

Applications of AI in the Context of National Security

August 2023

Presentation for INS VALSURA



Artificial Intelligence: The India Opportunity



AI and Data Value Add potential:
USD 957 Bn by 2035



2727 AI-driven Startups
Funding Raised – USD 836 Mn (2020)

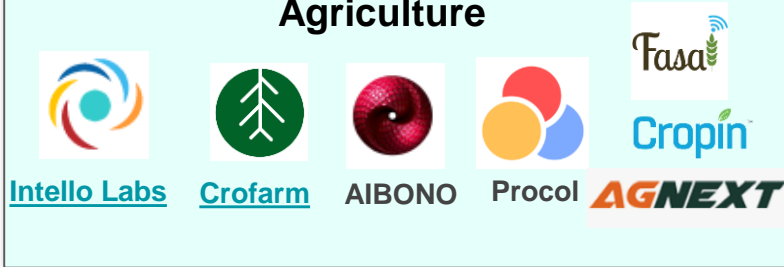


AI startups vs All Startups in India -
7.5%



India among Top Five countries in AI hiring
growth & ranks Third in Research

Agriculture



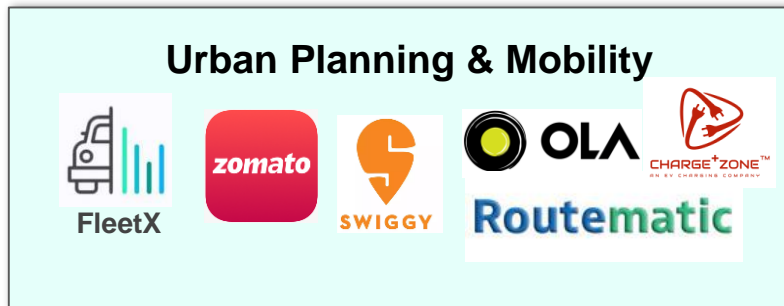
Healthcare



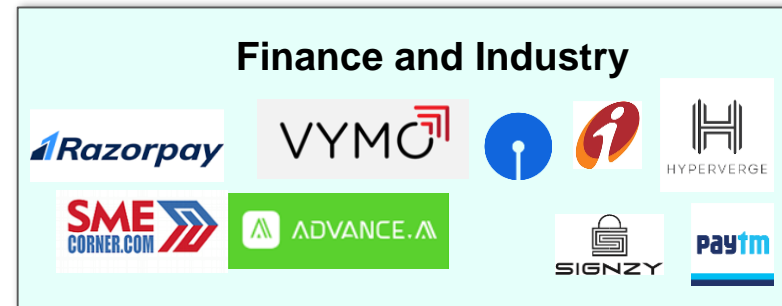
Education



Urban Planning & Mobility



Finance and Industry

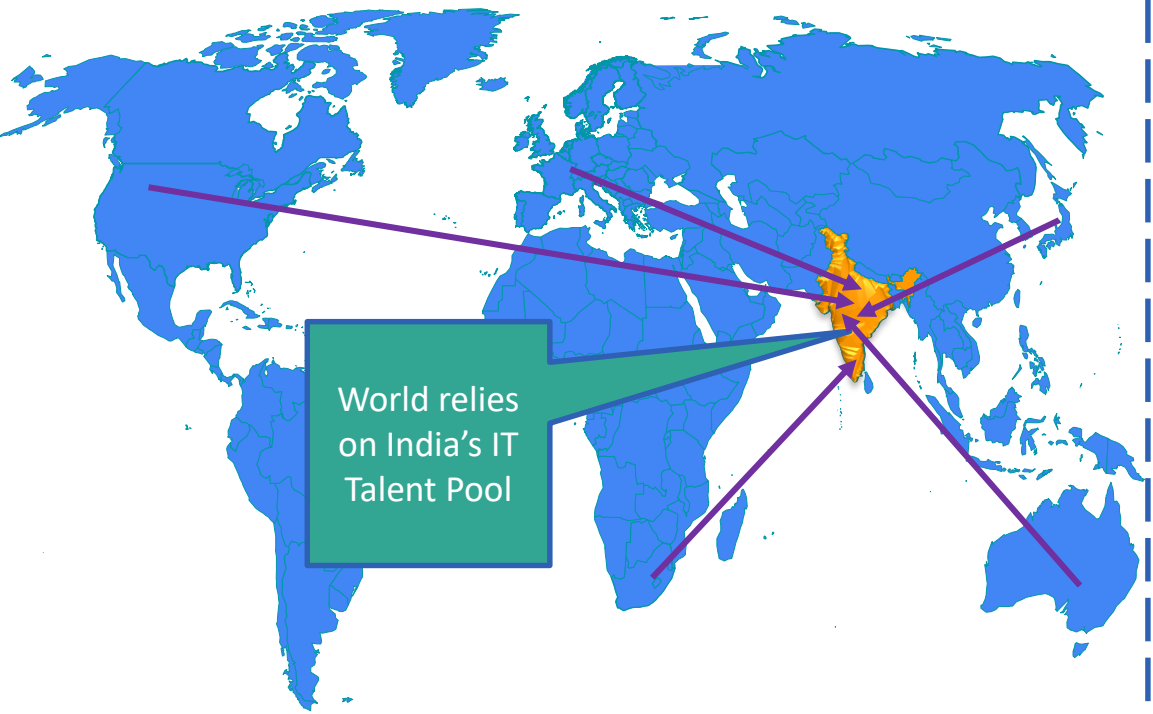


AI Opportunity for India

1

Global Relevance

- India is the undisputed No 1 IT outsourcing destination in the world
- 50%+ Fortune 500 companies outsource their IT to India



World relies on India's IT Talent Pool

2

Domestic potential

- India Stack - World-class digital platforms act as foundations
- Our digital footprint - gold mine of data serves as a huge AI market



