initiatives

AI-based innovators in agritech space need good quality data to build their solutions. Government's role as a data enabler is critical, so we have embarked on a massive data collection exercise, with a focus on priority use cases

NeGPA

Ministry of Agriculture & Farmers Welfare, Government of India

Working with Govt of India to deploy six high impact emerging technology use cases in Telangana

Status: RFP

Wadhwani AI

AI-based pest management solution using common smartphone

Status: 2 districts

Pesticide Spraying Using Drones

to define standard operating procedures and optimizing the dosage

Status: Research project

AI4AI : AI for Agricultural Innovation - in collaboration with C4IR WEF

Objective

To achieve digital transformation across the value chain - working with all stakeholders in a harmonized manner to realize benefits for the farmer, using AI and other emerging technologies.

Tech

Input Technologies: Remote Sensing (Satellite Imagery), Drones, IoT sensors

Data Processing Technologies: Data Analytics, Artificial Intelligence, Machine Learning

Benefits

Use for Agriculture Department

These insights can be used to adequately plan bio-inputs, farm mechanization, disbursements of subsidies and procurement.

Use for Farmer

Advisories to farmers on when to sow, when to apply crop protection and against which disease, when to harvest for optimally timing the market etc.

Use Cases

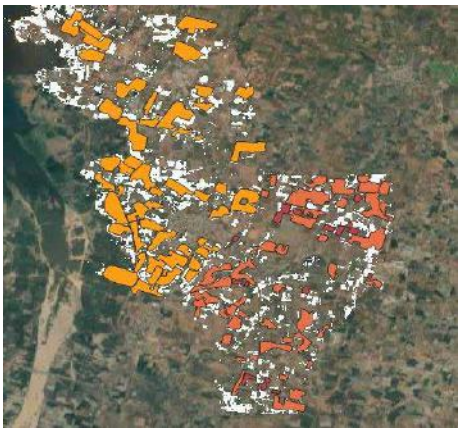
01. Sowing window prediction	02. Tillage estimation
03. Sowing monitoring	04. Crop detection
05. Area estimation	06. Crop health monitoring
07. Pest incidence prediction	08. Resource stress identification
09. Early prediction of crop yield	10. Harvest window prediction
11. Harvest progression	

The above use cases are being piloted for two consecutive crop seasons in 5 districts

Launch of AI4AI initiative in August, 2020

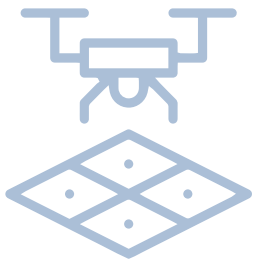
AI4AI Pilots – Sample Village – Varietal Identification

Crop identification at village level



Drone flight plan was generated for identified sampling points (500 acres) for rice varieties

Super high resolution (6 cm) drone survey done along with 15 GCPs



01. Feature extraction from drone image **02.** Feed forward deep neural network model

	Dataset	KNM Variety Accuracy	RNR Variety Accuracy	Overall Model Accuracy
Output	Drone	82%	94%	88%
	Satellite	80%	80%	80%

The Challenge

Government Data in Silos

- Open Data Portal
- Department of Agriculture
- Agriculture University
- Department of Economics and Statistics
- Development Planning Society
- Revenue Department
- NRSC
- Many More...

Agri-Data Hub Initiatives

We realize that all AI-based innovators in agritech space need good quality data to build their solutions. Government's role as a data enabler is critical.

In collaboration with PJTSAU (State's Agriculture University) we are establishing an open DataHub, which will provide AI innovators access to good quality data and foster social innovation.

The Approach

We have embarked on a massive data collection exercise, with a focus on priority use cases

These datasets need to be pre-processed to be useful for AI innovations

WORLD ECONOMIC FORUM

AI4AI: Working Group 4 Data-Driven Agriculture

Standardizing data required for all AI4AI use cases

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY HYDERABAD

Agritech Data Hub

Data preparation activities for four areas: Sowing Intelligence, Market Intelligence, Crop health monitoring, Irrigation management

NASSCOM®

Agritech Grand Challenge

Data pipelining for startup innovation challenge to be launched in December

National e-Governance Plan for Agriculture (NeGPA)

Landscape Review

ITE&C Department reached out to the vibrant agritech community– tech businesses, startups, incubators etc. for compiling a list of available solutions.

