

A workshop on the role of Artificial Intelligence in Sustainable Rural Development



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



Date: 21/03/2024

These slides can be accessed at <https://bit.ly/ai-workshop-patna>





About us

ERADA is an Indo-German development cooperation project commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, India is implementing the project in partnership with Ministry of Rural Development (MoRD), Government of India (GoI). The goal of the ERADA project is to strengthen the livelihoods of vulnerable households based on locally available natural resources and developmental support programmes.



The German Development Cooperation initiative “FAIR Forward – Artificial Intelligence for All” strives for a more open, inclusive and sustainable approach to AI on an international level. To achieve this, we are working together with seven partner countries: Ghana, Rwanda, Kenya, South Africa, Indonesia, Uganda and India. Together, we pursue three main goals:

- Access to Training Data and AI Technologies for Local Innovation
- Strengthen local technical know-how on AI
- Develop Policy Frameworks for Ethical AI, Data Protection and Privacy



An Artificial Intelligence powered digital solution which will enable access to personalized, timely, and actionable information to populations with low literacy and digital skills via an omni-channel delivery mechanism, such that farmers and extension workers can access this information on their current devices

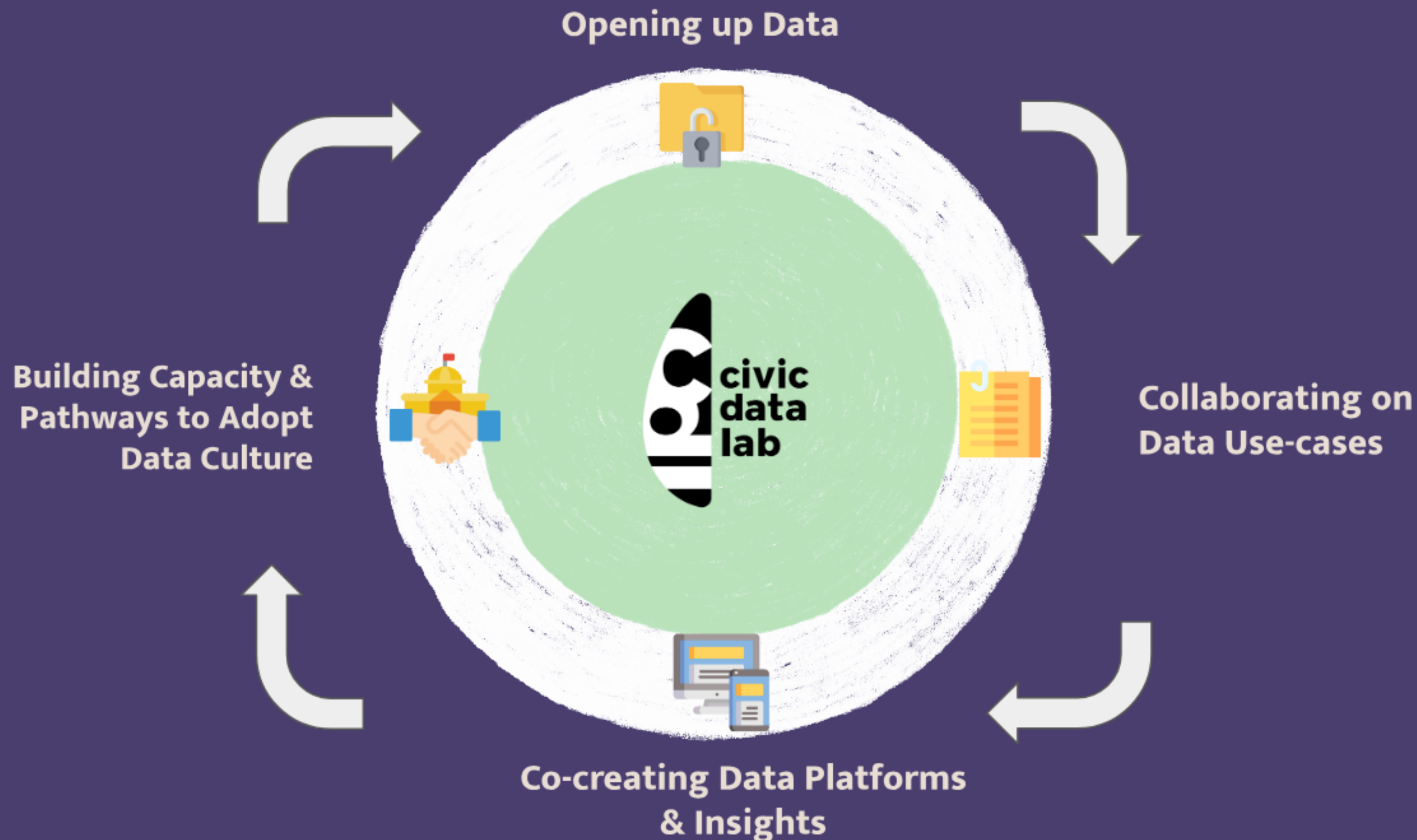
Currently being piloted in Bihar & Kenya, this project is funded by BMGF and executed by GIZ. We have identified four cohorts across India and Kenya who are working on an MVP towards building an information exchange platform for Agriculture using AI.



About us

CivicDataLab works at the intersection of data, technology, design and social science to strengthen access to public information, evidence-based decision-making and citizen participation in governance. We also work on **strengthening the data-for-public-good ecosystem** and enable citizens to engage in matters of public reform.

Our Process to Strengthen Data-Driven Governance

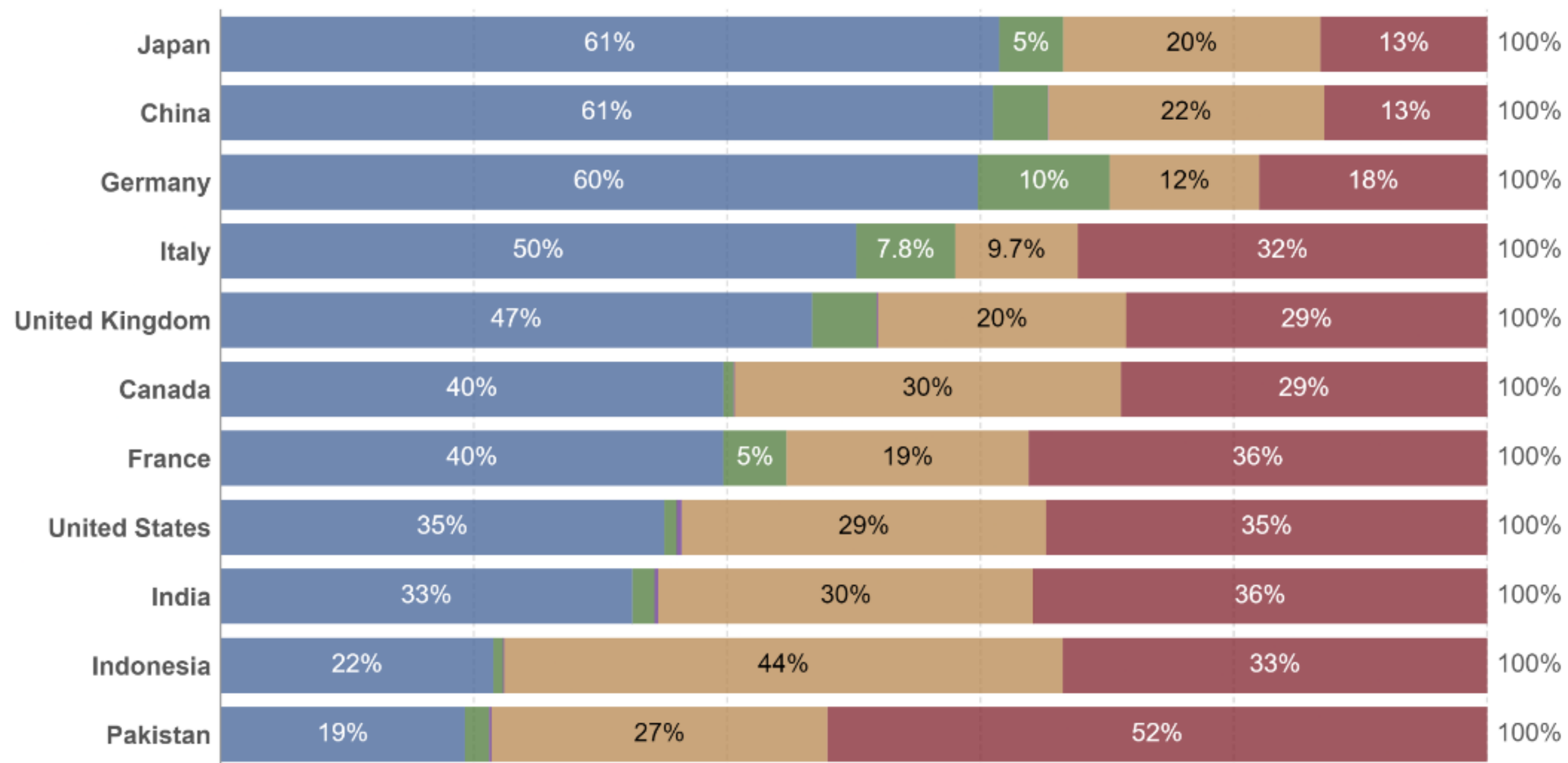


Views about AI's impact on society in the next 20 years, 2021

Our World
in Data

Survey respondents were asked, "Will artificial intelligence help or harm people in the next 20 years?"

■ Mostly help ■ Neither ■ No response ■ No opinion or don't know ■ Mostly harm



Data source: Lloyd's Register Foundation (2022)

OurWorldInData.org/artificial-intelligence | CC BY

Note: A global total of 120,000–130,000 people aged 15+ were asked this question in each survey year. For most countries, respondents were a nationally representative sample of around 1,000 people.

Workshop Outcome

1. Better understanding of **AI concepts and terminologies**.
2. Identification of potential **AI use-cases** by policy makers.
3. Better knowledge of current **tools and open datasets** for AI-based research and implementation.
4. Better understanding of the **significance of investing in AI** for governmental preparedness.

Introduction to Artificial Intelligence (AI)





UCF Business Incubation Program - U...
What is Artificial Intelligence (AI ...



ZDNET
artificial intelligence ...



URBE University
Artificial Intelligence for Stude...



Investopedia
Artificial Intelligence (AI): What It ...



Britannica
Artificial intelligence (AI ...



The Economic Times
Artificial Intelligence: Fo...



GeeksforGeeks
What is Artificial Intelligence ...



