



EMERGING TECHNOLOGIES
ITE&C DEPARTMENT

Emerging Technologies Wing

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Telangana: The Top Destination for Investors in India

Advantage Telangana

1. TG-iPASS

Single-window clearance system which gives approvals based on self-certification in less than 15 days.

6. Advantage Hyderabad

Hyderabad provides world class amenities, low cost of living, great infrastructure and travel connectivity to residents

5. Talent Pool

Home to top universities in India providing a skilled workforce. Telangana Academy for Skill and Knowledge (TASK) provides skilling programs to make industry-ready employees



2. Progressive Policies

New Industrial policy and Sectoral policies on EV, Life Sciences, AVGC, Semiconductors etc. to be launched soon.

3. Meet or Beat Incentives

Competitive incentives in comparison to other states are given to Mega Projects*

4. Innovation Ecosystem

Ranked 2nd in Innovation in India because of a vibrant innovation ecosystem with world-class facilities like T-Hub and T-Works

* Mega Projects are projects with investment over USD 25M or which provide employment for minimum of 1000 personnel

Telangana | Best in Class Infrastructure



KEY INFRASTRUCTURE INITIATIVES

Road Infra

24,245 km road incl. 2,690 km of National Highways & 3,152 km of State Highways

Outer Ring Road

158 km long ORR around Hyderabad connecting major industrial areas with airport and residential areas

Regional Ring Road

340 km long 4-laned access controlled RRR being planned connecting major suburbs



CONNECTING HYD TO THE WORLD | Enabling Global Trade



Non-stop and one-stop flights to the **20+ International & 60+ Domestic destinations**

RGIA Expansion

Airport's capacity expanded to up to **40 million passengers per annum**

Expansion of Hyd. Metro

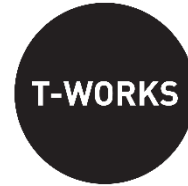
Second-largest operational network in India. New govt. has approved further expansion of metro and connectivity to airport

Telangana / Integrated Innovation and R&D Ecosystem



T-Hub

World's largest incubator ecosystem; actively working with 2000+ national and international startups raising funding of \$1.94 Bn



T-Works

India's largest prototyping Centre with a vision to create and celebrate a culture of experimentation and innovation



WE Hub:

Exclusive startup ecosystem for women entrepreneurs, already incubated 5,967 startups



RICH
Research and Innovation
Circle of Hyderabad

Research & Innovation Circle of Hyd.

links research institutions, academia and industry along with VCs, angel investors and incubator, and actively facilitates process of taking their research to market



TELANGANA STATE
INNOVATION CELL

Telangana State Innovation Cell

An initiative by State Government for aspiring innovators, start-ups, and changemakers



EMERGING TECHNOLOGIES
ITE&C DEPARTMENT

Emerging Technologies Wing

is created to develop ecosystem required for industry and govt. depts to leverage emerging tech, in 8 key areas such as Blockchain, AI, IoT, Cloud, 3D Printing, VR/AR, Robotics and Big Data

Achieving Telangana's vision to become a leader in Emerging Technologies

Two-Pronged Approach

ET Wing

Technologies in focus

- ✓ AI
- ✓ Blockchain
- ✓ Cloud
- ✓ Drones and Robotics
- ✓ IoT
- ✓ AR/VR
- ✓ Space Tech
- ✓ Additive Manufacturing

Ecosystem Development

Government Adoption

Actionable Policy Frameworks

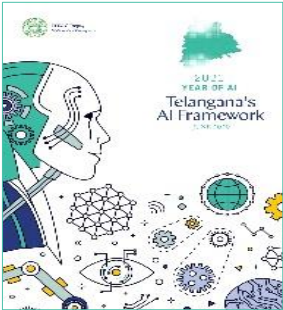
Institutions of Excellence



Policy Frameworks & Centre of Excellences

Ecosystem Development through policy frameworks and Center of Excellence bodies

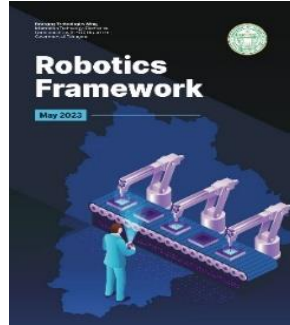
Formulated 6 policy frameworks in Emerging technologies