83+ startups participated

90+ emerging technology-based solutions were documented and screened

The following solutions were identified for the NeGPA program in Telangana:

Crop Cycle Stage	Solutions
Crop Planning and Monitoring	For Government: Crop Selection, Sowing Potential Prediction, Sowing progress, Crop Acreage Estimation, Crop Yield Prediction, Harvest Progress Advisory for Farmers: Crop Selection, Harvest Window Prediction, Crop health monitoring, Pest Condition Estimation, Harvest Window Prediction
Irrigation Management	Collect real-time water usage data through moisture detecting IoT sensors. Automate farm irrigation (timing and quantity) based on soil moisture and temperature data collected in real time from IoT sensors
Nutrient Management	IoT sensors will collect soil information and measure nutrient availability in real time. Fertilizer type, quantity and time of application will be recommended based on hyper local soil analysis.
Automating Farm Operations	Use of robots for precise application while seeding, spraying, weeding and harvesting.
Produce Grading and Quality Assaying	Instant chemical tests based on AI powered spectral analytics to replace lengthy lab test procedures, and Artificial Intelligence based image processing algorithms to do physical tests for grading.
Traceability	An end-to-end traceability from seed to produce, to strengthen the process of organic certification. Traceability solution will enable consumers to be assured of authenticity, and organic farmers will get the right price for their efforts.

Agritech Innovation Pilots (AIPs) – AgHub, PJTSAU

PJTSAU (Telangana's Agriculture University) has taken a visionary step towards agritech innovation, inviting agritech startups to work closely with agricultural scientists.

- AgHub, a new incubator for digital technologies pertaining to agriculture sector
- AgHub provides domain expertise, data and mentorship from agronomic scientists

11 startups were shortlisted for the first cohort

	Startup	Core Theme
01.	Thanos	Drone Spraying
02.	X-machines	Robotic weed management
03.	Transity	Supply chain management
04.	Marut Drones	Drone based diagnostics
05.	E fresh	FPOs based supply chain management
06.	Satyukt	Irrigation Management
07.	Krishi Tantra	Nutrient Management
08.	Soil Sens	Nutrient and Weather Management
09.	Amvicube	Post-Harvest Produce Grading
10.	Trace X	Traceability
11.	Super GRT	Market Place

3.2 Govtech Flagship Projects

COVID-related Initiatives

— COVID19 Data Platform

The COVID-19 Data Platform delivers more than 100 dashboards using anonymized government datasets along with public datasets. It enabled us to take timely decisions on augmenting medical capacities and systematic unlocking of specific industries during early phases of the COVID19 pandemic.

Key decision-making insights drawn from the platform:

- District-level Situational Awareness: Helps monitor the as-is situation.
- Rate of Transmission: The model helps understand transmission rate as a function of mobility and enables decisions of allowing / restricting specific industrial activities to contain disease spread.
- Scorecard by District: Enables decisions on containment status of the districts by estimating hospital care readiness, and days to capacity failure.

— Face mask violation enforcement:

Using image recognition algorithms on
live CCTV video feed can detect face mask violation. It is being utilized to mobilize patrol units, when alerts are generated at Command Control Centre.

— TCOVID19:

Launched Telangana's official COVID19 app, a single-source of official information, updates and advisories during the pandemic.

Unique features:

Telemedicine module integrated with the app, for remote medical consultations

AI-based multilingual chatbot for interactive self-assessment

Real-Time Digital Authentication of Identity (RTDAI)