NDHM
National Digital Health Mission by NHA

IDEA
Integrated Digital Ecosystem for agriculture by Ministry of Agriculture

NDEAR
National Digital Education Architecture by Ministry of Education

Technology Commons Platforms
ULIP(logistics), Unnati (jobs), etc

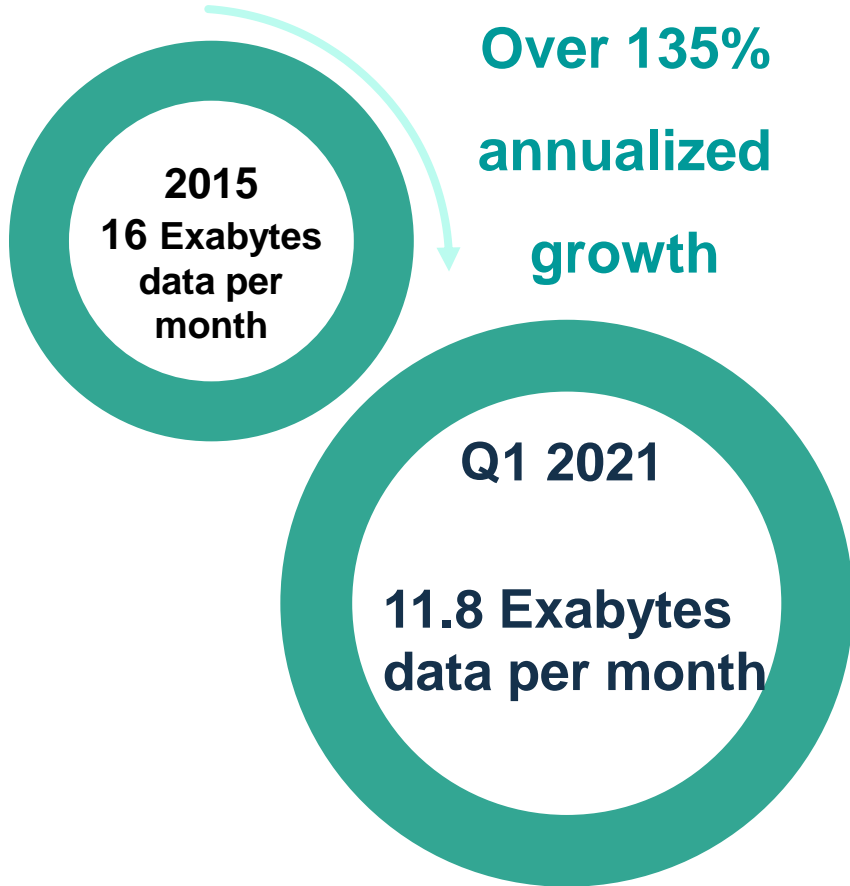
3

India as AI back office of the world

- AI as a massive low-skilled employment creation engine.
- India is already the IT back office of the world.
- The data annotation market in India stood at ~ US\$ 250 million in FY20, of which the US market contributed ~ 60% to the overall value. The market is expected to reach ~ US\$ 7 billion by 2030 due to accelerated domestic demand for AI.

India as Data Rich Nation

India consumes more data per person and is digitizing faster than rest of the world



India's data consumption has grown over 11 fold in the past 5 years



India accounts for over 20% of global data flows



India's Data Size, Scale and Diversity make it the most valuable globally



India's rich data reserves provides a unique opportunity for India's problems to be addressed using AI

Data and AI could add \$450-500bn to India's GDP

Sector	USD Bn	Examples of highest value Advanced Analytics / Artificial Intelligence use cases
Consumer Goods and Retail	90-95	<ul style="list-style-type: none"> Predictive analytics to develop targeted, personalized campaigns using customer data Protect against counterfeit products via blockchain-enabled UPC tracking
Agriculture	60-65	<ul style="list-style-type: none"> Production planning using soil mapping and crop prices to diversify farms towards higher value varieties Crop failure prediction to optimize food supply planning, determine subsidies, and protect farmer income
Banking and Insurance	60-65	<ul style="list-style-type: none"> AA-enabled risk assessments e.g. underwriting of SME customers for business loans Custom pricing for self-employed customers through income prediction
Telecom, Media, and IT	50-55	<ul style="list-style-type: none"> AI enabled telecom network design and optimization (e.g., self healing network, smart capex) 20-30% productivity improvement in IT service delivery
Energy and Industrials	50-55	<ul style="list-style-type: none"> Yield, energy, throughput maximization (e.g. optimizing field and well productivity across sites) Predictive maintenance strategies to improve reliability and productivity of asset / operations
Transport and Logistics	50-55	<ul style="list-style-type: none"> Optimize inbound and outbound delivery network, asset utilization, and warehousing operations Predictive maintenance via telematics for ships, trucks, freight rail, and cargo air
Auto Manufacturing and Assembly	40-45	<ul style="list-style-type: none"> AA-enabled adjustment of production to minimize utilities and raw material spend Provide predictive maintenance using remote on-board diagnostics
Public Sector ¹	25-30	<ul style="list-style-type: none"> AA-enabled identification of audit cases for tax collection and prediction of insolvency events AI-enabled water management systems for regional and last mile demand-supply matching
Healthcare	25-30	<ul style="list-style-type: none"> AA-enabled mitigation strategy to target and reach underserved patients Improve compliance in manufacturing of pharmaceutical drugs
Total	450-500 Bn	

1.Public sector includes: Public admin and defense, Water treatment and supply, Sewage and waste management, Human health and social work, Education, Arts and culture
 Source: India's Trillion Dollar Digital Opportunity, Feb 2019 (MeitY); Notes from the AI Frontier: Insights from Hundreds of Use Cases, 2018 (MGI)

Where we stand Globally

India Leading the Global AI Revolution in Most Parameters

1st

AI Skill Penetration*

1st

AI Skill Penetration-
Female*

1st

Number of GitHub AI
Projects by Region

5th

No. of newly funded AI
companies*

5th

Private Investment in
AI*

1st

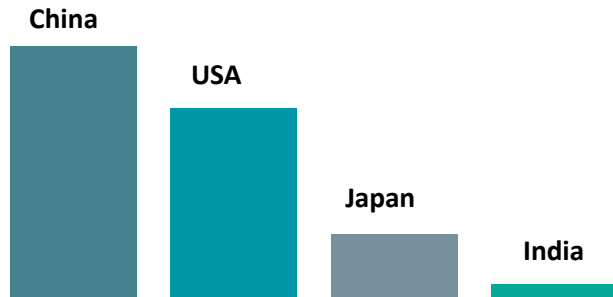
Leading all 5 Pillars of Peak
AI's Decision Intelligence
Maturity Scale

Need investments in Compute & Research

India needs to leapfrog in both Computing & Research Capabilities

Computing

No. of Supercomputing Systems



- The existing infrastructure:
 - Not upgradable for AI workload,
 - Only designed for specific purposes, (weather forecasting)

Research

- India lags in both core and applied research

Time period	Country	1996 – 2019	Last 10 years	Last 5 years
Citable documents	China	6469704	108,603	56,869
	USA	11339587	77,399	43,001
	India	1741868	30,788	22,261
Citations per document	China	9.36	5.44	4.25
	USA	26.42	8.94	4.38
	India	9.74	3.30	1.84

Challenges in Deployment & Adoption of AI



Inadequate access to quality curated datasets for AI Innovation



Absence of a Procurement Policy for AI Innovation



Absence of a central repository of viable AI solutions.