Forbes
The Future Of Artificial Intelligence



Deep Blue

IBM, 1997



[Source: AlphaGo - IMDB](#)



How can I help you today?



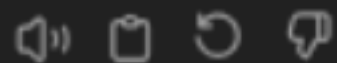
You

बिहार राज्य की राजधानी क्या है?



ChatGPT

बिहार राज्य की राजधानी पटना है।



You

मुझे बिहार में कौन सी जगहें देखनी चाहिए ?



ChatGPT

बिहार राज्य में कई प्राचीन और ऐतिहासिक स्थल हैं जो दर्शनीय हैं। यहाँ कुछ प्रमुख जगहों का सुझाव दिया जा सकता है:

1. महाबोधि मंदिर, बोधगया - गौतम बुद्ध की अनुमोदना की जगह, बुद्ध का बोधत्व इसी जगह हुआ था।
2. नालंदा विश्वविद्यालय और मुस्लिम विश्वविद्यालय, राजगीर - एक प्राचीन शिक्षा केंद्र जो बौद्ध और इस्लामी शिक्षा के लिए प्रसिद्ध था।
3. वैशाली - यहाँ बुद्ध के एक आधिकारिक स्थान पर बुद्ध के संयमन के बारे में कहानी है।
4. पटना साहिब - गुरु गोबिंद सिंह के जन्मस्थल और गुरुद्वारा है।
5. विक्रमशिला - यहाँ प्राचीन बौद्ध विद्यालय था जिसे बुद्धिस्त शिक्षा केंद्र के रूप में जाना जाता है।
6. कुशीनगर - गौतम बुद्ध की मृत्यु के स्थान पर स्थित है, और यहाँ पर महापरिनिर्वाण मंदिर है।

ये केवल कुछ हैं, बिहार में और भी बहुत सारे प्राचीन स्थल हैं जो आपकी धार्मिक, सांस्कृतिक और ऐतिहासिक दृष्टि को आकर्षित कर सकते हैं।



APRIL 21, 2023 | 5 MIN READ

How This AI Image Won a Major Photography Competition

Boris Eldagsen submitted an artificial-intelligence-generated image to a photography contest as a “cheeky monkey” and sparked a debate about AI’s place in the art world

BY ALLISON PARSHALL

Source: [ScientificAmerican](https://www.scientificamerican.com/article/how-this-ai-image-won-a-major-photography-competition/)



So how well did it do?

Honestly, I'm pretty astonished by this. The video is 7s long, it pans quite fast (there is some motion blur in the video) and some of the books are partially obscured by items.

It didn't get all of them, but it did about as good a job as I could have done given the same video.

I'm particularly impressed that it got "Site Seeing: A Visual Approach to Web Usability" by Luke Wroblewski, where the book itself is almost entirely obscured by a squirrel leaving only "Site-Seeing" visible.

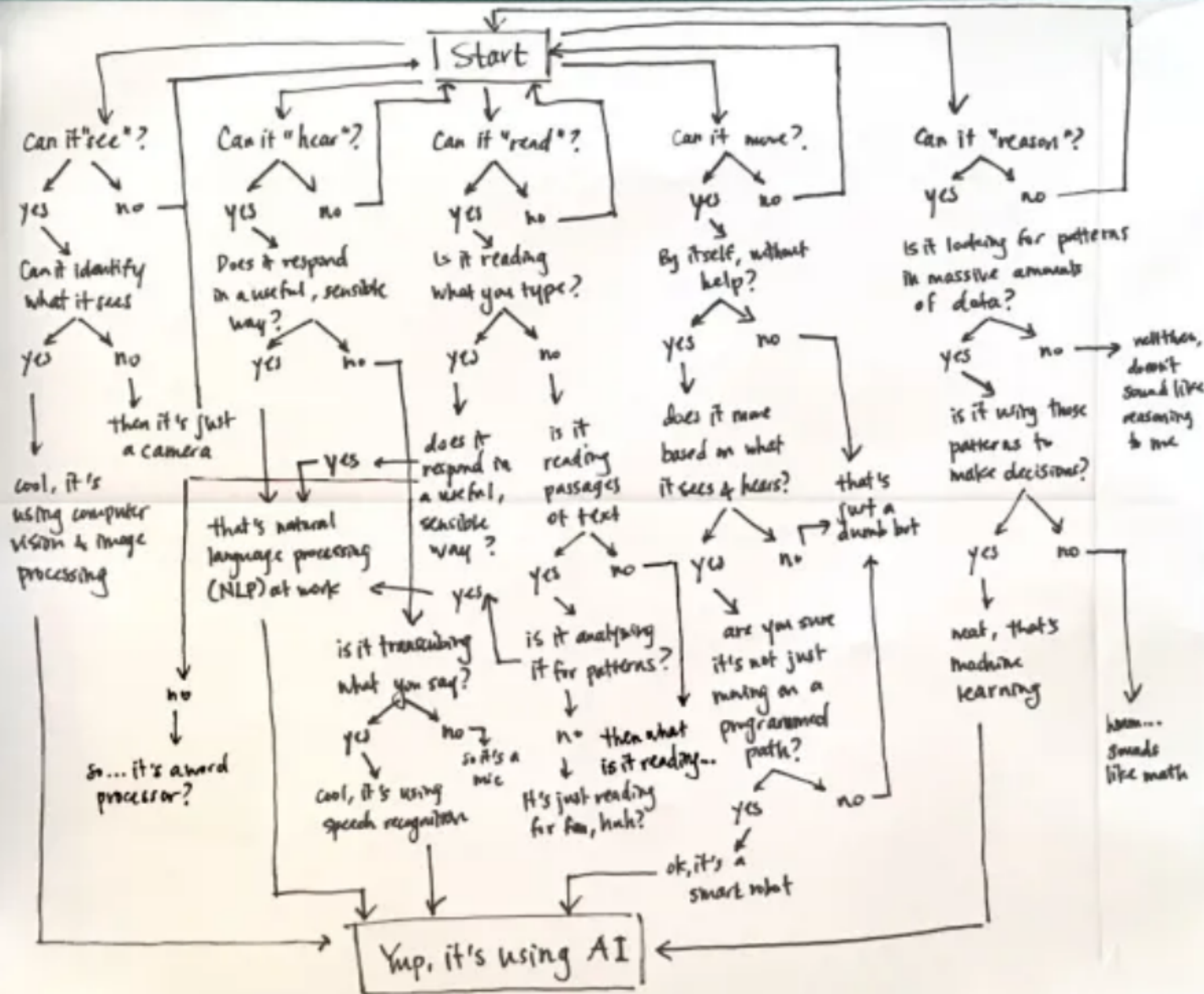
It is not possible to fully identify all the books in the video. However, here are some of the books that can be seen:

- The Lord of the Rings by J.R.R. Tolkien
- Structure and Interpretation of Computer Programs by Harold Abelson and Gerald Jay Sussman
- Rework by Jason Fried and David Heinemeier Hansson
- The Hacker Ethic and the Spirit of the Information Age by Pekka Himanen
- The Google Story by David A. Vise
- The Art of Agile Development by James Shore and Shane Warden
- Creative Code by John Maeda
- Web Operations by John Allspaw and Jesse Robbins
- Python Framework by David Mertz
- The Personal MBA by Josh Kaufman
- Growing Up with Lucy by April Henry
- Getting Things Done by David Allen
- Site-Seeing: A Visual Approach to Web Usability by Luke Wroblewski

Source: [Simon Willison's Weblog](#)

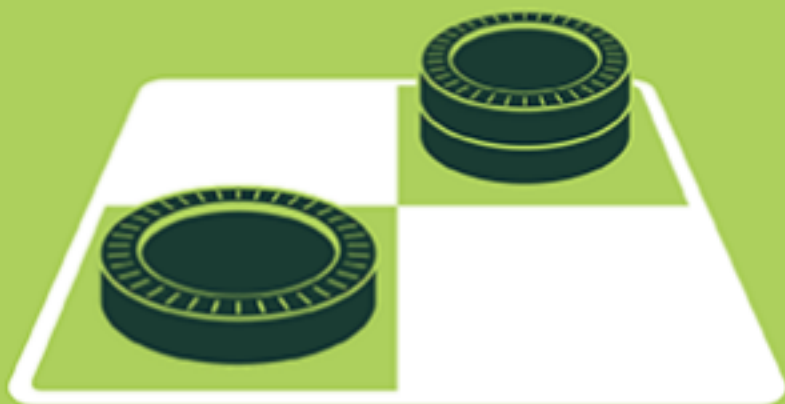
"Is it using AI?"
The Algorithm,
MIT Technology
Review

By:
Karen Hao



ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



MACHINE LEARNING

Machine learning begins to flourish.



DEEP LEARNING

Deep learning breakthroughs drive AI boom.