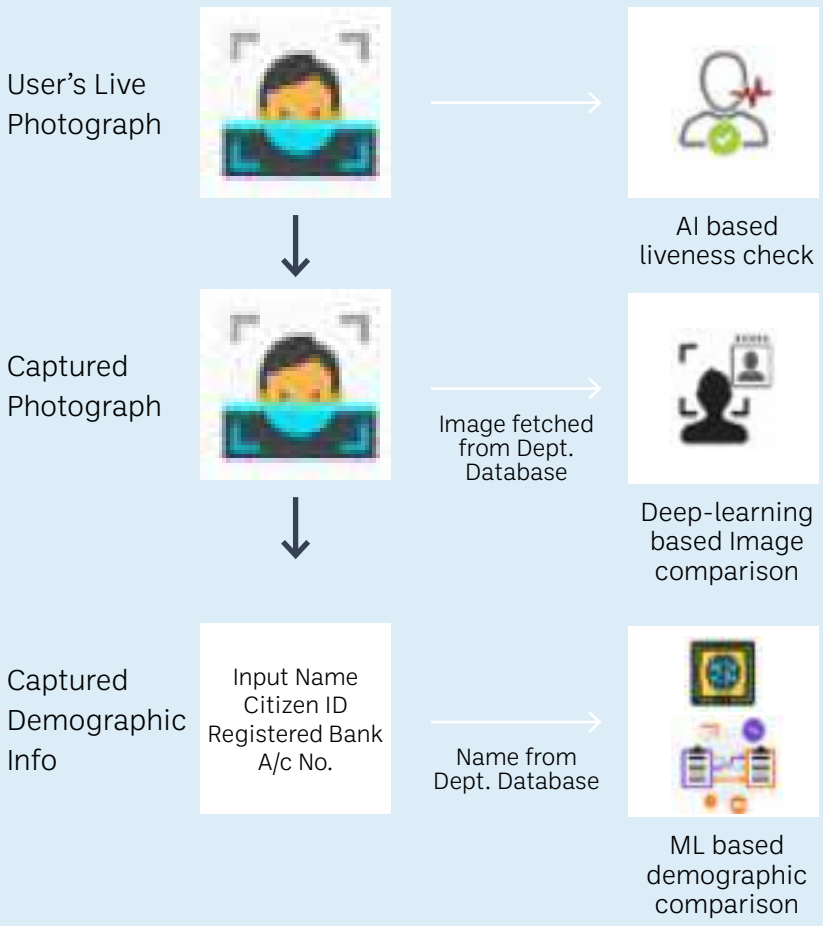
Using a computer vision platform, an image comparison solution is used to provide contactless and presenceless service delivery to citizens from home. It uses three factor authentications based on Demographic Check + Photo + Liveness. Telangana is the first state in the country to build this kind of platform leveraging emerging Technologies like Big Data, AI, ML and Deep learning, making Government service delivery efficient, convenient and transparent. The three-factor authentication:

01. AI-based Liveness check to ensure that selfie uploaded is from a live person at that instant and not of a photograph or a selfie taken earlier. This is the most important test since the identification is done remotely.

02. Big Data based Demographic check to match names with multiple name variations.

03. Deep Learning-based Image comparison to match photographs. The Technology can handle many variations in the photos.

New three factor authentication based on
demographic check + photo + liveness



Applications of RTDAI: Pensioners' Life Certificate through Selfie (PLCS):

32,000+ pensioners

have registered on the T-App Folio to avail annual certificate, out of 3 lakh registered pensioners.

- Old age pensioners need not visit the government office or submit a certificate that she or he is alive. This became a powerful service during the COVID19 pandemic.
- The PLCS checks the liveness of the person and matches with the photograph in the database and issues a certificate.