Inadequate Compute Infrastructure



Inadequate Early Stage and Scale-Up Funding



Lack of capacity and enhanced understanding of AI and its Use Cases



Lack of AI Talent at the intersection of Technology & Subject Matter



Lack of Public Trust in the Use of this Technology



Lack of AI Standards & Fairness Assessment Tools

AI and National Security

Importance of AI for India's National Security

Priority Use Cases

1 The adoption of Artificial Intelligence technologies will **revolutionize** and **modernize India's Defense Capabilities**

2 **Military Superiority** - Progress in AI will **enable new capabilities** and make existing capabilities affordable to a broader range of actors

3 **Information Superiority** - AI will dramatically enhance capabilities for the collection and analysis of data, but also the creation of data.

4 AI-enabled machines can be expected to **maneuver** and **change tactics at speeds that human operators cannot**

5 The increasing use of AI allows soldiers, sailors, and airmen the ability to **conduct their missions with much less risk & more efficiency**



Execute Surveillance Missions



Analyzing Intelligence & providing recommendations on the battlefield



Enhancing and Maintaining weapon system & platforms



Operating lethal autonomous weapon systems



Detect and neutralize mines, unexploded ordnance



Satellite Imagery analysis and cyber defense

AI has the potential to be a transformative national security technology, poised to change future battlefields and the pace of threats India faces, on par with nuclear weapons, aircraft, computers, and biotech.

India's brightest minds are developing cutting-edge AI solutions to make our defense forces future-ready and create a safe and secure future for India

Make in India Defense Efforts

01



Swarm Drones (Indian Army)

- Group of drones operating in conjunction with ground maneuver forces
- Swarm Drones can be effectively employed to detect enemy ground activities and target enemy ground forces

02



Silent Sentry (Indian Army)

- AI-based surveillance robot that performs object detection, autonomous patrolling, automated intrusion detection, etc.
- Fully 3D-printed rail mounted robot

03



Autonomous Fast Interceptor Boat (Indian Navy)

- Indigenously developed boat with capability to perform autonomous operations
- Autonomous operations for search & rescue operations
- Flood Rescue Operations

04



Sapper Scout (Indian Army)

- Mine detection robot capable of detecting mines and marking mines using an illuminating spray
- Saves lives, more efficient and less labor intensive

India's brightest minds are developing cutting-edge AI solutions to make our defense forces future-ready and create a safe and secure future for India

Make in India Defense Efforts

05



Project Seeker (Indian Army)

- Self-contained, AI-based facial recognition, surveillance, monitoring and analysis system for identification of threats.
- It can be used for monitoring disturbed areas and provide continuous surveillance.

06



AI-based Translators (Indian Army)

- Natural Language Processing-based wearable language translation devices with low weights, less latency and high battery life.
- Such devices can be used to translate Mandarin to English.

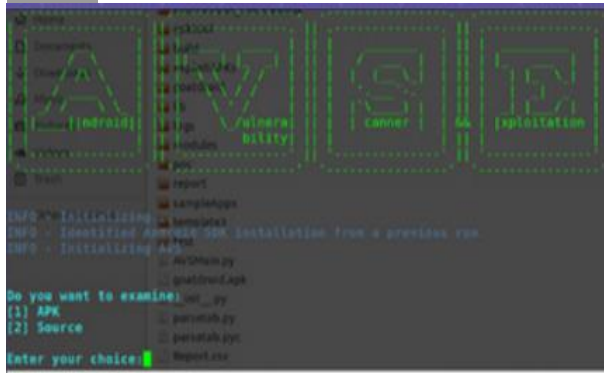
07



PRO HM+ (Indian Startup)

- Prediction of equipment failure by using AI to monitor flight patterns and the health of aircraft components.
- Predictive monitoring can help avoid defects, hazards and delays in the flight of the aircraft.

08



Android Malware Detection (Indian Startup)

- Comprehensive system to analyse weaknesses of android applications and report detected malware after performing audits and exploits.
- Set of tools also includes malicious application detection and review reporting.

Transforming Training & Simulation Exercises

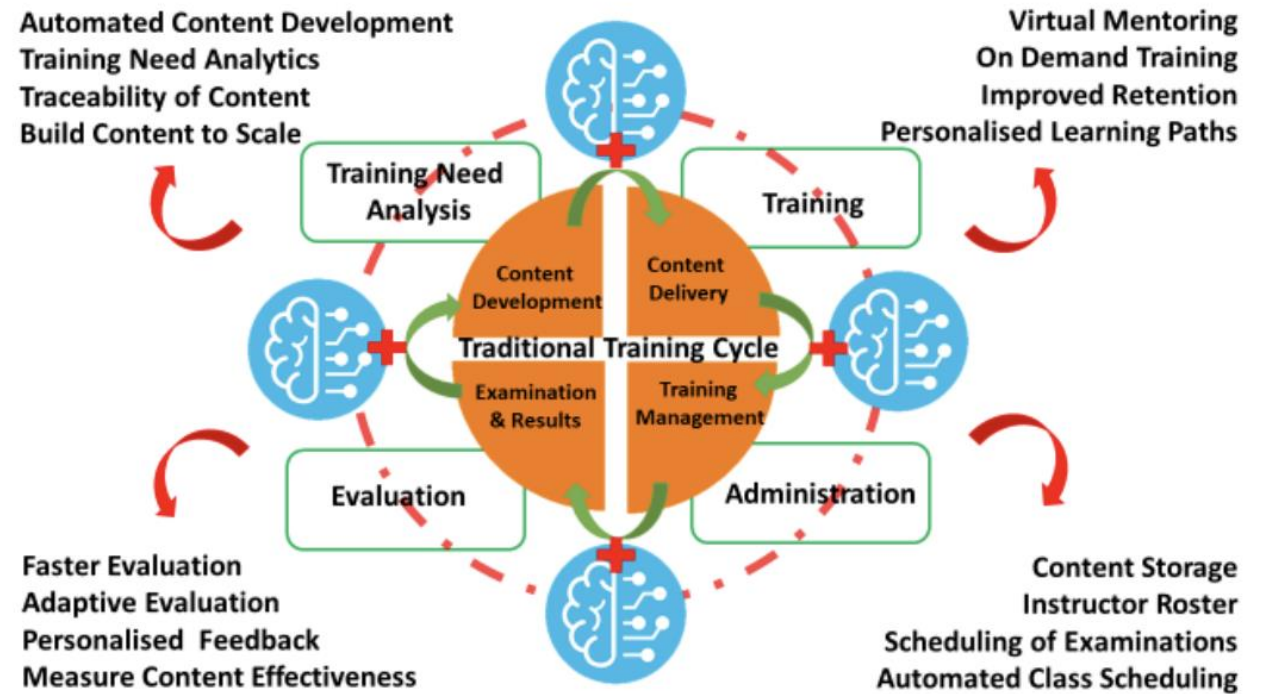
Current Landscape

- With rapid progress in technology across sectors, training those who handle such advanced technologies calls for continuous learning
- The limited number of instructors to cater to the needs of an expanding Navy limits training
- Deputation of naval personnel as trainees and trainers to the Indian Navy's training centres spread across the country constitutes a mammoth logistical exercise and expense