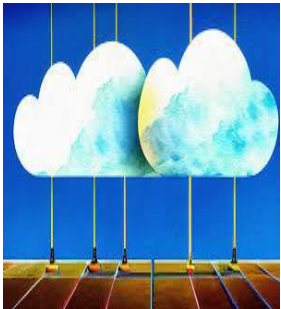
AI framework



Spacetech Framework



Robotics framework



Cloud Policy

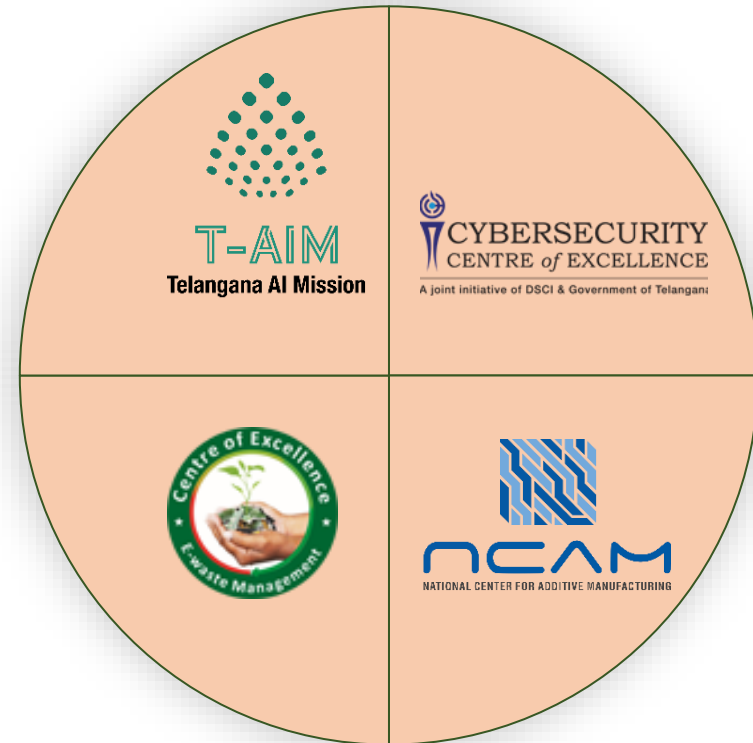


Drone Framework



Blockchain framework

Implementation through CoEs



Telangana's AI Vision - to make Hyderabad among Top 25 Global AI Innovation Hubs

Year of AI & Beyond

- The Telangana government declared 2020 as the year of Artificial Intelligence
- Launched **Telangana AI framework with 6 pillars**
- **Telangana AI Mission (T-AIM)** was established in collaboration with NASSCOM to execute the framework