Govtech Pilots Completed & Ongoing

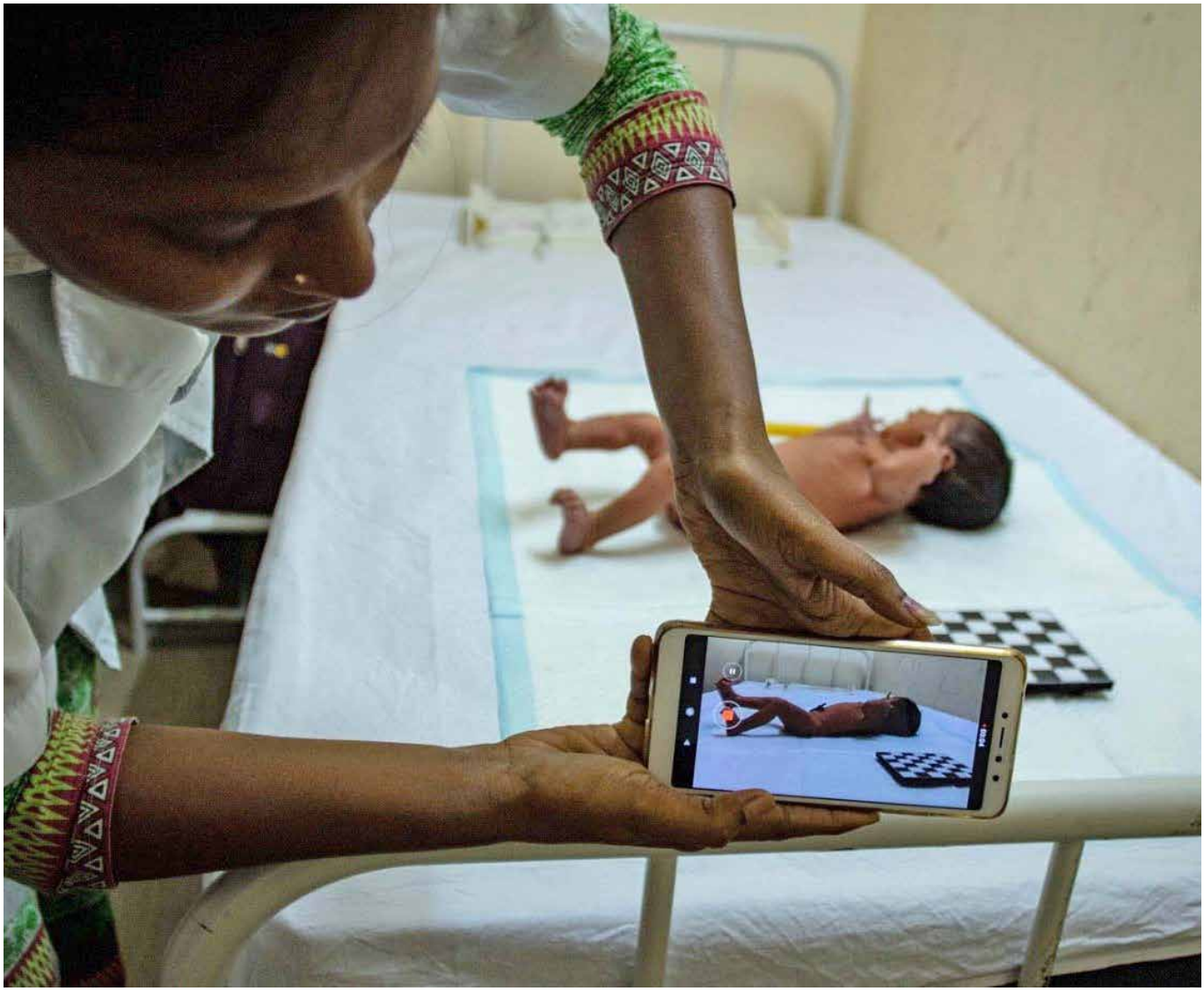
— AI-based Anthropometry for newborns

India is home to the largest number of malnourished children in the world. AI will empower ASHA and Anganwadi workers in Telangana to improve the newborn health space.

Wadhwani AI is creating a smartphone-based anthropometry technology that will allow frontline workers to screen for low-birth-weight babies in rural homes.

This AI-powered visual weighing machine will provide accurate, tamper-proof, geo-tagged measurements on a smartphone, without additional hardware or data connectivity.

A controlled setting has been created in Niloufer Hospital, Hyderabad, where we have collected data from 3500+ newborns for algorithmic training and validation exercises. Prototype has been tested and validated, and being further developed



— AI-based pest management solution using common smartphone

Wadhwani AI is a world-renowned non-profit research institute with a vision of using Artificial Intelligence for social good.

Currently, their product detects Pink Bollworm and American Bollworm, 2 of the most devastating pests for the Cotton crop. The solution is currently deployed in 2 districts – Adilabad and Rangareddy.

— Quality Assaying of Agricultural Commodities

To categorize the produce qualitatively and accurately, ensuring fair compensation for the farmer and ensuring good quality produce for the consumer, we are piloting this solution in collaboration with NITI Aayog. Technology:

- Instant chemical tests based on AI-powered spectral analytics
- AI-based image processing algorithms to do physical tests for grading.

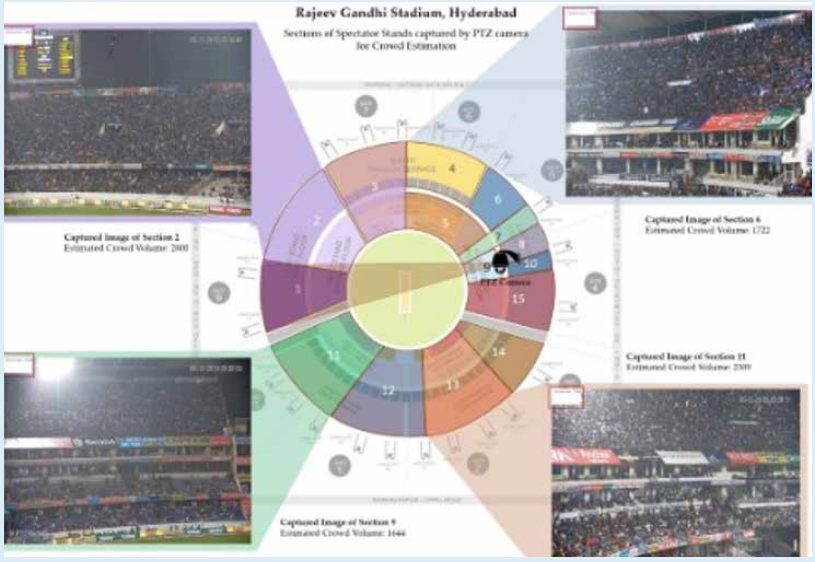
— Crowd Management Solution:

- Police department required a tool which can estimate head count in real time, and aid quick decision-making for effective crowd management.
- They need to timely disperse dangerously increasing crowd to avoid stampedes, especially during religious processions, political gatherings etc
- A Gurgaon based AI startup was selected among 400 entries in an online competition. Their solution can estimate crowd count in real-time using surveillance cameras (CCTV), and raise an alert when the crowd density numbers cross a threshold. This is particularly effective to predict and prevent stampedes.

First Test of Application

India vs WI T20i match at Rajiv Gandhi Internation Stadium, Hyderabad.

Stand	Section	Estimated Crowd
West Stand	1	3867
West Stand	2	2800
North Pavilion	3	2407
North Pavilion (Terrace)	4	1722
North Pavilion/ East Stand	5	1173
East Stand (First Floor)	6	1397
East Stand	7	1651
East Stand (First Floor)	8	1140
East Stand (Ground Floor)	9	1038
East Stand (First Floor)	10	285
South Pavilion	11	1644
South Pavilion	12	1110
South Pavilion	13	2389
South Pavilion	14	1073
East Stand	15	1503
Total Estimated Crowd		25, 199



Total crowd in the stadium estimated with

90+% Accuracy

3.3 TASK

TASK is a Government of Telangana initiative bridging the skills gap in students and offering quality human resources to the industry.

Telangana Academy for Skill and Knowledge (TASK), along with Telangana State Council of Higher Education (TSCHE), has joined hands with Microsoft and Nasscom FutureSkills to implement the March to Million initiative in Telangana. This initiative aims at skilling one million youth in Artificial Intelligence by 2021, with an aim to train 30,000 youth in Telangana.

March to Million: For the first batch - 20,537 students enrolled for the program from 383 colleges covered across 31 districts of Telangana

I am glad that TASK and TSCHE have partnered for this initiative. The students of our state must make use of this opportunity to skill themselves in emerging technologies.

I appreciate Microsoft and NASSCOM FutureSkills for bringing this initiative to Telangana. This will aide us to achieve our policy target of increasing the AI workforce by at least 30,000 by the end of 2022.

Other major AI skilling Initiatives	Description
Introduction to AI with ML in JAVA	Training was offered to 1104 students from Khammam, Karimnagar, Warangal Medchal Districts Virtually
Artificial Intelligence & Deep Learning	Partner pilot initiatives with 360DigiTMG and ExcelR, Training was offered to 584 faculty virtually
IBM Gurucool	204 Faculty members got trained from 86 colleges across 11 districts of Telangana in association with IBM and Smart bridge. Training & Project Build-A-Thon program on Machine learning,Auto AI and IBM Watson Studio was organized exclusively for Faculty members.
Skills needed and Job opportunities in Artificial Intelligence	Eenadu and HYSEA organized a Webinar on Artificial Intelligence. More than 5000 people participated in the webinar on various platforms.

Recap of 2020

we organized 120+ events during the Year of AI program.

2020 has been a vibrant year. Despite the pandemic, a multitude of institutions came together to contribute to Telangana's Year of AI program.

09 — Indian Institute of Technology Hyderabad

10 — MUST RESEARCH

13 — TASK: Telangana Academy for Skill and Knowledge

11 — Telangana Information technology association (TITA)

44 — SMARTBRIDGE

14 — IEEE HYDERABAD SECTION

11 — Hyd AI & Deep Learning Meetup Group

05 — NASSCOM

02 — ASIA INC. 500

02 — WADHWANI AI

02 — STPI

For More Details of Events

http://ai.telangana.gov.in

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YEAR OF AI

Telangana's Year of AI — 2020 and Beyond

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