Benefits of deploying AI

- **Free instructors of routine administrative tasks** so that they can focus on necessary research-based activities
- Facilitate **remodelling of training need analysis**, based on automated data analysis
- Enable **delivery of adaptable** and on-demand **training**

Extended Reality can transform the traditional training cycle in the Indian Navy



Source: <https://www.turbomachinerymag.com/virtual-and-augmented-reality/>

Inventory Management

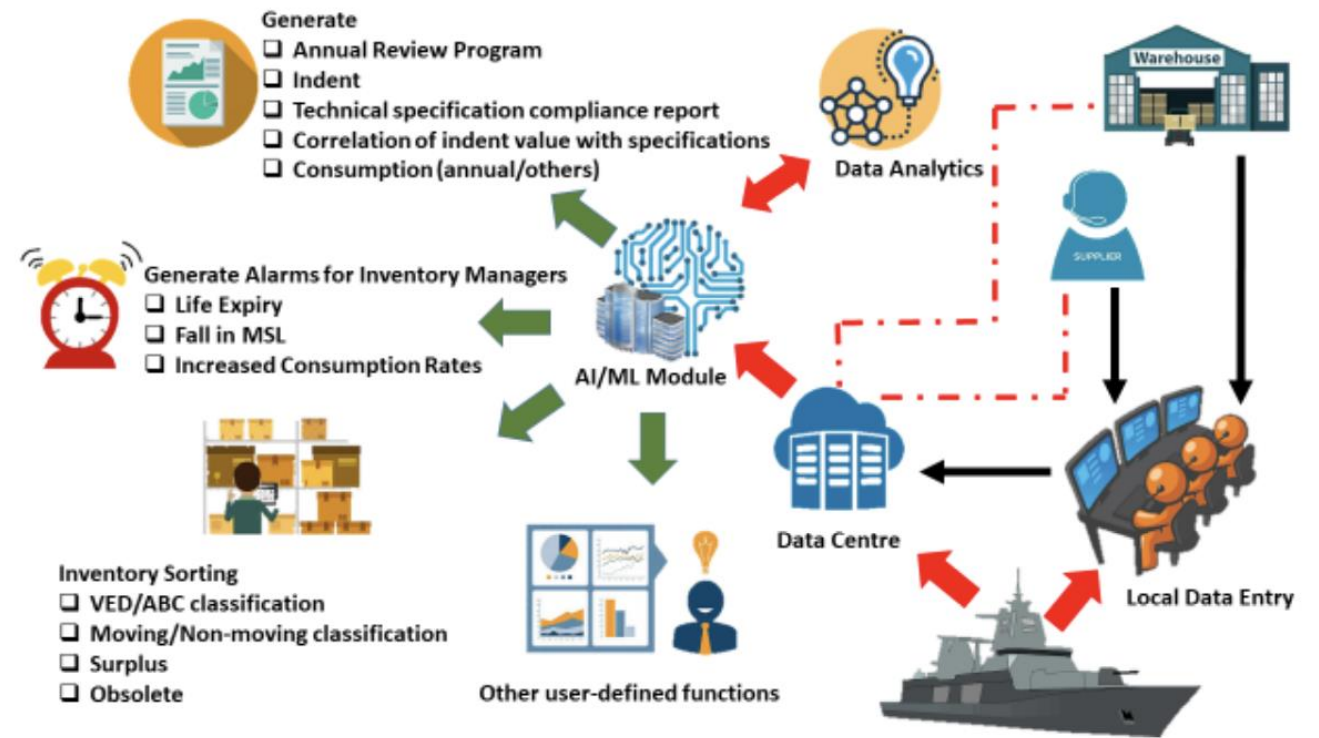
Current Landscape

- The Indian Navy currently operates a Systems Applications and Products (SAP)-based platform for inventory management
- Advances made by the e-commerce/logistics industry, on the back of AI/ML based models will be also useful for inventory management in the Indian Navy

Benefits of deploying AI

- **Reduced dependence on human intelligence** for data analytics
- **Reduced workload** of inventory managers
- Establish intelligent consumption patterns
- Efficiently manage warehouse space
- Generate reports and alarms for inventory managers

Basic Architecture of AI-based Inventory Management System



Source: Gateway House Research

Global Advancements: Nations Embracing AI for Futuristic Defence Forces



United Kingdom

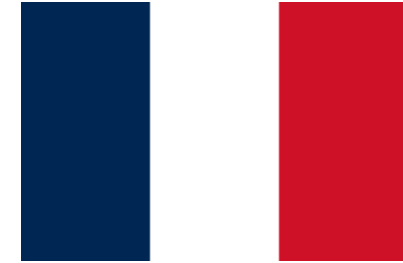
A.I. in the Royal Navy UK **used during Exercise Formidable Shield** (Europe's biggest and most complex air and missile exercise) for **early detection** and a **rapid hazard assessment** to measure to counter the target

Startle A.I. system has been designed to help **ease the load on sailors** by providing **live recommendations and alerts**



China

China launched the world's **first AI-operated crewless drone carrier, Zhu Hai Yun**, that uses artificial intelligence to navigate autonomously in open water



France

Within the French Navy (Marine Nationale), **AI is used to provide support to system operators**, processing all the information to ease crew cognitive load and enabling them to focus on decision-making and key tasks