Telangana AI Framework Pillars



Data Exchange
Platform and HPAIC



Skilling and
Education



Governance, Ethics
and Privacy



Research
And Innovation



Enabling Adoption
and Community
Collaboration



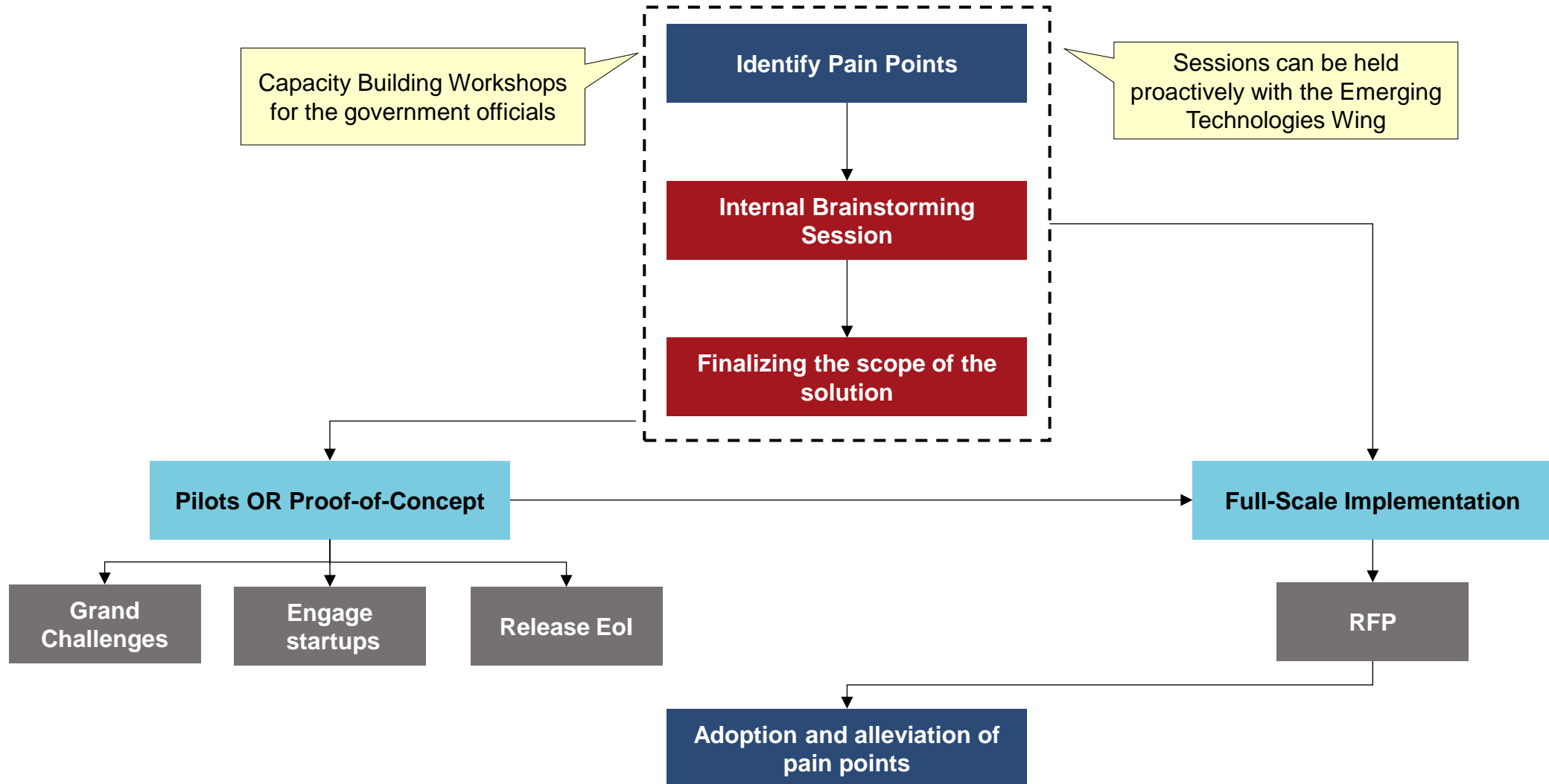
AI
Investment Fund



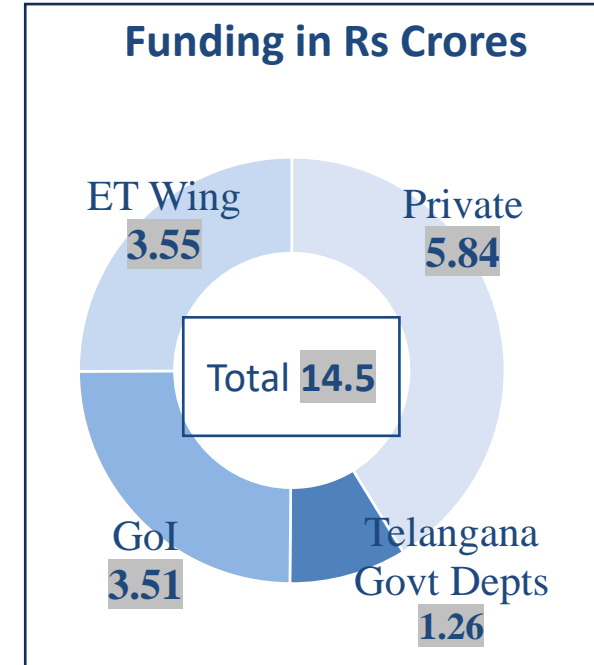
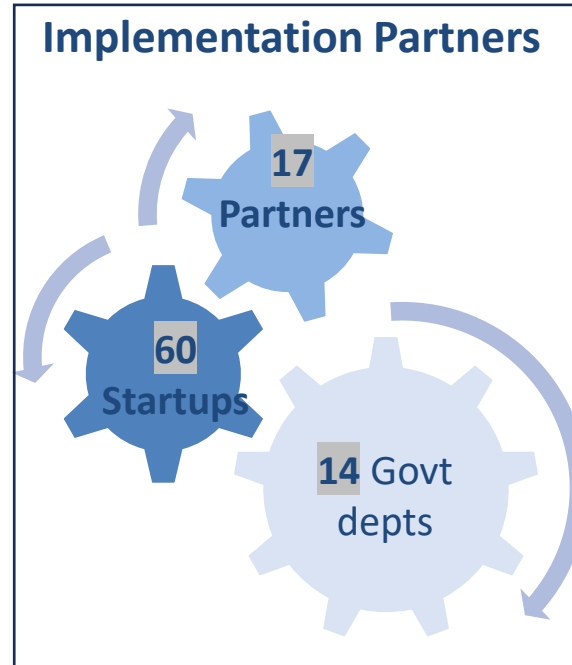
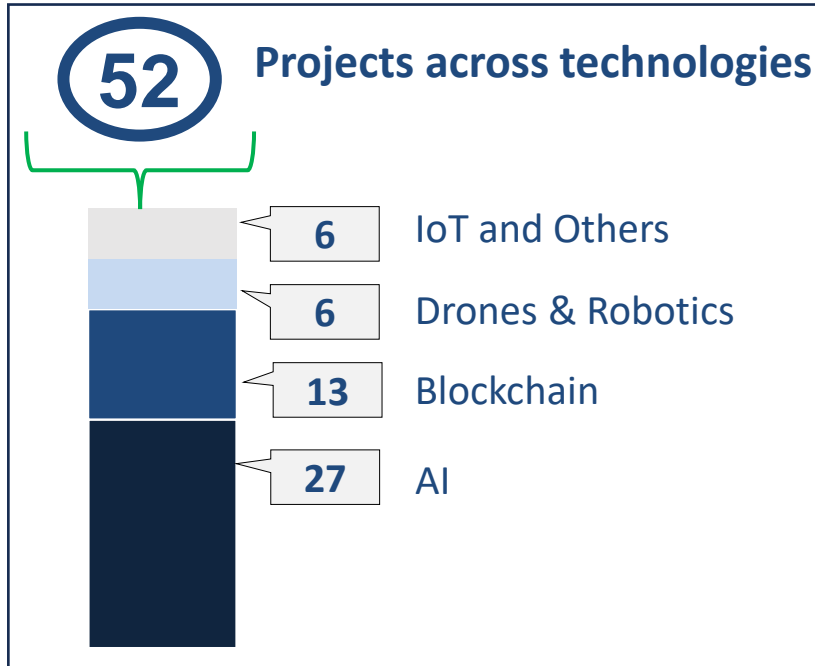
Tech Solutions for Social Good



GovTech Adoption - Approach



Implemented 52 projects across 14 Telangana Government departments





Artificial Intelligence



27 AI use cases in 10 departments with 17 startups

AGRICULTURE

- Smart Nutrition Management Of Soil
- Data In Climate Resilient Agriculture (DICRA)
- Quality Assaying
- Agriculture Land understanding and Monitoring

TRANSPORT

iRASTE

ELECTION COMMISSION

Facial Recognition For e-Voting

GOVERNANCE

- Real-Time Digital Authentication Of Identity (RTDAI)
- Chatbots
- COVID19 Data Platform