1950's 1960's 1970's 1980's 1990's 2000's 2010's

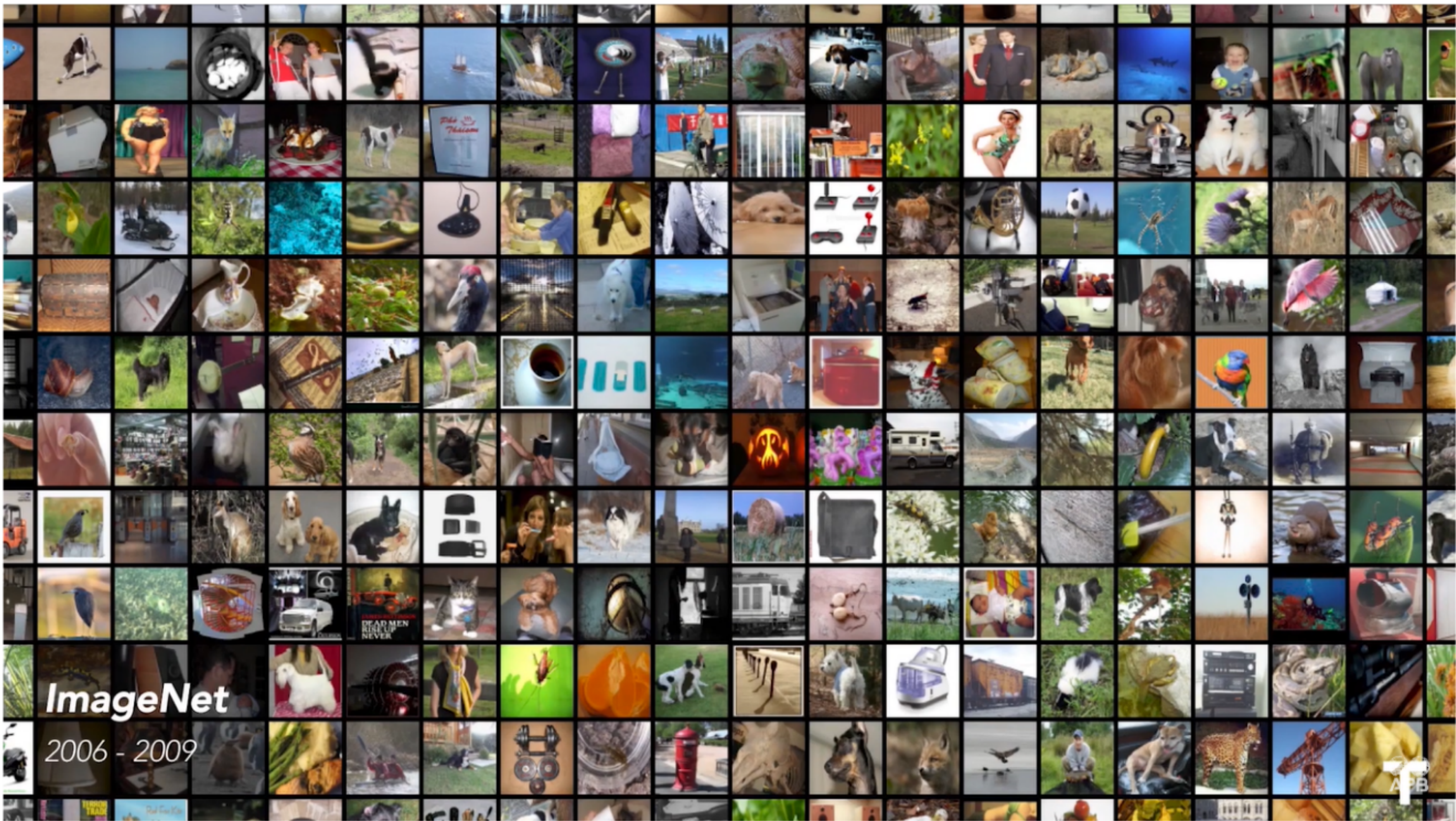
Engineering of making Intelligent Machines and Programs

Ability to learn without being explicitly programmed

Learning based on Deep Neural Network

1950's 1960's 1970's 1980's 1990's 2000's 2006's 2010's 2012's 2017's

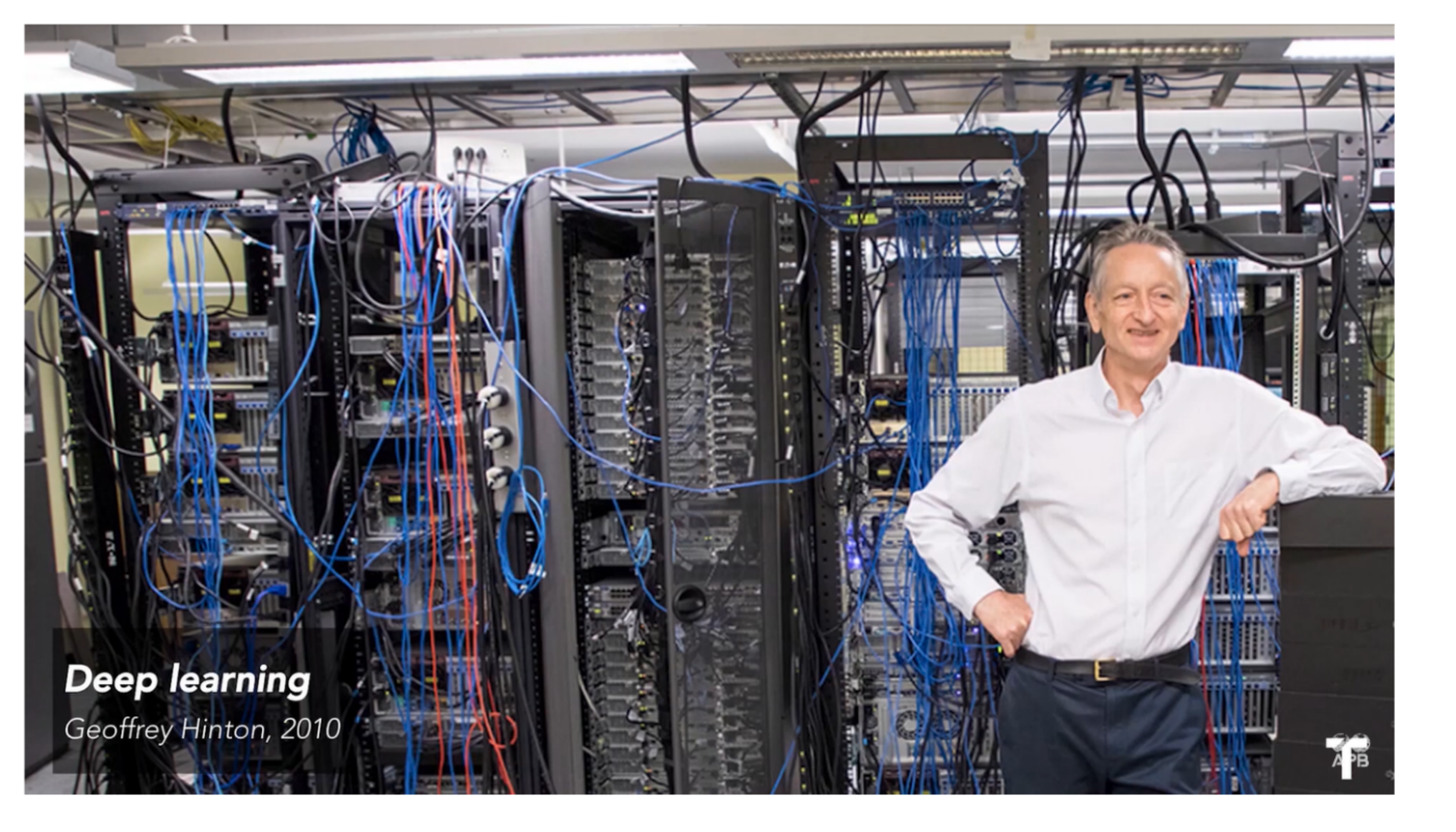
Machine learning is the process of using statistics to find patterns in data and using those patterns to make decisions.



ImageNet

2006 - 2009

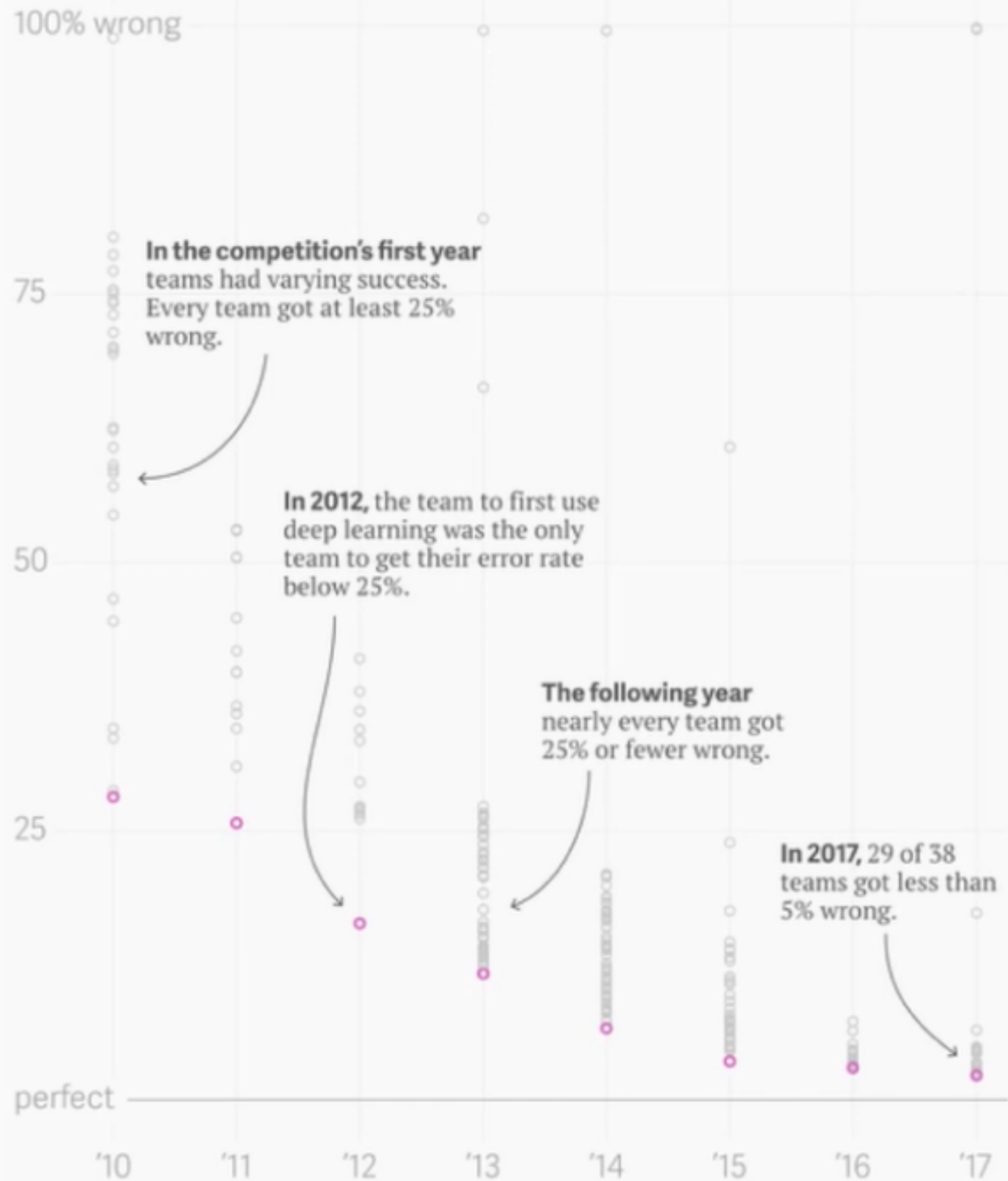


A photograph of Geoffrey Hinton standing in a server room. He is wearing a white button-down shirt and dark trousers, leaning against a server rack. The room is filled with rows of server racks, many of which are densely packed with blue and red network cables. The lighting is bright, and the overall atmosphere is one of a high-tech computing environment.