Application of AI also explored for **risk prediction analysis**

Global Advancements: Nations Embracing AI for Futuristic Defence Forces



United States of America



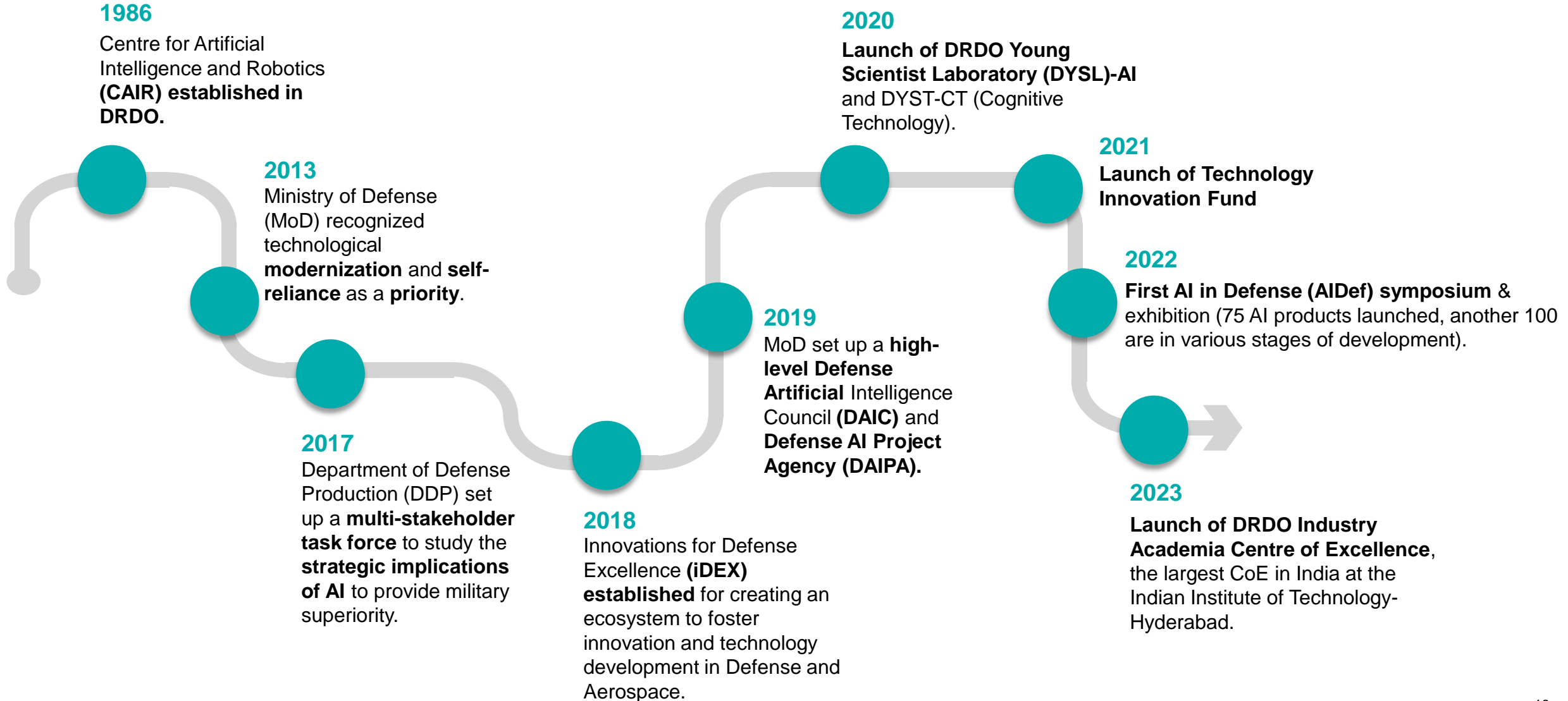
A **US Navy Task Force** has launched **Project OpenShip** that will give sailors **AI and ML tools** that would manage large volumes of data gathered by ships on a daily basis

Amelia, US Navy's conversational AI tech-support tool leverages conversational AI to interact with and help solve issues for over 1 million users in the Department of the Navy — including active-duty officers, military spouses, civilian employees and more. It is set to launch in August 2023.

Task Force 59 combined persistent unmanned systems for surveillance, high-speed unmanned systems to respond to problems and AI and machine learning tools to make sense of the significant quantity of data generated by the dozens of unmanned platforms.

Sea Hunter, a large unmanned vessel is designed to locate, track enemies and engage submarines, primarily using a high-frequency fixed sonar array

Timeline of 'AI for National Security' Initiatives in India



AI Institutions for National Security: Landscape

Defense AI Council

Defense AI Project Agency

Defense Innovation Unit

Joint Working Group on AI in Tri-Services

Key Institutions

AI Developer/Research Agencies

AI Ecosystem Enablers

AI Users

Military Labs/R&D Centers

- DRDO
- Centre for AI and Robotics (CAIR)
- DRDO Young Scientist Laboratory (DYSL) - AI
- DYSL-CT (Cognitive Technology)
- Defense Industry Academia Centre of Excellences
- AIF Unit for Digitization Automation, AI & App Networking (UDAAN)

Industry

- Defense PSUs (DPSUs)
- Private Sector Organizations/Start-ups

Academia/Think-Tanks

- Leading Academic Institutions (Like IITs, NIITs)
- Think Tanks (Like MP-IDSA)

Skilling

- Defense Institute of Advanced Technology (DIAT)

Financing & Ecosystem Development

- DRDO Technology Development Fund
- Innovations for Defense Excellence (iDEX)

Army

Airforce

Navy

Coast Guard

NDRF

Intelligence Agencies

Civil Services under MoD

Efforts of the Defence AI Council and Defence AI Project Agency will integrate AI technology into defense forces, and AI will take their place alongside military personnel in keeping India safe, secure and Aatmanirbhar

Ethical Considerations & Challenges in the Use of AI for National Security

The use of AI in National Security context raises a number of interlinked issues and challenges, which development teams and users will need to take into consideration

- 1** **Algorithmic Bias** — The risk that biased datasets used to **train AI systems could result in discriminatory outcomes and disproportionate harms for certain groups** of users
- 2** **Unpredictability** — The risk that some AI systems may behave unpredictably, particularly **in new or complex environments**, or as they learn and adapt over time
- 3** **People Implications** — The need to think differently about what is expected of people, and the impact of AI on people, as AI-enabled systems **create opportunities to automate 'dull, dirty or dangerous' tasks**
- 4** **Human Control** — When using AI-enabled systems for Defence purposes, the need to understand the **appropriate form of human involvement required** for any given application or context.
- 5** **Responsibility & Accountability** — The need to ensure that delegation of tasks or decisions to AI systems does not lead to a 'responsibility gap' between systems that take decisions and the human commanders responsible for them

Responsible & Ethical Use of AI for National Security

The nature of AI gives rise to risks and concerns about the possible impact on humans, thereby necessitating compliance to principles for responsible and ethical use of this technology

General Principles for Responsible & Ethical AI for National Security

Human Oversight, Judgement and Control

AI actors should be informed and should exercise appropriate levels of oversight of the choices made – whether, when and how to delegate decisions and actions to AI systems and when to take control.

Wellbeing

AI systems should generate measurable social and economic, and security benefits.