POLICE

Crowd Management Tool

FOREST

Monitoring Wildlife Using AI

Project iRASTE (Intelligent Solutions for Road Safety through Technology and Engineering)


Challenge — Solution — Outcomes

Company Logo

Installation (Coverage Map)

- Installation in 200 Buses (190 ADAS + 10 ADAS/DMS) Complete
- Installation of further DMS units – Will start after Eval

No.	Bus route	Count of ADAS-equipped buses
1	Hyderabad to Vijayawada	129
2	Hyderabad to Bangalore	35
3	Hyderabad to Vizag	7
4	Hyderabad to Nizamabad	7
5	Hyderabad to Mysore	2
6	Hyderabad to Chennai	3
7	Hyderabad to Tirupati	4
8	Hyderabad to Kumool	9



Problem Statement

An average of 422 deaths everyday or 18 deaths every hour due to road accidents and Govt's objective is to reduce them by 50%

Solution

Advanced Driver Assistance Systems & Collision Avoidance Systems deployed in **200 buses on 3NHs** (Adilabad, Bangalore, Vijayawada)

- Generate **accident data** based on alerts for 5 accident types
- Identify **black spots** based on accident data
- **Predict** Future Accident-prone locations (**Greyspots**)

Driver Monitoring System

- Track driver performance and alertness

Impact

- ZERO accidents (compared to double-digit accidents in non-ADAS fleet) in the past 4 months (may '23 - Aug'23)
- Driver behavior has improved after each training on ADAS
- Remedial measure recommendations for top 5 Blackspots

Monitoring Wildlife using AI

Telangana Today
Tech Tools

Forest dept to use AI in conservation

Startups come up with solutions to prevent loss of wildlife

B KRISHNA MOHAN
HYDERABAD

Technology can be used for societal good. The 'Forest AI Grand Challenge', launched by Telangana Artificial Intelligence Mission (T-AIM) together with information technology company Capgemini, has proved that new-age technologies like artificial intelligence can be used in wildlife conservation, getting information about location, number and movement of animals across the forest area.

This data can also be used to identify potential human-animal conflict zones as well as wildfire hazards thus preventing the loss of wildlife. "The solution that we built can help forest officials move quickly from raw

Smart Steps
FOREST AI GRAND CHALLENGE WAS LAUNCHED BY TELANGANA ARTIFICIAL INTELLIGENCE MISSION (T-AIM) ALONG WITH IT COMPANY CAPGEMINI

- Challenge received 59 applications
- 12 startups given the opportunity to build a Proof of Concept
- Maharashtra-based Think Evolve Consulting adjudged the winner. Its models will help gather large scale collection and processing of camera trap data information and integrate it with data from satellite imagery
- Hyderabad-based Garudalytics showcased a solution based on which forest officials can know about water bodies or any attempts at deforestation. Officials can use the animal count and movement data while planning ecotourism activities

"We have showcased a solution based on which forest officials can know about water bodies or any attempts at deforestation. Officials can use the animal count and movement data while planning ecotourism activities"

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Problem Statement

Telangana Forest Department currently monitors wildlife and human movement manually using camera trap images which is time-consuming and laborious

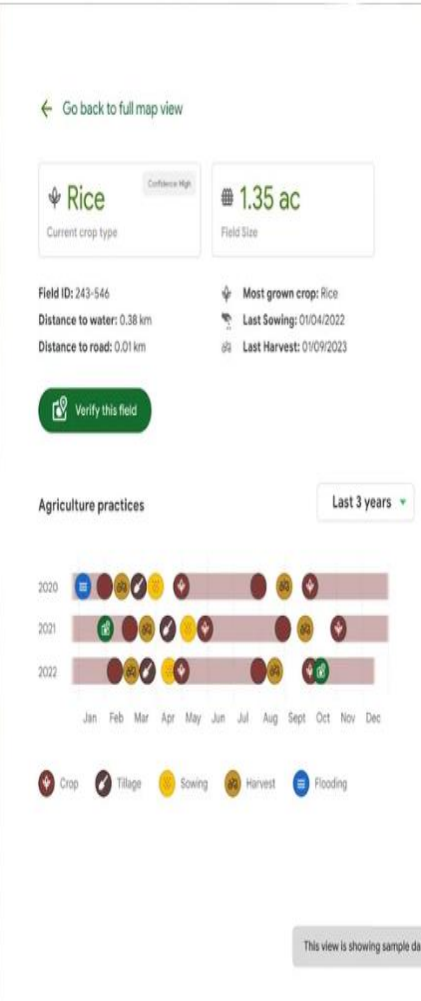
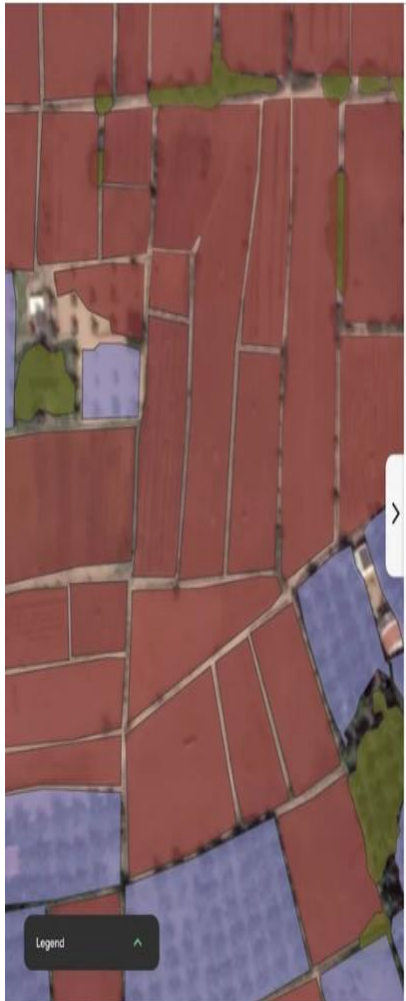
Solution