Deep learning

Geoffrey Hinton, 2010

ImageNet Large Scale Visual Recognition Challenge results



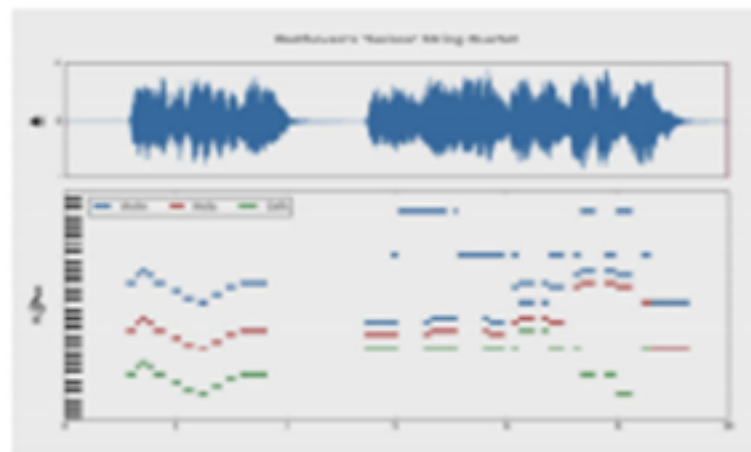
Geoffrey Hinton, Ilya Sutskever, and **Alex Krizhevsky** from the University of Toronto submitted a deep convolutional neural network architecture called **AlexNet**—still used in research to this day—which beat the field by a whopping 10.8 percentage point margin, which was 41% better than the next best.

“The IMGENET of x ”



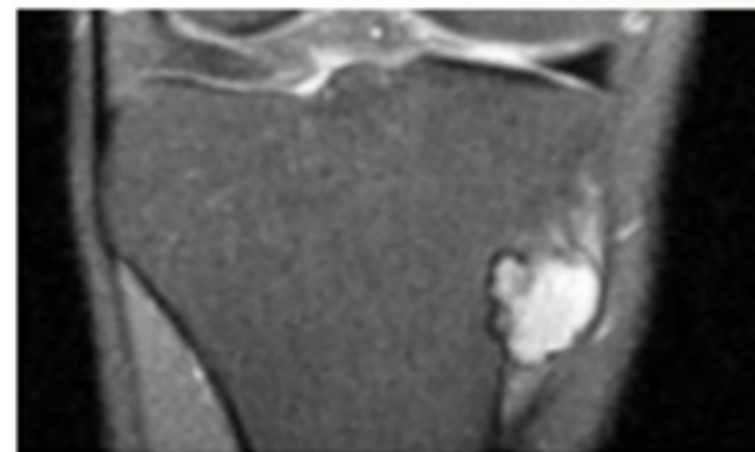
SpaceNet

DigitalGlobe, CosmiQ Works, NVIDIA



MusicNet

J. Thickstun et al, 2017



Medical ImageNet

Stanford Radiology, 2017



ShapeNet

A.Chang et al, 2015



EventNet

G. Ye et al, 2015



ActivityNet

F. Heilbron et al, 2015

Slide from talk “Imagenet: Where have we gone? where are we going?” ([Fei-Fei, 2017](#)) depicting benchmark datasets inspired by ImageNet.

The current state of Generative AI (GenAI)

1. **Solves anything** - ChatGPT
2. **Writes anything** - Writesonic
3. **Generates Art**- midjourney
4. **Generates code** - Replit
5. **Generates video** - Synthesia
6. **Generates Tiktoks**- Fliki
7. **Generates avatars**- Starrytavs
8. **Generates Powerpoints** - Slides AI
9. **Edit pics** - Remini
10. **Edit vids**- Pictory
11. **Summarize notes** - Wordtune

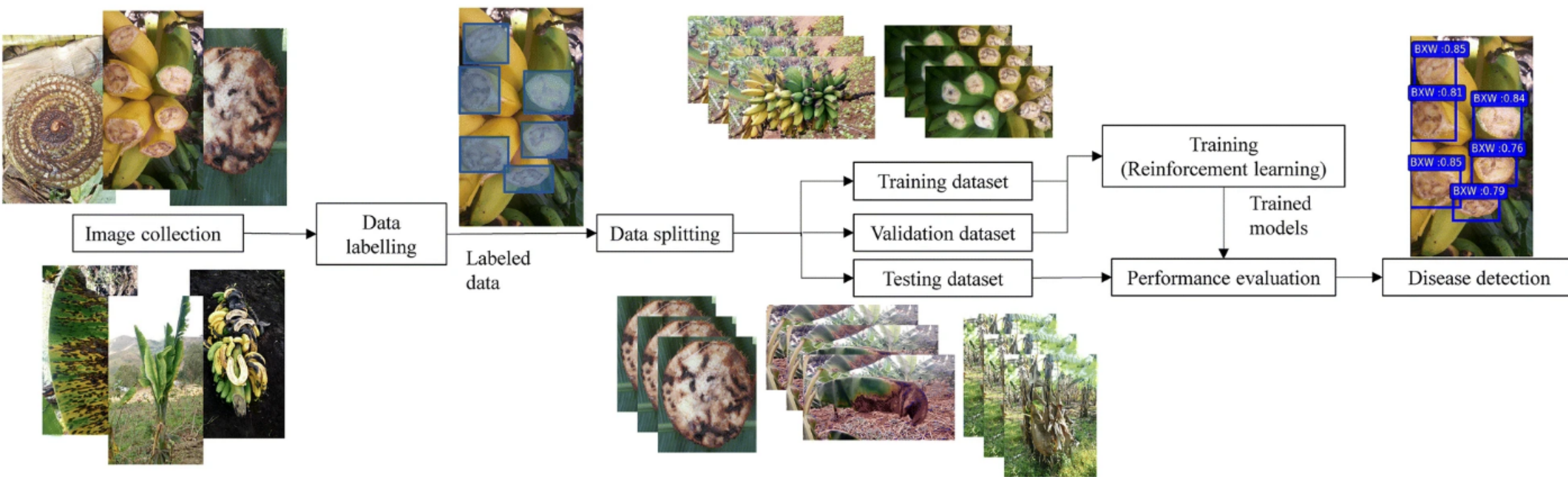
Source: [Youtube](#)

Discussing regional AI use-cases

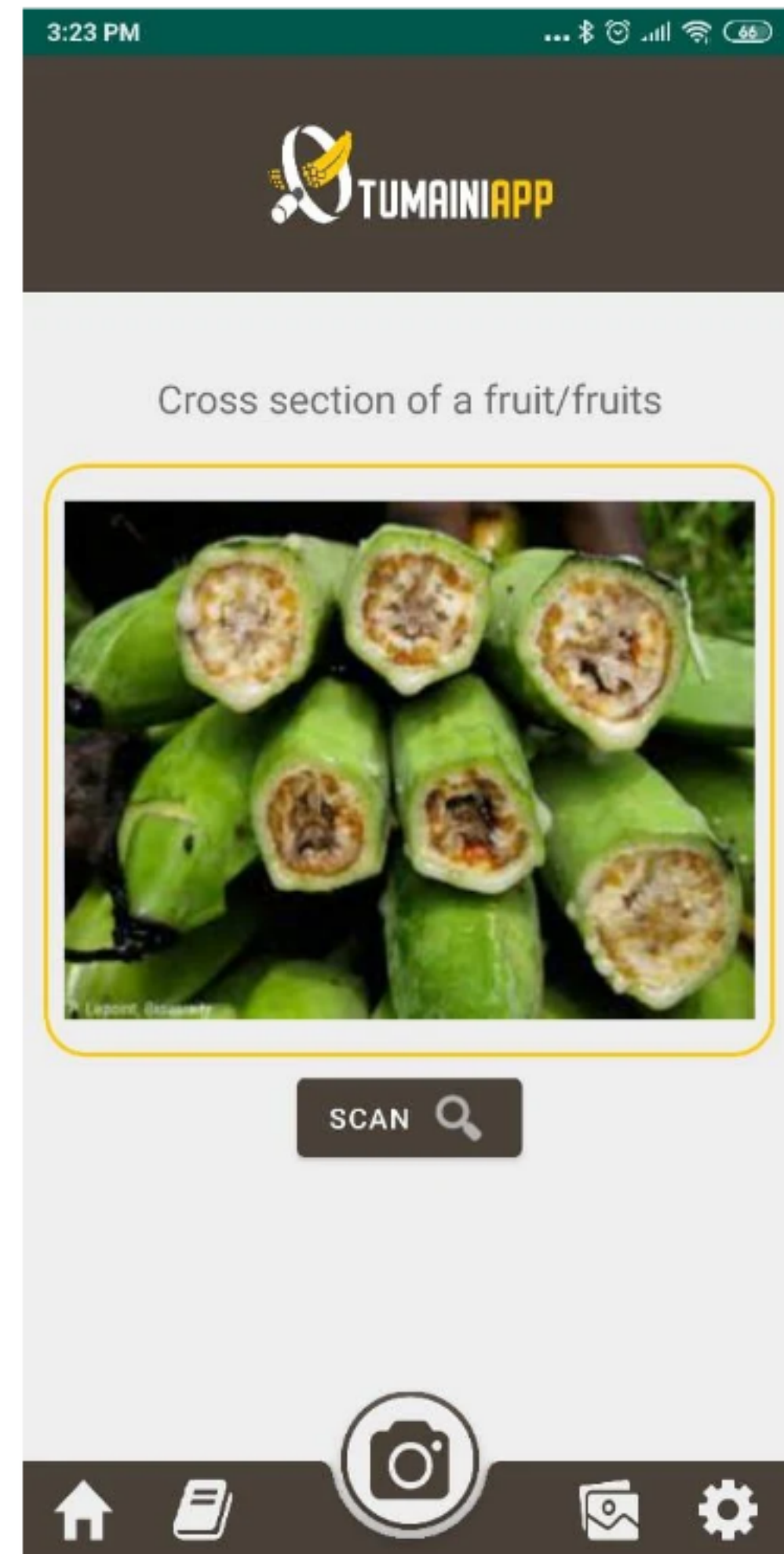
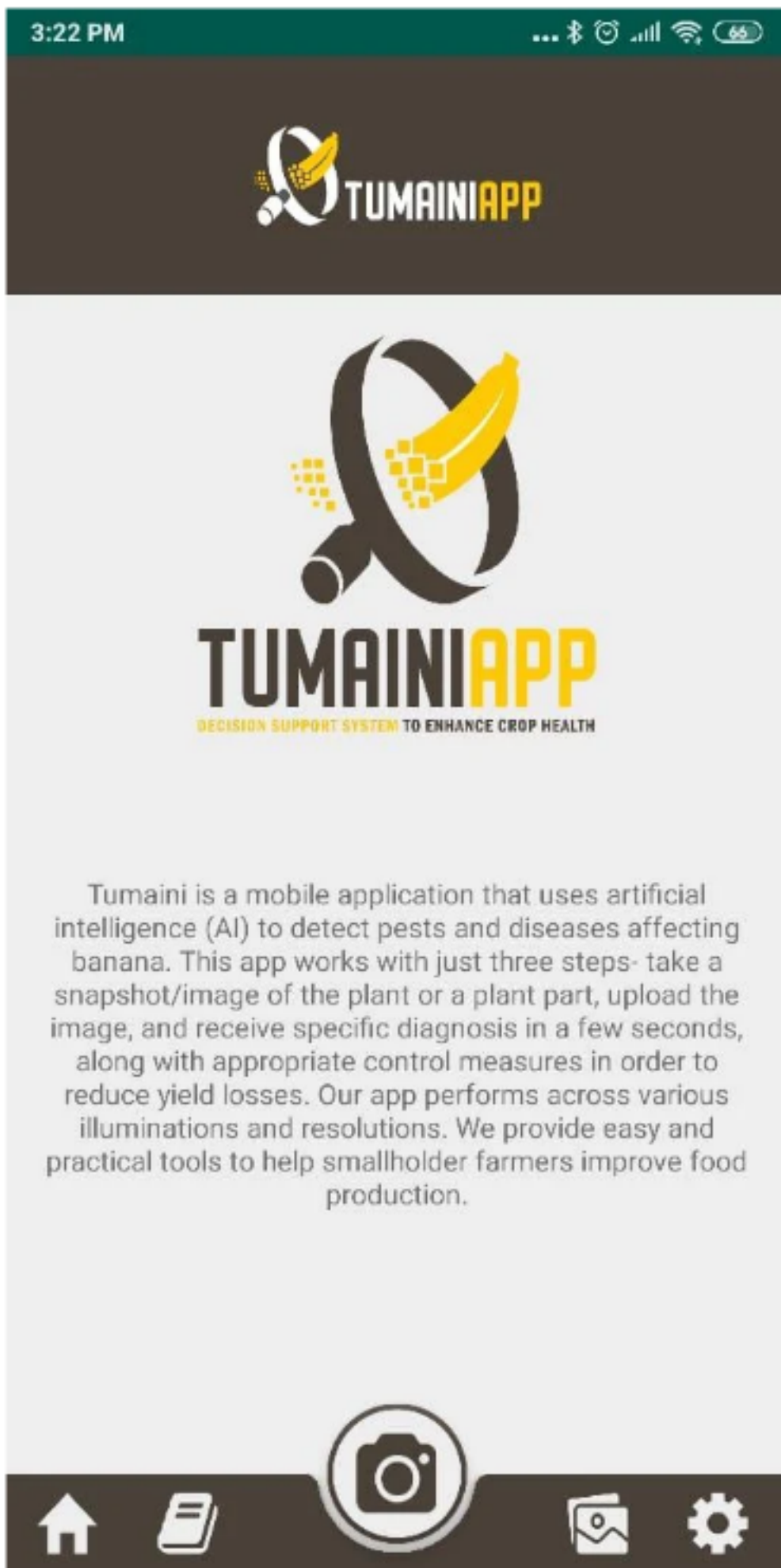
(Group Exercise)