Transparency

AI actors should be duly informed when a decision is assisted by or made by an AI system or when their data is being collected for use in an AI system, if appropriate.

Effectiveness

AI systems should be tested appropriately to ensure that they function as intended in the circumstances of their use.

Accountability

Human actors should remain accountable for the decisions and actions performed by or based on an AI system

Safety and Reliability

Unintended harms should be avoided, addressed, prevented and eliminated throughout the life cycle of an AI system.

Awareness of Misuse

AI actors should be aware of the possible harms and potential of misuse of the AI system.

Inclusivity & Non-Discrimination

AI systems should not create, follow or reinforce unintended biases.

Equality

All should be able to access the benefits of AI.

Best Practices for Responsible & Ethical Use of AI for National Security

Ensuring use of AI is safe, reliable and responsible doesn't impede innovation; it's key to collaboration and ensuring systems deliver the outcomes we need



Ensure military AI capabilities are developed with **auditable methodologies, data sources**, design procedures, and documentation



Maintain **human control and involvement for all actions critical** to informing and executing **sovereign decisions** concerning **nuclear weapons employment**



Ensure **deliberate processes and controls** are in place to **minimize unintended bias** in military AI capabilities



A **principled approach** to the military use of AI should include careful consideration of **risks and benefits**, and it should also **minimize unintended misuse** and accidents



Ensure that **senior officials oversee** the development and deployment of all military AI capabilities with **high-consequence applications**, including, but not limited to, weapon systems

Best Practices for Responsible & Ethical Use of AI for National Security

Ensuring use of AI is safe, reliable and responsible doesn't impede innovation; it's key to collaboration and ensuring systems deliver the outcomes we need



Ensure use of AI in armed conflict is in accordance with applicable international humanitarian law, including its **fundamental principles**



Use of AI capabilities needs to be **accountable**, including through such use during military operations within a **responsible human chain of command and control**



Appropriate **frameworks** and **guidelines** must be in place for the **responsible design, development, deployment, and use of AI capabilities** by their military organizations.



Conduct **AI-focused war-games & Military exercises** to identify and **test** potential disruptive military innovations



Fund diverse, long-term-focused strategic analyses on **AI technology** and its implications. **Prioritize AI R&D** spending areas that can provide **sustainable advantages** and **mitigate key risks**.

Challenges in Deployment of AI for National Security



Inadequate access to National Security relevant curated datasets for AI Innovation



Lack of AI Talent at the intersection of Technology & National Security



Absence of a central repository of viable AI solutions.



Inadequate Compute Infrastructure



Inadequate Early Stage and Scale-Up Funding



Absence of a Procurement Policy for AI Innovation



Lack of AI Standards & Fairness Assessment Tools



Lack of coordination among various agencies



Lack of capacity and enhanced understanding of AI and its Use Cases

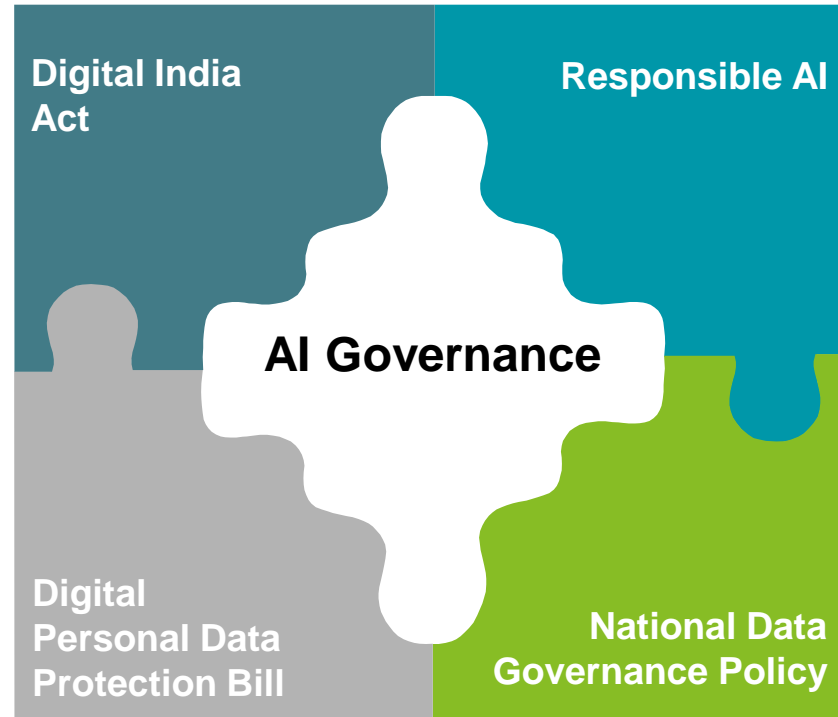
The development, deployment, and adoption of AI will be governed under the following policies/regulations

01 Digital India Act (Upcoming)

DIA will deal with all **legislative issues** pertaining to AI. DIA will act as **catalyst** for **Indian economy** by enabling more **innovation**, while protecting **safety** and **trust** of citizens

03 DPDP Bill (Upcoming)

DPDP bill will establish a comprehensive legal framework **governing digital personal data protection** in India



02 Responsible AI Principles

NITI Aayog defined **Principles** for the **responsible & ethical development, deployment & adoption of AI in India**

04 National Data Governance Policy (NDGP)

The NDGP, through the Data Management Office, will govern and **ensure** the **fair and ethical use of data**

1



Improving Public Service Delivery

AI has the potential to **optimize public welfare delivery** and increase administrative efficiency, enabling **citizen-centric services**. Ex - **UMANG** platform has the potential to leverage the power of AI and Natural Language Processing (NLP) to provide citizens **access to government services through voice-based queries**

2



Driving Inclusive Development

AI can **transcend traditional barriers** to inclusive development and enable large-scale social transformation for all. Ex - **Saagu Baagu** project in Telangana is **providing support to farmers** around soil quality testing, crop health monitoring, etc. using the power of AI.

3



Improving Policy Making & Evaluation

AI enables evidence-based policy development, implementation and monitoring, **bringing targeted social benefits to citizens**. Ex - **Analysis of beneficiary databases** can provide relevant insights into to effectiveness of various government schemes.

4



Empowering Digital Nagriks

AI enables improved citizen experiences and engagement with the government as Digital Nagriks. Ex - **MyGov Corona Helpdesk** is an Intelligent Virtual Assistant (IVA) that brings accurate information about coronavirus at the fingertips of citizens

5



Enhancing Efficiency & Innovation

AI provides innovative models of governance, catalyzing digital innovation for public good & **create new economic opportunities**. Ex - **Unified Health Interface** allows organizations to **innovate on top of the digital infrastructure built by the government**.