- AI-based solution implemented in **2 Tiger reserves** of Amarabad and Kawal
- Processed **4.5 millions** of stored images with just **1.5-2sec processing speed/image**
- Identified **20 animal species with 95% accuracy**
- Track animal movements and **Spatio temporal density maps** are generated

Impact

- Conservation of wildlife and forest biodiversity
- Provide Insights to forest officers on
 - Waterbody management
 - Redesigning the eco-tourism spots
 - Protection measures for animals
 - Identification of human - animal conflict zones

Agricultural Landscape Understanding and Monitoring by Google



Problem Statement

About 55.5% of the state's population is dependent on agriculture. However, Insufficient actionable information at field level and unsustainable farming practices contribute to low crop yield

Solution

Advanced AI and ML technologies along with Remote sensing technology for 15 villages, Agricultural Landscape Understanding:

- Field boundaries delineation for **~60k agriculture fields** with close to **85% accuracy**
- It enables precise data on agriculture acreage, forested areas, and irrigation structures

Landscape Monitoring and Event Detection

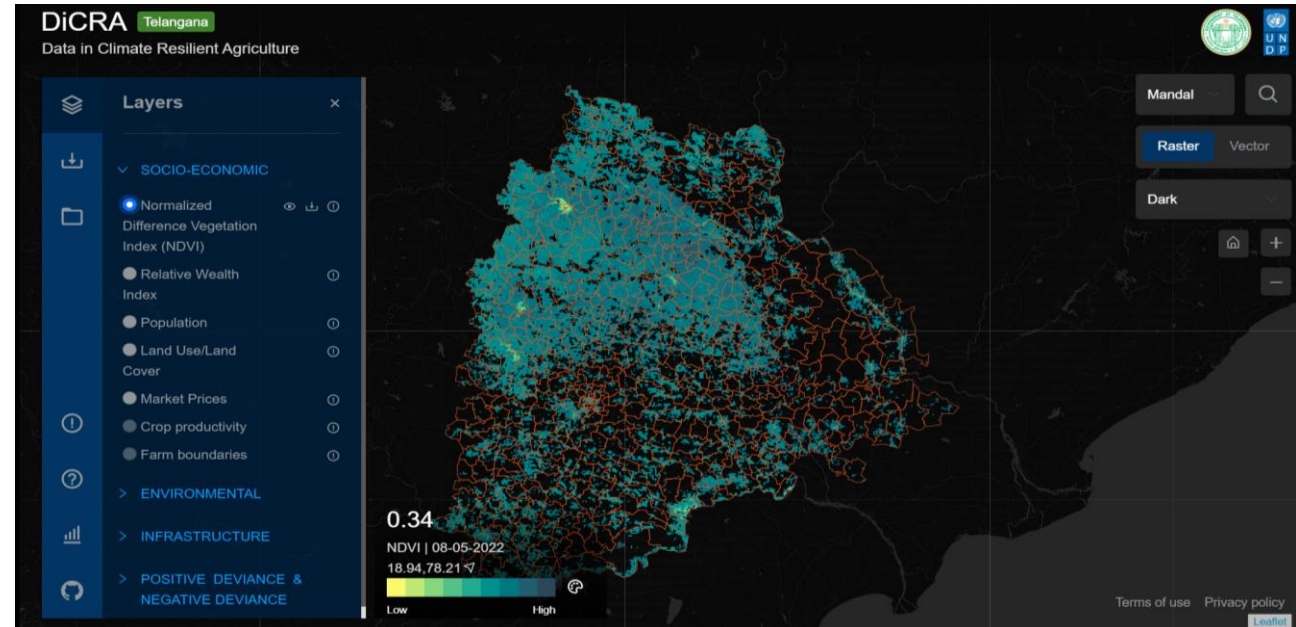
- Model is under progress and outcome provides information on crop type, sow & harvest schedule, water bodies.

Impact

- Efficient crop yield estimations and farm advisories
- Agricultural field-level dataset to enable DPGs and build insights related to credit and climate crisis

Data In Climate Resilient Agriculture (DiCRA)

1. World's first **Digital Public Good on Climate Resilient Agriculture**
2. **Demystifies Climate Resilience in Agriculture** through measurable data parameters.
3. Customized advisory to 21,000 Villages on climate resilient agriculture using DiCRA.
4. **Open Geospatial platform** curated by data collaborative of 9 organizations and 100+ volunteering data scientists.
5. Provides Open Access, Open Data, Open Software, and Open AI.
6. Plug & play design can be applied for any geography in the world. Scaling fast to 5 states in India and 2 countries in Latin America.