1. **Prediction of future events**, such as projecting agricultural yields or anticipating the demand for specific services in rural areas
2. An **AI-driven dictation software** can facilitate multilingual interactions, ensuring that information about government programs is accessible to all
3. **Detection of low occurrence events**, such as identifying emerging patterns in crop diseases or natural disasters.
4. An **agent(bot) driven experience** tailored for rural development can streamline processes like program enrollment, subsidy distribution, and appointment scheduling.

Components of an **AI** system



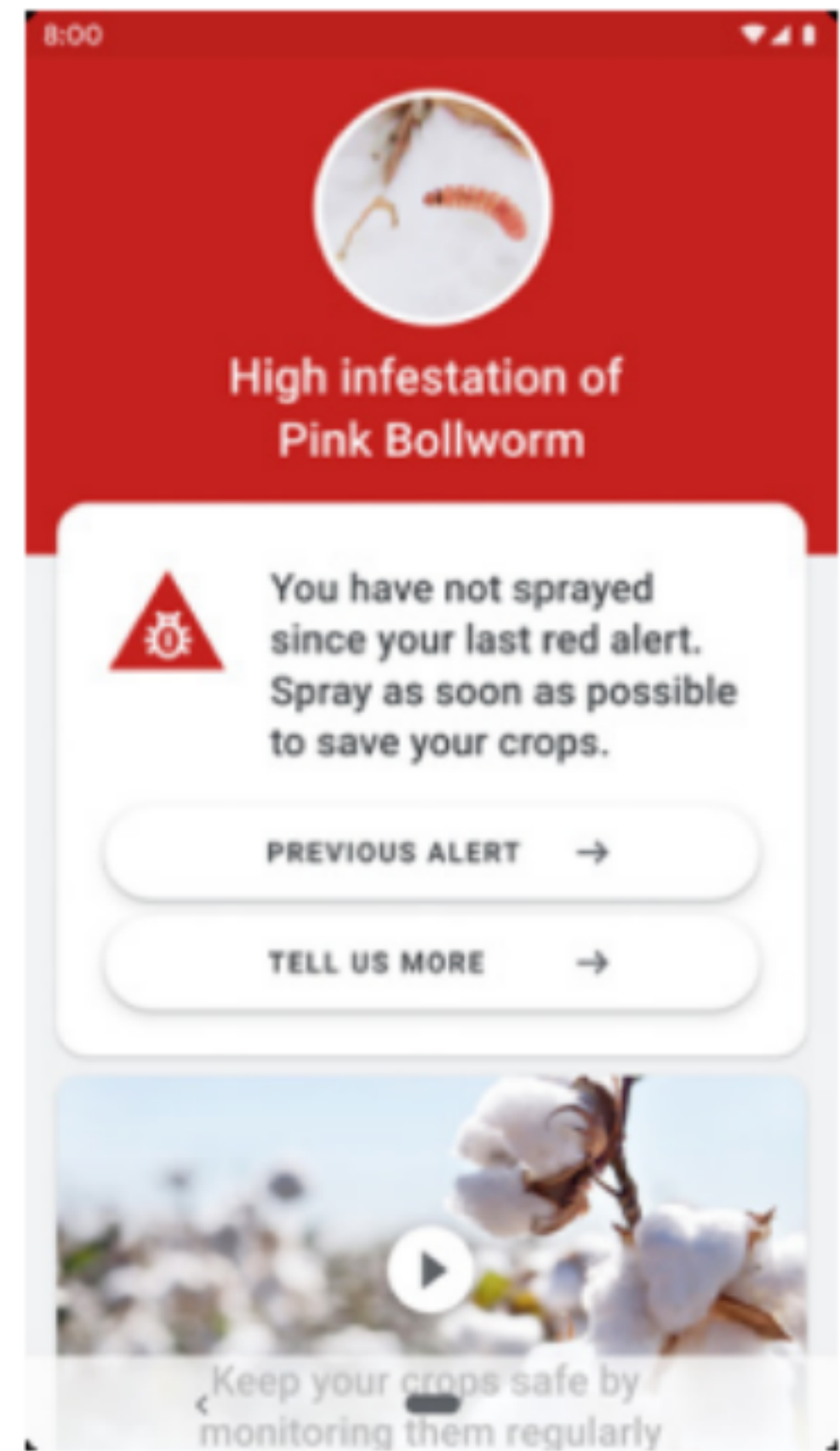
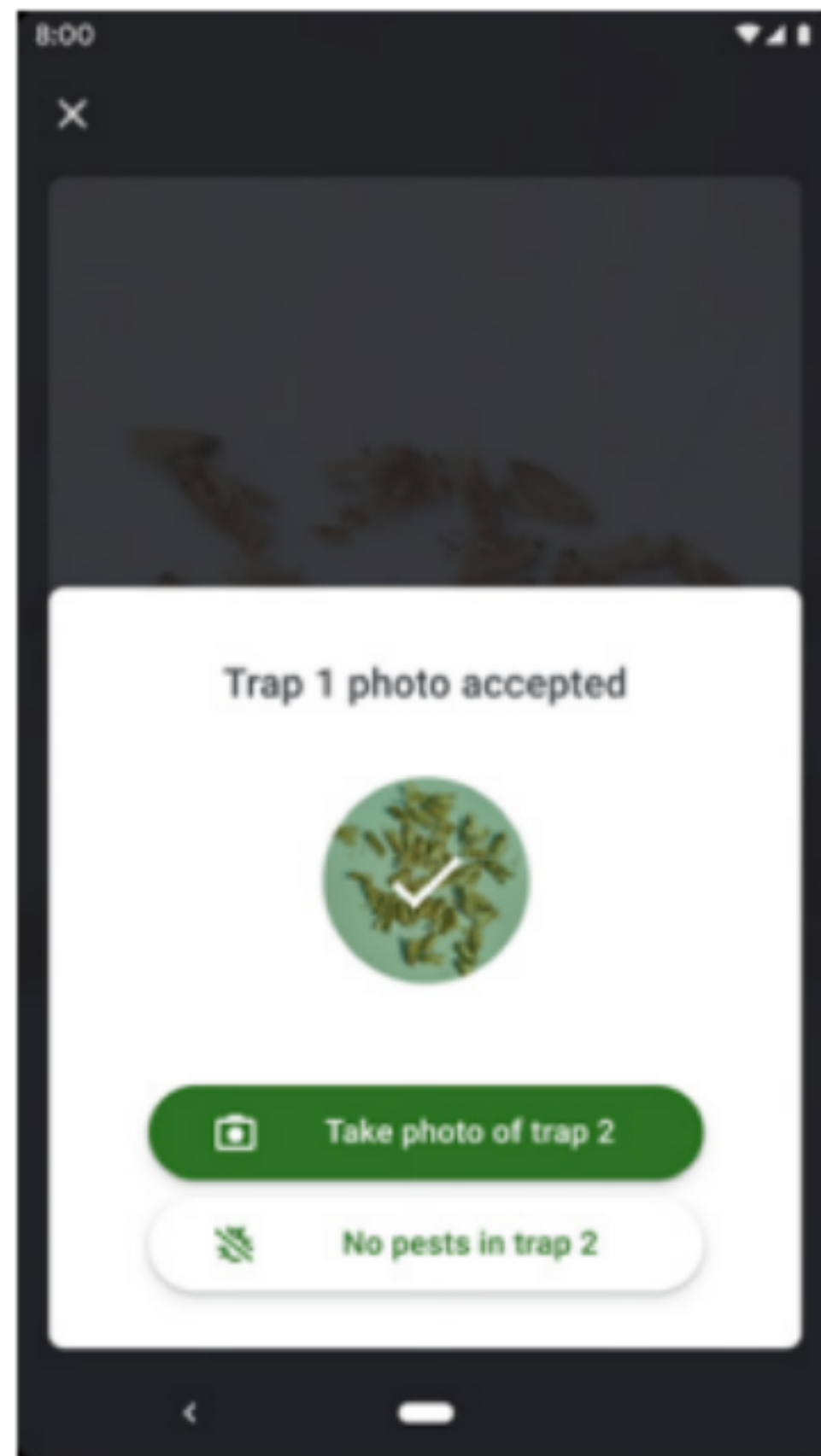
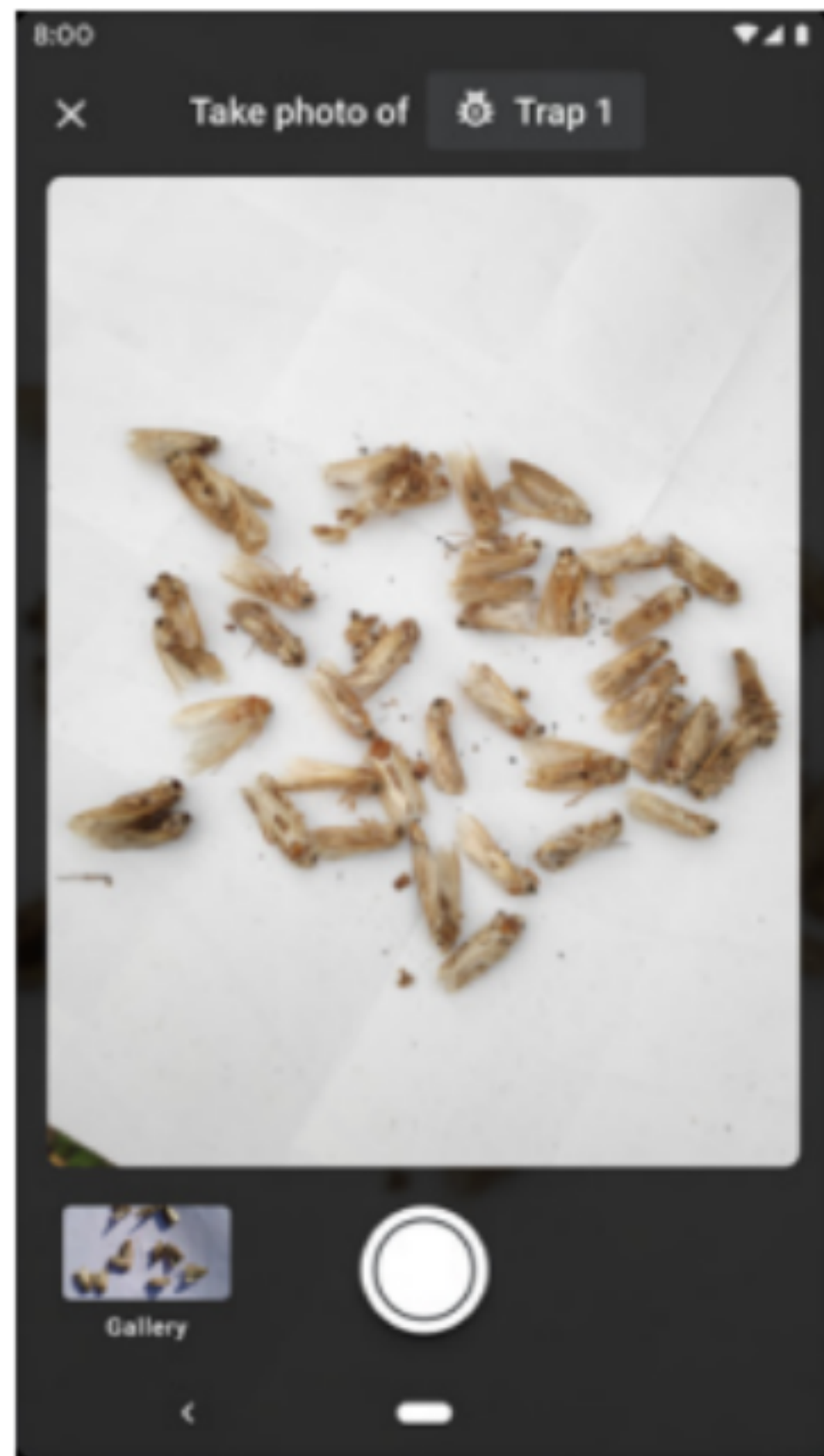
AI-powered [banana diseases and pest detection](#) (Use Case - *Smartphone-based AI apps could alert farmers and expedite disease diagnosis, thus preventing the possible outbreak of pests and diseases*)