Key AI Initiatives (1/2)

National Program on AI



MeitY's comprehensive program to catalyze the AI innovation ecosystem with 4 pillars – **Data Management Office, Skilling, Responsible AI & National Center for AI**

Global Partnership on AI



India has been elected as the **council chair of GPAI** to guide the responsible and ethical development, deployment & adoption of AI

Digital India Bhashini



Digital India Bhashini aims to build speech-to-speech machine translation systems for various Indian languages and dialects. This will enable citizen to access digital services in their vernacular language to further increase digital inclusion & accessibility

YUVAi



MeitY's National Program for demystifying AI for school students and creating human centric designers and users of AI

Future Skills Prime



MeitY along with industry partners has jointly initiated this program, a B2C framework for re-skilling/ up-skilling of IT professionals in 10 emerging areas including Cloud Computing and Artificial Intelligence.

Visvesvaraya PhD Scheme



The Scheme aims to enhance the number of PhDs in Emerging Technologies like AI, Robotics, Blockchain, Electronics System Design & Manufacturing (ESDM) and IT/IT Enabled Services (IT/ITES) in the country.

Key AI Initiatives (2/2)

Responsible AI #AIFORALL



A series of Discussion papers by NITI Aayog detailing the **Principles and Operationalising Principles** for Responsible AI, and a use case approach on **Facial Recognition Technology**

AI COEs



For realizing the vision of "Make AI in India and Make AI work for India", **three centers of excellence for Artificial Intelligence** will be set-up in top educational institutions in a **hub and spoke model**

AiDef 2022



The Department of Defense Production, Ministry of Defense organized AiDef in July 2022 to showcase **AI use cases by domestic defense organizations** and startups.

AIRAWAT (Compute)



AIRAWAT (**POC**) **200 AI Peta Flop** supercomputer will be operational by May, 2023, to provide compute power to researchers & innovators

IndiaAI Portal



National AI Portal for providing all **information and resources regarding AI** to all stakeholders in one place

BIS Standard (ongoing)



A new **Indian Standard** detailing the principles, processes and methods for understanding the **ethical and societal concerns of AI** is being developed

NPAI - Key Components

Data Management Office

- Data Governance as per NDGP -*
- Data Capacity through DMUs -*
- Managing the India Datasets Program -*
- Maintaining the India Datasets Platform -*

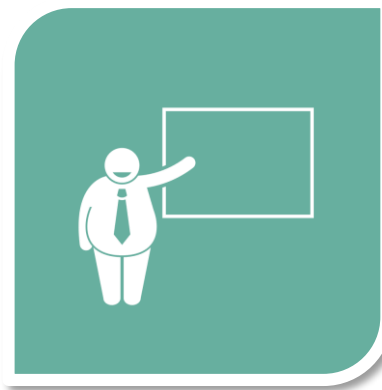


NCAI: National Centre for AI

- Sourcing AI solutions for priority social empowerment goals*
- Scaling AI solutions*
- Synergising the India Datasets Program*

Skilling

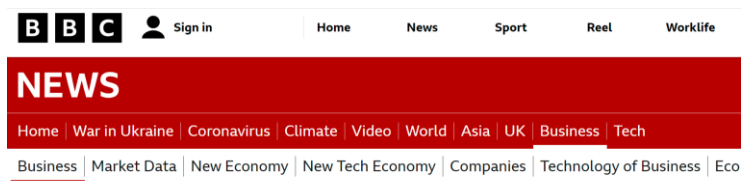
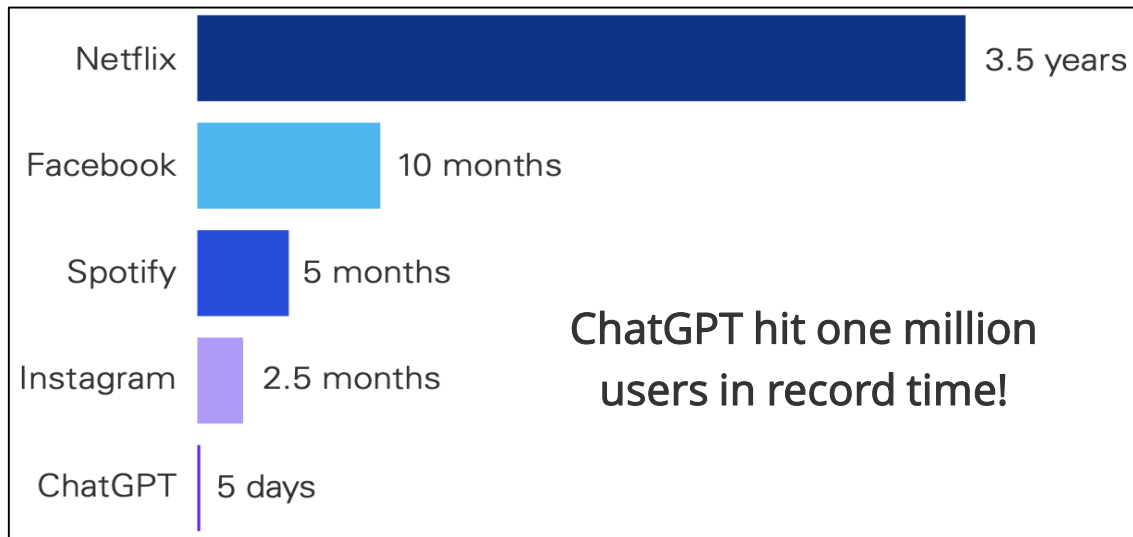
Creation of a future-ready workforce that is trained to support the AI value chain in a variety of foundational, technical and leadership roles



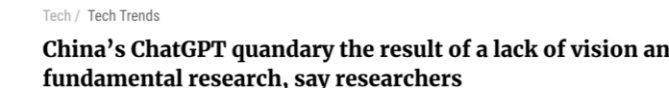
Responsible AI

Promote research and development of contextualized tools and advisory support to regulators through Responsible AI CoEs