Data In Climate Resilient Agriculture (DiCRA)

Utility

- Pattern detection & historical trends from satellite data to understand - What has been working?
- Positive stories from Positive deviance
- Provides high-resolution high-frequency maps that one can zoom to farm level
- Customized advisory to 21,000 Villages on climate resilient agriculture using DiCRA.

Different Data Sets & Analytics

Environmental

Climate Exposure, Soil moisture, Soil Organic Carbon, Vegetation, Crop fires, Extreme weather incidents, Disasters, Crop type

Socioeconomic

Relative Wealth, Population, Land Use Land Coverage, Crop productivity, Commodity Prices, Farm boundaries

Infrastructure

Warehouses, Cold storages, Polyhouses



Saagu Baagu project has provided agritech services across chilli crop value chain



Saagu-Baagu Project



Digital Green

BILL & MELINDA GATES foundation



Saagu Baagu Project is implemented based on the principle – ‘Think Big, Start Small, Scale Fast’ on a Public Private Cooperation (PPC) model by Agriculture Department & ITEC Department Govt. of Telangana



Kisan Diary Enterprise



Video based extension and Chatbot



AI based Soil testing



AI based Quality Assaying



Market linkages



Farmstack - Secured data exchange platform for ag-tech partners

Crop Classification using Artificial Intelligence Datasets

Satellite Images from Sentinel-2 will be collected and marked with ground truth data collected
Crops prioritised- Cotton, Paddy, Maize, Red Gram, Chillies, Groundnut, Bengal Gram (Chana).

Phase 1 &
Phase 2



Ground truth data of crop classification to be collected across geographical areas identified

Phase 3



High Quality Test and Training AI datasets prepared for data challenge using satellite images

Phase 4



Organizing and hosting of a **data challenge**

Phase 5



Inception of use cases and development of an implementation concept to bring **AI models** into use

AI Procurement Guidelines for Public Sector

- Procurement guidelines help to procure responsible AI solutions that mitigate risks to privacy, data protection, discrimination
- Nodal agency and Ethics AI committee will be part of
 - Pre-procurement assessments related to risk and data
 - Ethical review of bids in the procurement phase
 - Oversee sandbox testing of solutions in post-procurement

Some of the Guiding Principles are

- Do-no harm
- Uphold persons' autonomy and privacy
- Non-exploitation
- Fair distribution of benefits
- Risk minimization
- Transparency and accountability

The ethical review process of bids evaluates harm and impact under aspects of

- Socio-economic
- Legal
- Privacy

FAIR Forward



Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

ET Wing at Google for India



For a comprehensive vision and innovation surrounding the use of AI; Director of the Emerging Technologies Wing, Government of Telangana was recognized as one of the 3 "**Women in AI**" by Google at "**Women Will**" during their annual event, **Google for India**.



Blockchain



Blockchain Initiatives



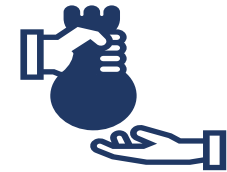
Seed Traceability



FIR and Evidence
Tracking



T-Chits



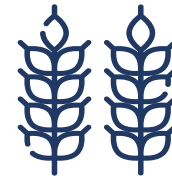
Credit Cooperative
(StreeNidhi)



eVoting



Carbon Credits on
Blockchain



Civil Supplies
tracking



WEB3.0 Regulatory
Sandbox

Smartphone based e-Voting



Languages : తెలుగు | हिंदी



Problem Statement

State Election Commission planned to implement an eVoting solution to help senior citizens, covid patients, etc., during pandemic