CottonAce is an AI-powered early warning system developed by [Wadhvani AI](#), available through an app on Android smartphones. It helps farmers protect their crops by determining the right time to spray pesticides through immediate and localized advice. The AI technology analyzes photos of pests caught in traps which are uploaded by farmers and agriculture program workers, and classifies and counts the number of PBW or ABW found.

Source: [Wadhvani AI: Learnings from deploying CottonAce in India](#)



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NON-REPORTABLE

IN THE SUPREME COURT OF INDIA

CIVIL APPELLATE JURISDICTION

CIVIL APPEAL NO. OF 2015

(Arising out of SLP(C) No.16939 of 2015)

M/S. ROOTS INDUSTRIES INDIA LTD. ... APPELLANT(S)

VS.

NON-REPORTABLE

IN THE SUPREME COURT OF INDIA

CIVIL APPELLATE JURISDICTION

सिविल अपीलिय न्याय अधिकार क्षेत्र

Enter translated sentence

Click to move text, TAB key to move suggested words, Ctrl+S to save

ANUVAAD

Anuvaad is an **open source** judicial domain, document-translation platform to **translate judicial documents** at **scale**. Separate instances of Anuvaad are deployed to Supreme Court of India (SUVAS) and Supreme court of Bangladesh (Amar Vasha).

the original file, we are of the view that the writ

JUDGMENT

petition is to be remitted to the High Court for

consideration on merits.

..... APPELLANT(S)

VS.

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Page Sentences 23

Total Word Count 0 of 380

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MERGE

NON-REPORTABLE

IN THE SUPREME COURT OF INDIA
CIVIL APPELLATE JURISDICTION

CIVIL APPEAL NO. OF 2015
(Arising out of SLP(C) No.16939 of 2015)

M/S. ROOTS INDUSTRIES INDIA LTD. ... APPELLANT(S)

VS.

M/S. AIRPORTS AUTHORITY OF INDIA & ORS. ... RESPONDENT(S)

J U D G M E N T

ANIL R. DAVE, J.

1. Leave granted.

2. Upon hearing the learned counsel and upon perusal of the original file, we are of the view that the writ petition is to be remitted to the High Court for consideration on merits.

NON-REPORTABLE

IN THE SUPREME COURT OF INDIA

CIVIL APPELLATE JURISDICTION

सिविल अपीलिय न्याय अधिकार क्षेत्र

Enter translated sentence

Ctrl+m to move text, TAB key to move suggested words, Ctrl+s to save

SAVE

RETRANSLATE

CIVIL APPEAL NO. OF 2015

(Arising out of SLP(C) No.16939 of 2015)

M/S. ROOTS INDUSTRIES INDIA LTD.

..... APPELLANT(S)

VS.

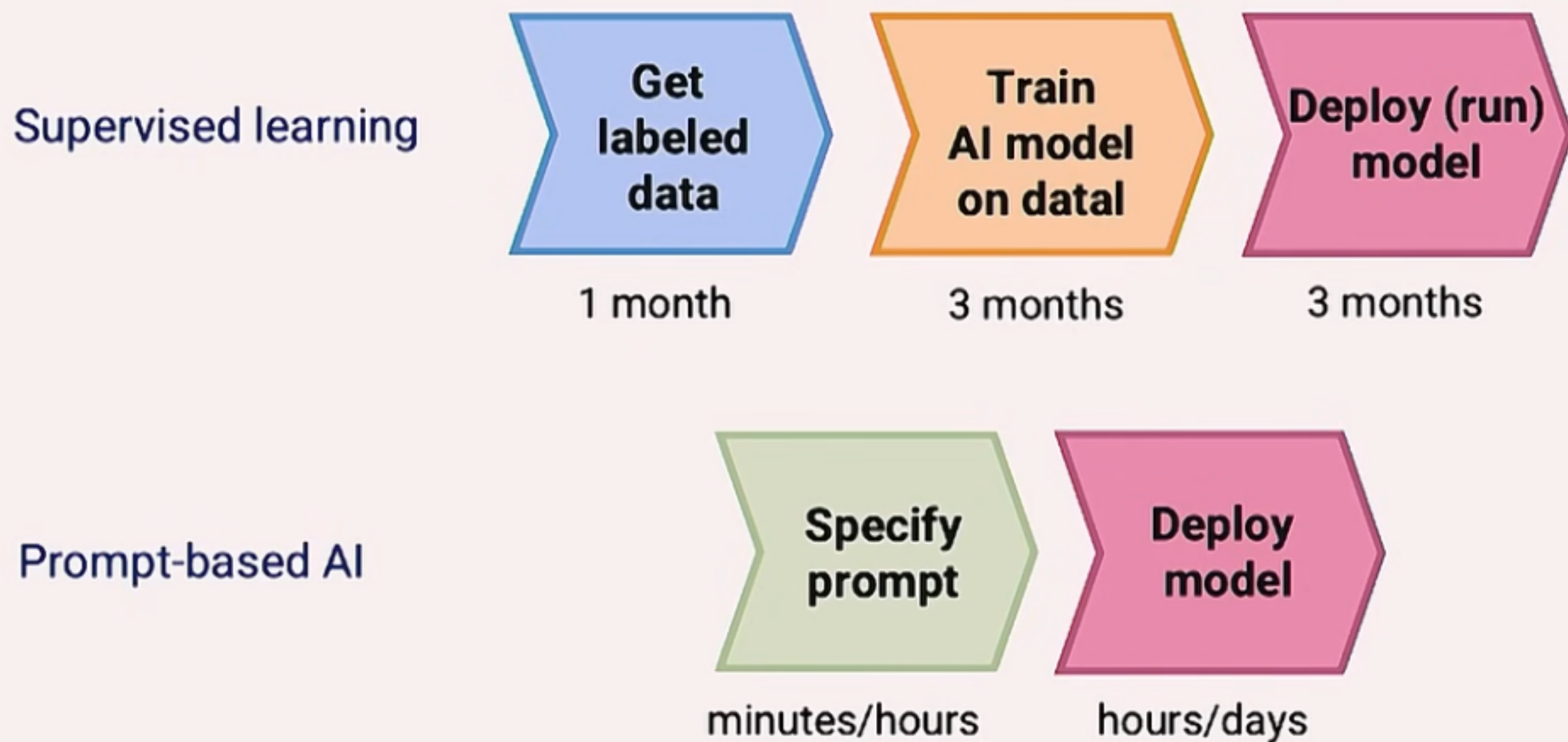
Understanding **AI** in the **local context**



An AI Assistant created by [Digital Green](#) to make vetted farmer knowledge accessible.