The Buzz Around ChatGPT & Generative AI

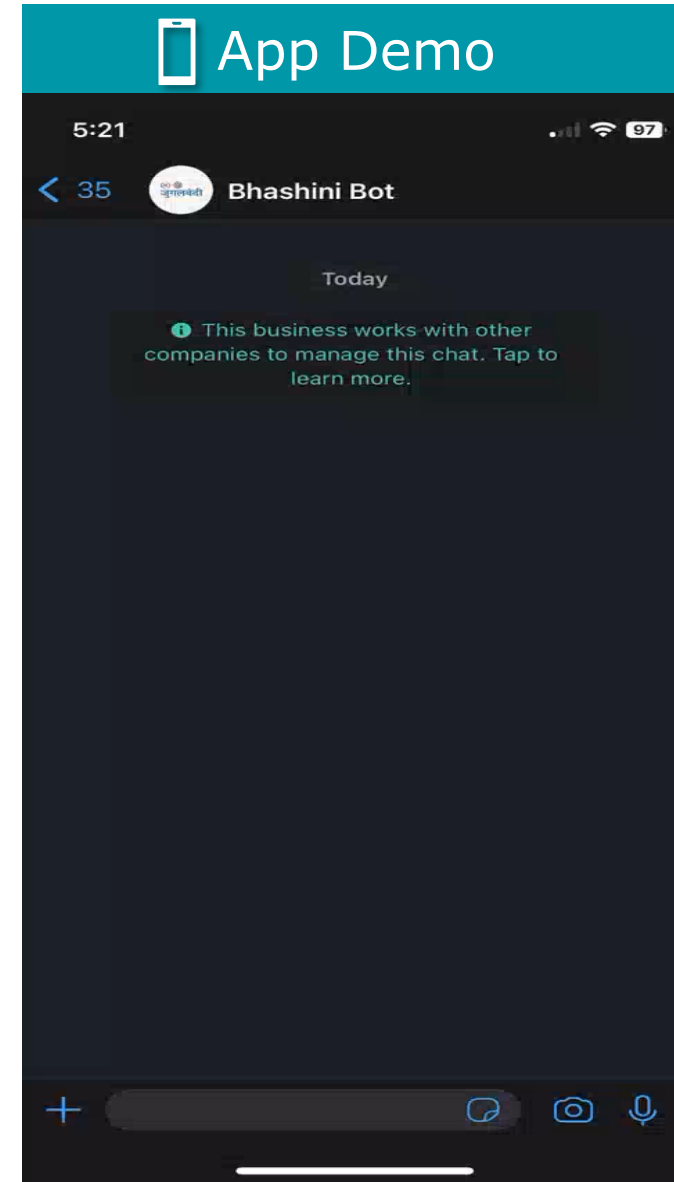


Friend or foe: Can computer coders trust ChatGPT?



Bhashini Open AI WhatsApp Chatbot

- Bhashini integration with Whatsapp and ChatGPT3
- Helps to **converse in own language** with voice input.
- Users can ask any kind of question e.g. the video showing a user conversing with the bot to know about eligibility for PM Kisan Yojana.
- Languages: Hindi, Gujarati, Kannada, Marathi, Bangla, Punjabi, Tamil, Telugu, Odia, English



Prompt

Reply to email stating that I will attend the meeting

Dear all,

I hope you are doing well.

Thank you for confirming participation for the India Stack brainstorming on Friday, May 26th. We are really grateful for you taking time to provide inputs and feedback on the work. I am attaching the agenda and the background note for the meeting and look forward to an engaging discussion.

Venue:

Time: 930 AM - 2 PM

On behalf of India Stack Team

With regards

Anurag

Response

Dear Anurag,

Thank you for your email and for providing the agenda and background note for the India Stack brainstorming session on May 26th. I am glad to confirm my participation in the meeting and am looking forward to an engaging discussion.

I appreciate the opportunity to provide inputs and feedback on the work, and I am confident that this session will be beneficial for all involved.

Thank you again for organizing this meeting and I look forward to seeing you and the rest of the team at Electronics Niketan, CGO Complex, Lodhi Road at 9:30 AM on Friday, May 26th.

Best regards,

[Your Name]

Generative AI in Governance: Use Cases – Translating Government Order (2/2)

Response (Incomplete Translation)

No.DOPT-1673852820019

भारत सरकार

कार्मिक, लोक शिकायत एवं पेंशन मंत्रालय

कार्मिक एवं प्रशिक्षण विभाग

एआईएस (एआईएस-III)

नार्थ ब्लॉक, नई दिल्ली

16 जनवरी, 2023 को तिथि

कार्यालय ज्ञापन

विषय: - एआईएस अधिकारियों के संबंध में राज्य केंद्र द्वारा भारत से छुट्टी पर जाने के लिए केंद्र सरकार के स्वीकृति देने के प्रक्रिया को समतुल्य बनाना। एआईएस (अध्ययन छुट्टी) विनियम, 1960 के अनुसार।

सभी राज्य सरकारों के मुख्य सचिवों को।

श्री / श्रीमती,

मैं उपरोक्त विषय से संबंधित दिशानिर्देश देने के लिए निर्देशित हूं और यह स्थान पात्र महोदय को सूचित करना चाहता हूं कि एआईएस अधिकारियों की भारत से छुट्टी पर जाने की प्रस्ताव को AIS (अध्ययन छुट्टी) नियम, 1960 के अनुच्छेद 3 (3) के अनुसार केंद्र सरकार द्वारा जांच की जाती है।

इस संदर्भ में, यह महसूस किया गया है कि राज्य स्तर और केंद्र सरकार स्तर दोनों में केंद्र प्रबंध

Was this response better or worse?

Prompt Engineering

Prompt engineering is the process of crafting and optimizing text prompts for large language models to achieve desired outcomes. A prompt is a text or set of instructions given to an AI model to generate a specific output.

A prompt can contain any of the following components:

- **Instruction** - a specific task or instruction you want the model to perform
- **Context** - can involve external information or additional context that can steer the model to better responses
- **Input Data** - is the input or question that we are interested to find a response for
- **Output Indicator** - indicates the type or format of the output.

Not all the components are required for a prompt and the format depends on the task at hand.



Limitations of Current Gen AI

Limitations of current Gen AI tools and what precautions need to be taken while using them

- **Bias and discrimination:**
 - Generative AI models can also reflect and amplify biases and stereotypes present in the training data, which can lead to unfair or discriminatory outcomes.
 - For example, language models trained on biased text corpora may generate offensive or harmful language.
 - To mitigate this risk, it is important to use diverse and representative training data, to audit and mitigate bias in the models, and to involve diverse stakeholders in the design and deployment of the models.
- **Hallucination and incorrect replies:**
 - Another limitation of generative AI models is that they can sometimes generate unrealistic or implausible content, or even outright falsehoods.
 - For example, the model may generate responses that are not accurate or appropriate and may even propagate misinformation or hate speech.
 - To avoid such risks, it is important to carefully evaluate the quality and reliability of the generated content, to provide sufficient context and disclaimers, and to encourage critical thinking and fact-checking by users.



Thank You



सत्यमेव जयते

**Ministry of Electronics
& Information Technology**
Government of India