Solution

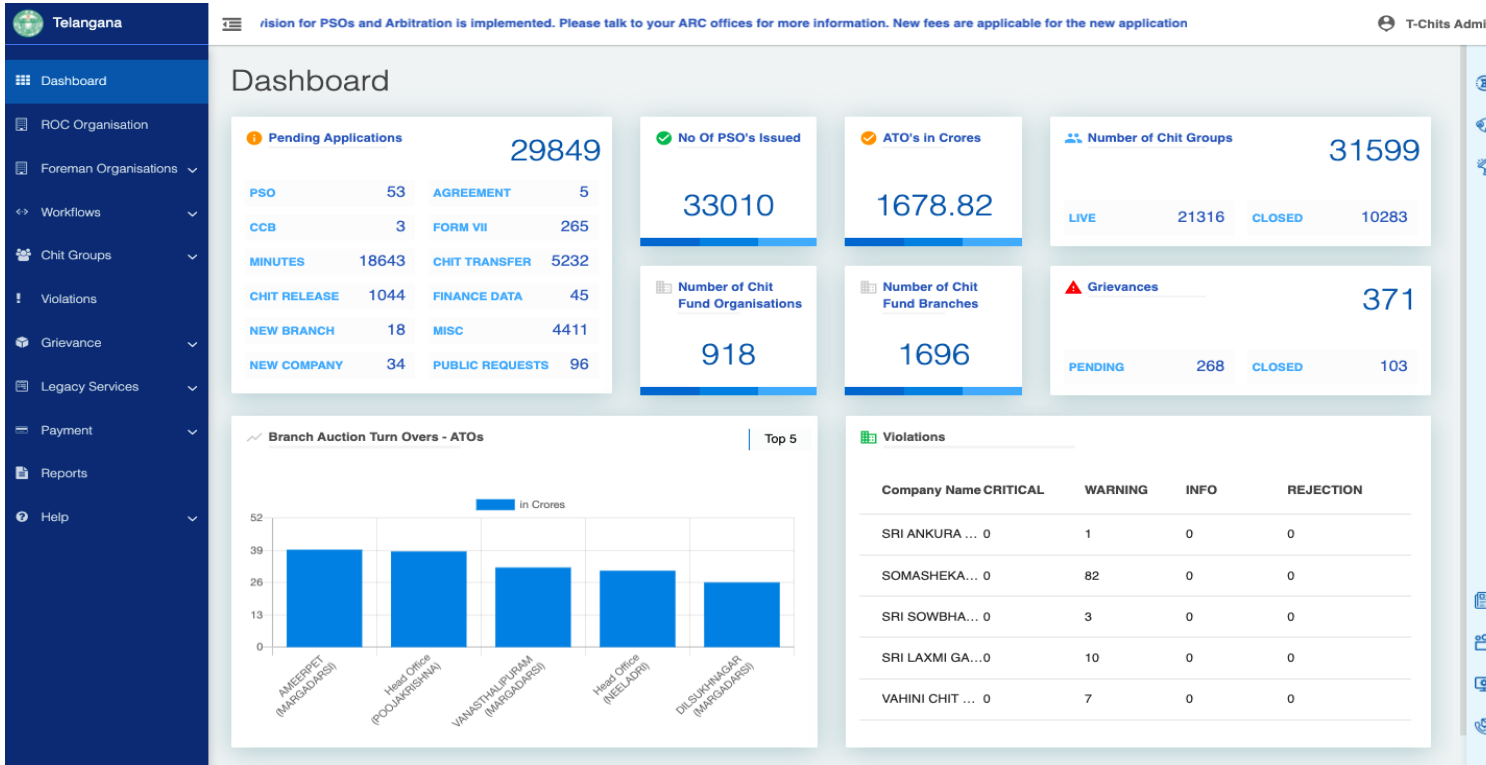
- **Artificial Intelligence** was leveraged for 3 Factor Authentication of the valid voter during registration:
 - Name Matching with Aadhaar
 - Liveness Detection of Individual
 - Image Matching with EPIC Database
- **Blockchain** (Distributed Ledger) technology has been used to secure the de-identified and encrypted votes
- CDAC is the implementation partner
- Conducted dry run in Khammam district with **3500 users** and **achieved 85% accuracy**

Impact

- Potential increase in urban voting
- Ease of voting for persons with disabilities, Senior citizens, patients, etc.,



T-Chits



Oct '18
Launched



All 14 regulator
Offices Telangana



31,599+
Groups



1696+
Chit fund Offices



12,28,300+
Subscribers



20,145.84 Cr+
Monies rotated Per Annum



2,60,354+
Blocks



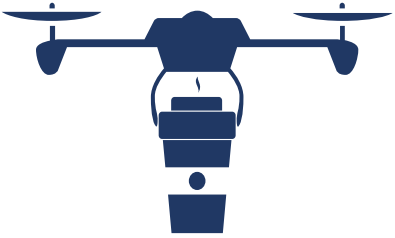
15,45,723+
Transactions

Awarded Gold @ National level for "Excellence in implementing Emerging Technologies" in 2020



Drones

Drone Initiatives



Medicine from the sky



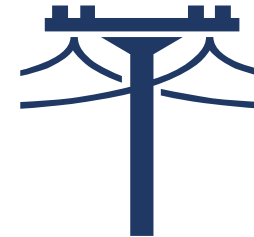
Hara Bahara



T-Meds



Precision Agriculture



Powerline inspection



Ecosystem Enablers

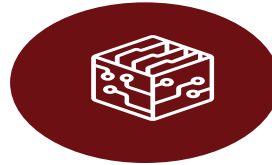
Started with sectoral approach with a focus on the agriculture sector

Telangana is the first state to create digital agriculture infrastructure framework



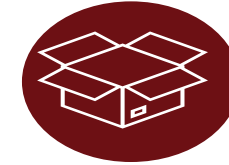
Policy Support

- Telangana Government drafted country's first **Agri Data Management framework**
- Policy framework on how to collect, store & share data while ensuring farmer's privacy



Digital Public Infrastructure

- Telangana developed country's first **Agri data exchange** with five use-cases



Agritech Sandbox

- Developed framework to set up and implement an **Agritech sandbox** to validate new technologies from three perspectives - Functional, Technology and Policy & Regulatory

ADMF Protects users, Prevents harm & Promotes innovation with following salient features of the framework



Notice

A notice to be issued to the principal before collection of any personal data for any purpose



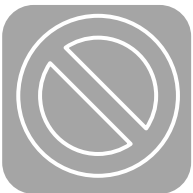
Consent Framework

- Consent before the commencement of processing of any personal data



Purpose-based limitation for accessing Data

- Personal data to be used only for the purposes specified by the Framework
- Any additional purposes must be consented afresh



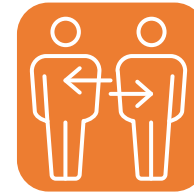
Fair and lawful processing of personal data

The collection of personal data must be fair, lawful and limited



Responsibility and Accountability

Each AIP, AIU and DSP will appoint a DMO to carry out their functions under ADMF



Ease of Access with responsible sharing

The ease of access of data to the AIUs and DSPs shall be balanced with the requirements of data protection