Source: [Farmer.CHAT by Digital Green](#)

Prompting is revolutionizing AI application development



Source: [The Near Future of AI - Andrew Ng](#)

The AI stack

APPLICATIONS

Workhelix

BEARING.ai

meeno

Woebot Health

(kira*)learning

WORKERA

VALIDMIND

SpeechLab

credo | ai

ECHELON | AI

NETAIL

common sense

esteam.ai

Infrastructure

aws

Google Cloud

Developer Tools



LANDING AI

RapidFire

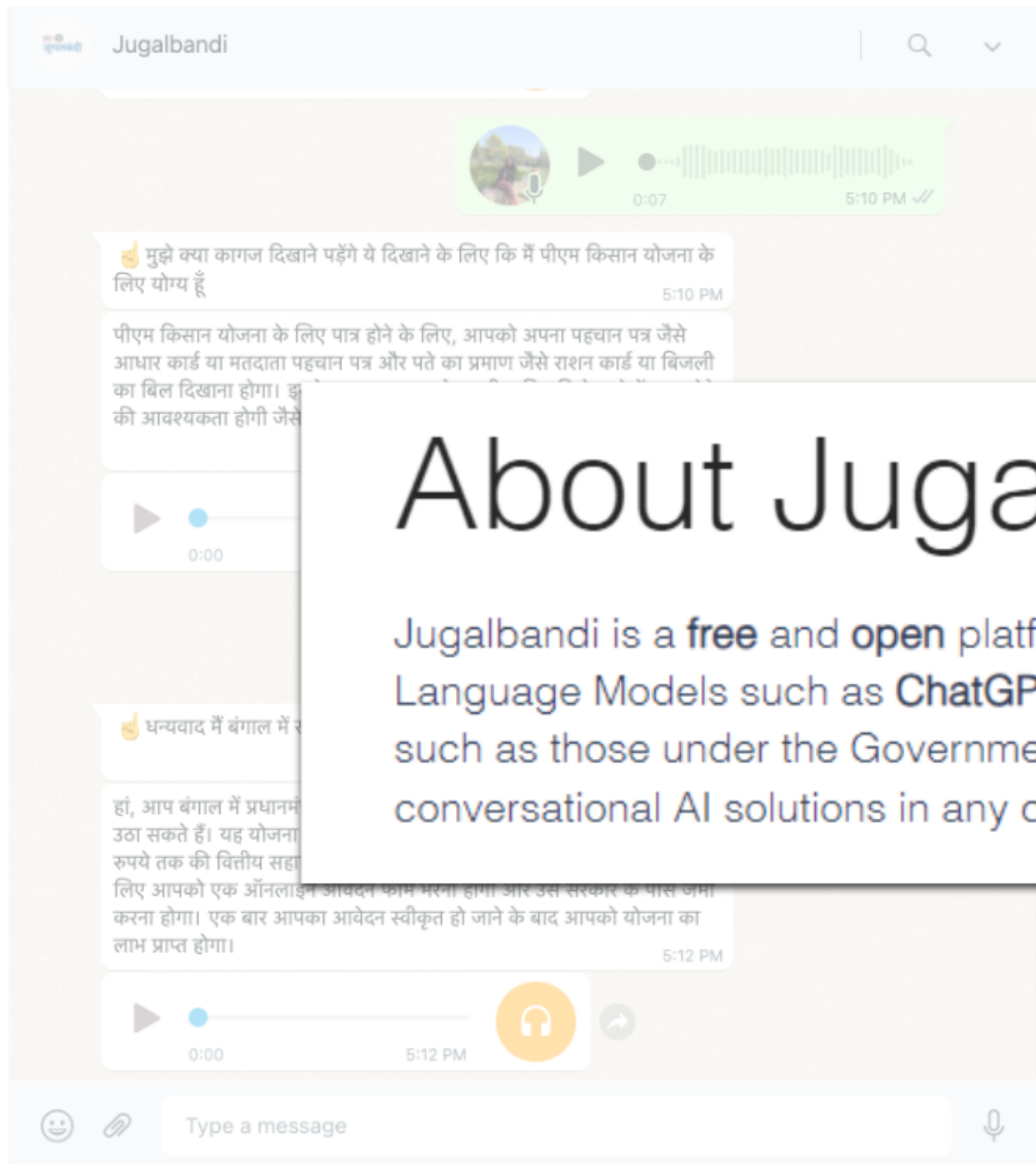
Hardware



NVIDIA

intel

AMD



About Jugalbandi

Jugalbandi is a **free** and **open** platform that combines the power of Large Language Models such as **ChatGPT** and Indian language translation models such as those under the Government of India's **Bhashini** mission to power conversational AI solutions in any domain.

Source: jugalbandi.ai



Source: jugalbandi.ai



Sunday, Mar 17, 2024
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Premium

Why The New York Times is suing OpenAI and Microsoft, what it could mean for AI and copyright

The New York Times (NYT) has become the first major news publisher to sue OpenAI and Microsoft, the creators of ChatGPT and other popular artificial intelligence (AI) platforms, citing “unlawful” use of copyrighted content.

Source: [Indian Express](#)



*bride,
ceremony,
wedding, dress,
woman*



*ceremony,
bride, wedding,
man, groom,
woman, dress*

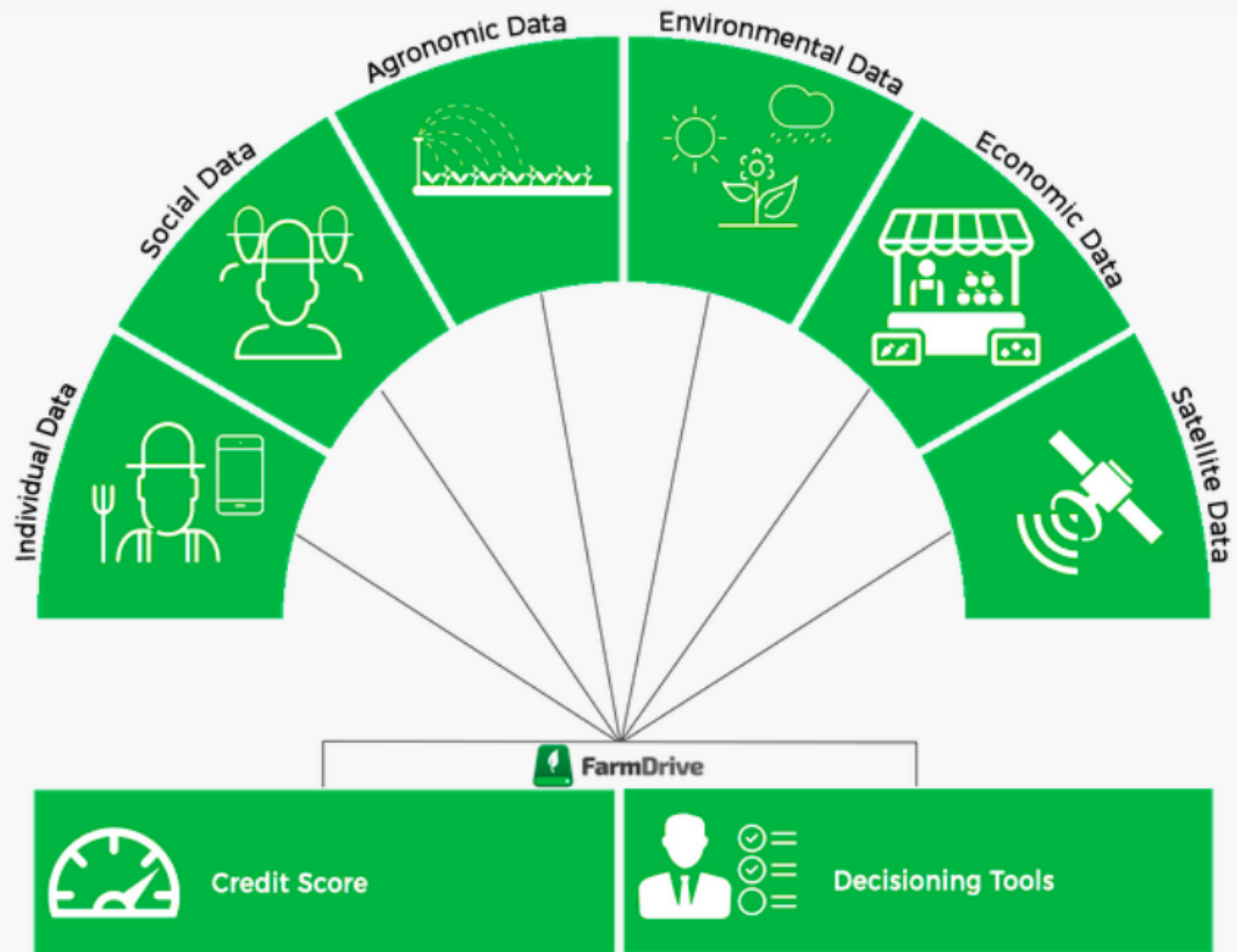


person, people



AI Use-Case Discussion

Development goal	Decision-making challenge	Possible AI solution(s)	Is AI appropriate?	User benefit	Possible risks (to user & society)	Key enablers
<i>E.g. Increased food security for region</i>	<i>Banks are reluctant to provide loans to local farmers due to weak credit profiles</i>	<i>Banks could consider a more diverse mix of variables (beyond income, assets, credit history) when making loan decisions e.g. <u>FarmDrive</u></i>	<i>Large number of variables suggests a machine-learning approach could be helpful</i> <i>Cost of errors is medium level: not immediately life threatening, but financial and social implications</i>	<i>Local farmers are able to secure loans for supplies and equipment.</i> <i>Banks can make more informed loan decisions.</i>	<i>Privacy of farmer due to increased data collection and sharing.</i> <i>Error or bias in credit scoring could affect livelihood of farmer/ bank sustainability.</i>	<i>Improved data collection on farmer assets, trading, environment and practices.</i> <i>Understanding amongst farmers of how data is being used. Transparency and accountability (incl. appeal) on how decisions made.</i>