Rights of Data Principals

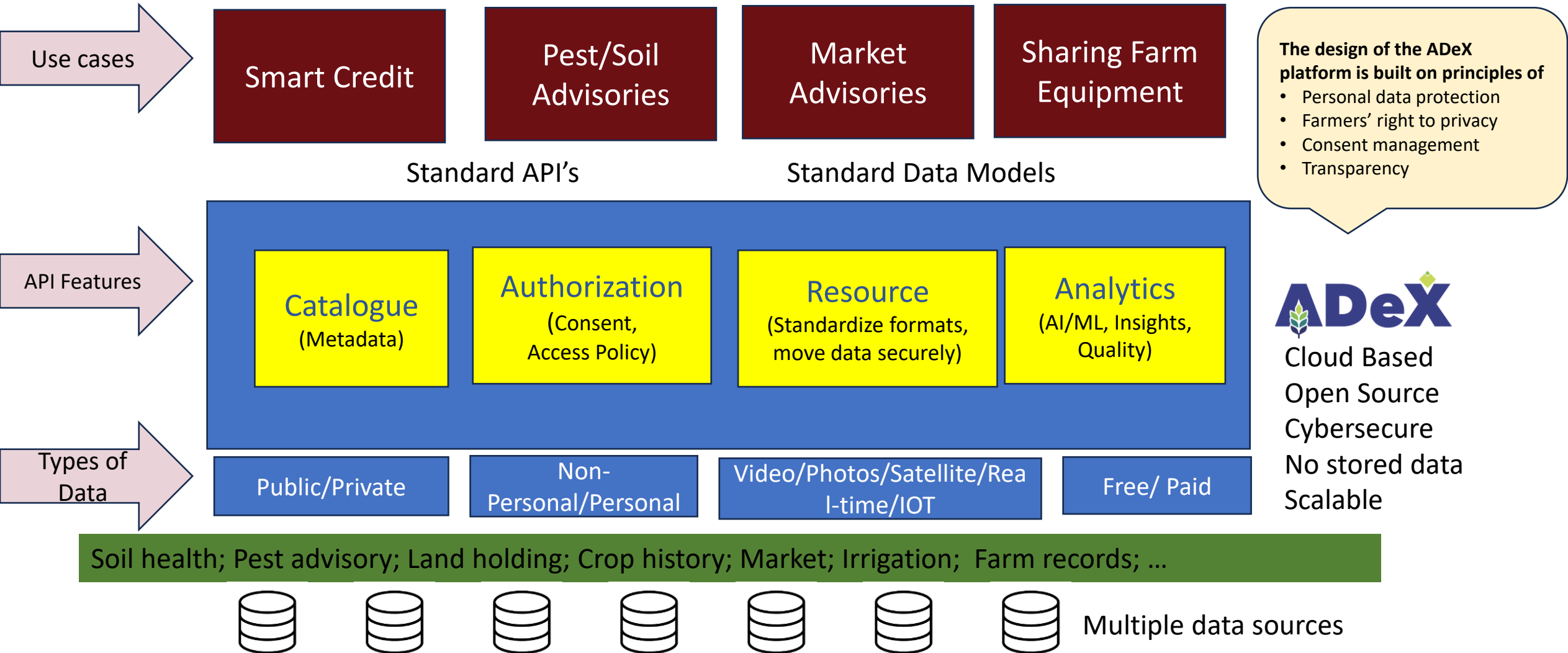
- Access to their personal data
- Information about users of their personal data
- Amendment of their personal data
- Can request for deletion of their personal data



Technological and operational safeguards

- Security-by-design
- Privacy-by-design
- Privacy protecting technologies

Agricultural Data Exchange Platform (ADeX) is an open-source platform





Agritech sandbox is a controlled environment to test and validate innovative Agritech solutions

The objective is to safeguard farmers' interests while promoting validated and deployable innovations in Telangana State

Functional Evaluation

- Evaluation through on-farm/field level to **validate the solution claims**
- The primary focus is on use-case applicability and accuracy, value to farmers, and efficiency improvement
- The '**CAUSE NO HARM**' principle is a key validation parameter

Technology Evaluation

- Evaluation of **solution algorithms and data models on ADeX** (test data ecosystem)
- Test parameters include **performance, accuracy, data privacy**, technical feasibility of implementation, and scalability.

Policy & Regulatory Evaluation

Regulatory Compliance

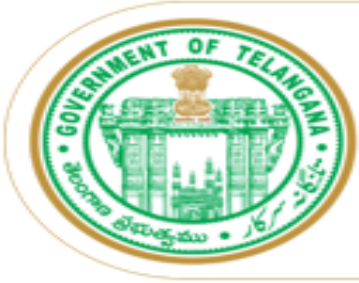
- Conformance to legal, regulatory, ethical requirements of agricultural domain
- Conformance to data protection regulations

Policy Reforms

- **Identify policy gaps and build reforms** to accelerate new-age digital solutions

The 3 evaluations are conducted by **Task Force institutions** as mentioned below:

- A. Agricultural department, AgHub of Professor Jayashankar Telangana State Agriculture University (PJSATU)
- B. ITE&C Department in partnership with academic institutions and others
- C. Research & Innovation Circle of Hyderabad (RICH)



**EMERGING TECHNOLOGIES
ITE&C DEPARTMENT**

Thank You!

**We believe that technology is an enabler that can transform
lives**

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Government of Telangana, India
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