AI projects within the public sector present unique challenges

1. Public-sector AI projects must advance the **public good** yet also deliver **public value**
2. These projects must go beyond simple cost and efficiency gains to satisfy a richer and **diverse set of stakeholders**.
3. The need for **transparency and fairness** in decision making and system operations adds to the complexity of public-sector AI projects.
4. Given that public-sector projects and systems are **taxpayer-funded**, these efforts face regular scrutiny and oversight that is generally not seen

Category	CCS Challenge	Public Sector Strategies
Data	<ul style="list-style-type: none"> • Data availability • Data sources identification • Legal/ethical challenges 	<ul style="list-style-type: none"> • Assess data availability, accessibility, and analyzability • Walk away from grand challenges if data not acceptable

Desouza, K. C., Dawson, G. S., & Chenok, D. (2019). *Designing, developing, and deploying artificial intelligence systems: Lessons from and for the public sector. Business Horizons*. doi:10.1016/j.bushor.2019.11.004



The

HAND-BOOK

OF THE MODERN DEVELOPMENT SPECIALIST

Being, a Complete, Illustrated Guide to
Responsible Data Usage, Manners, and
General Deportment



[Source: Responsible Data Handbook](#)

Table 1. Risk and value typology

	Low value	High value
Low risk	Explore partnership	Perform work in-house
High risk	Outsource work	Explore partnership

Technical	<ul style="list-style-type: none"> • Current asset identification • Identification of complementary partners • Risk versus value determination 	<ul style="list-style-type: none"> • Focus on risk dimension • Internal expertise versus partnerships • Eye on future cost
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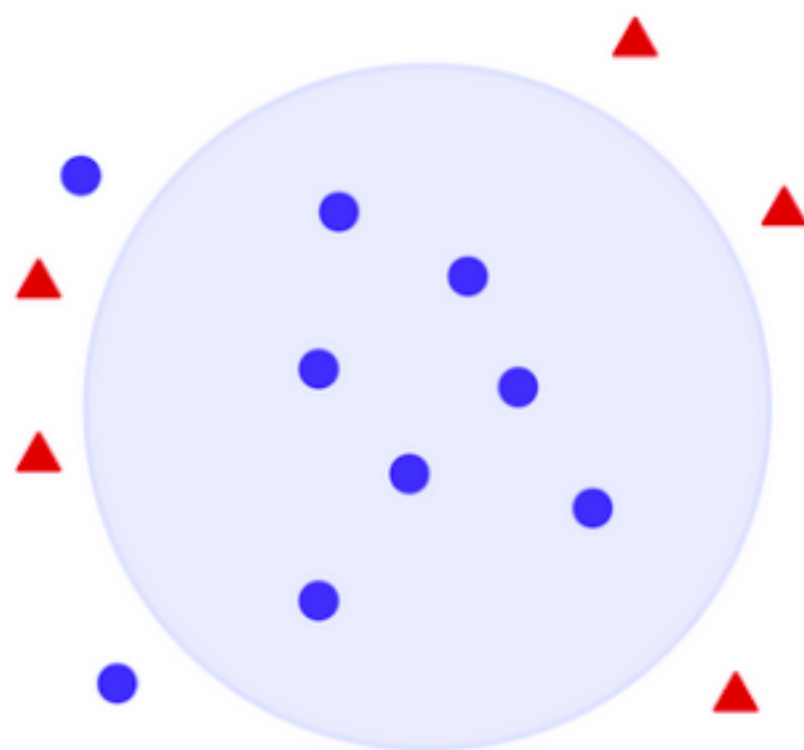
Organizational	<ul style="list-style-type: none">• Challenge in quality assessment	<ul style="list-style-type: none">• Engage outside experts• Sharing data across government• Hire missing expertise
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Desouza, K. C., Dawson, G. S., & Chenok, D. (2019). *Designing, developing, and deploying artificial intelligence systems: Lessons from and for the public sector. Business Horizons*. doi:10.1016/j.bushor.2019.11.004

Environment	<ul style="list-style-type: none">• Challenge in disclosure of information	<ul style="list-style-type: none">• Leverage inherent government transparency
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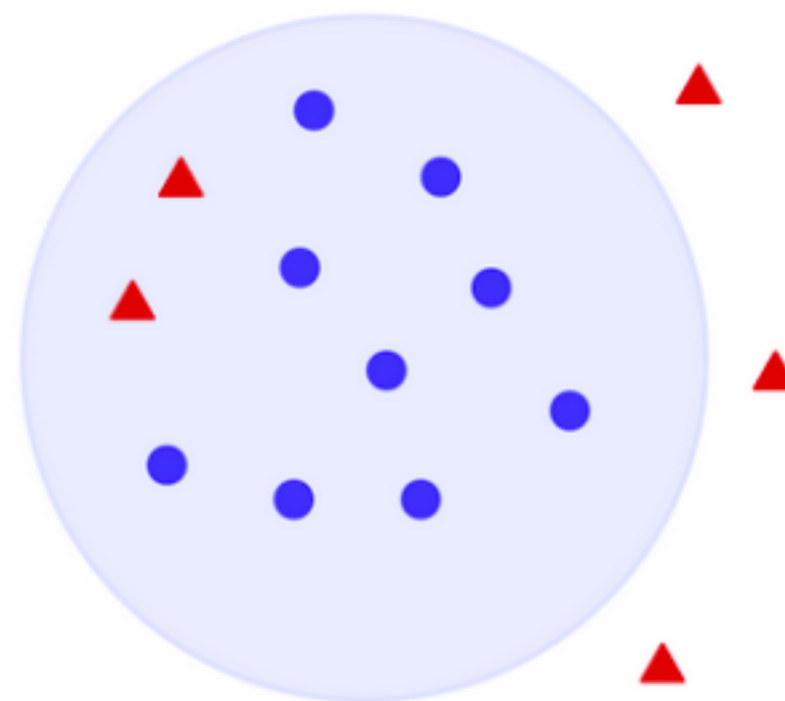
Desouza, K. C., Dawson, G. S., & Chenok, D. (2019). *Designing, developing, and deploying artificial intelligence systems: Lessons from and for the public sector. Business Horizons*. doi:10.1016/j.bushor.2019.11.004

Optimizing for precision



Model classifies no false positives, but misses some true positives

Optimizing for recall



Model classifies *all* true positives, but captures some false positives

AI probably better	AI probably not better
<ul style="list-style-type: none"> <input type="checkbox"/> The core experience requires recommending different content to different users. <input type="checkbox"/> The core experience requires prediction of future events. <input type="checkbox"/> Personalization will improve the user experience. <input type="checkbox"/> User experience requires natural language interactions. <input type="checkbox"/> Need to recognize a general class of things that is too large to articulate every case. <input type="checkbox"/> Need to detect low occurrence events that are constantly evolving. <input type="checkbox"/> An agent or bot experience for a particular domain. <input type="checkbox"/> The user experience doesn't rely on predictability. 	<ul style="list-style-type: none"> <input type="checkbox"/> The most valuable part of the core experience is its predictability regardless of context or additional user input. <input type="checkbox"/> The cost of errors is very high and outweighs the benefits of a small increase in success rate. <input type="checkbox"/> Users, customers, or developers need to understand exactly everything that happens in the code. <input type="checkbox"/> Speed of development and getting to market first is more important than anything else, including the value using AI would provide. <input type="checkbox"/> People explicitly tell you they don't want a task automated or augmented.

Responsible AI

As artificial intelligence continues to emerge as a catalyst for growth and economic output in nearly all industries, responsible AI is a developing set of principles to help our systems and organizations think critically about overcoming the challenges inherent in this technology.

Inclusive and Fair

Inclusive and fair artificial intelligence means AI engineers must find ways to **remove unfair biases in training data**.

Responsibility in this area means development teams will need to actively seek out unfair biases to improve AI systems, such as those based on nationality or race, sexual orientation, income, ability, or beliefs.

Safe and Reliable

Safe AI should strive to be safe for society. This principle asks AI developers to **consider potential uses for AI that could hurt people**, such as creating materials that deceive or spread falsehoods.

To create safe AI, engineers, and other developers will need to test AI programs before deployment to identify safety risks and find ways to mitigate those problems.

Data privacy

Data privacy in responsible AI means **being transparent with people about how their data will be used** and giving users the ability to make decisions about what private data will be shared.

In addition to giving consumers tools to **manage their privacy**, AI engineers and developers can take steps to safeguard user data to keep it safe from malicious agents.

Transparency

For consumer protection, it's important that companies and organizations are transparent about the ways they're using artificial intelligence.

Users and company stakeholders **need to be able to understand how the AI works** and draws the conclusions it does. Providing transparency also allows consumers to hold companies accountable for the ways they use AI.



Identifying potential AI use-cases

(Group Exercise)

1. What **challenge** is your department or region facing for which you think decision-support or automation may be needed?
2. What are the **currently technological or data analysis options**, where are they lacking, and in what way could AI be of benefit?
3. What are the **expected benefits and risks** to different stakeholders?
4. What are the **important inputs or enablers** for implementing an AI-based solution?

Group Descriptions

Group	Theme	Description
Maithili (मैथिली)	Agriculture & Allied (Farm, Livestock and Aquaculture)	Optimize crop yields, improve livestock health monitoring, and enhance aquaculture productivity and infrastructural support.
Bhojpuri (भोजपुरी)	Livelihood - Non Farm	Potential of a livelihood activity, ecosystem support, economic growth, addressing unemployment challenges, and promoting sustainable livelihoods in non-farm sectors.
Magahi (मगही)	MNREGA implementation	Streamline the planning, implementation, and monitoring of MNREGA projects to enhance efficiency, transparency, and accountability.
Angika (अंगिका)	Role of MNREGA in livelihoods	Improve targeting, skill development, and asset creation under MNREGA for livelihood in agriculture and non-farming sectors.
Surjapuri (सुरजापुरी)	Role of stakeholders in DRR and Climate Change	Stakeholders - MNREGA, JEEVIKA, BSDMA and Environment forest & climate change.

Discussion Template

Development goal	Decision-making challenge	Possible AI solution(s)	Is AI appropriate?	User benefit	Possible risks (to user & society)	Key enablers
<i>E.g. Increased food security for region</i>	<i>Banks are reluctant to provide loans to local farmers due to weak credit profiles</i>	<i>Banks could consider a more diverse mix of variables (beyond income, assets, credit history) when making loan decisions e.g. <u>FarmDrive</u></i>	<i>Large number of variables suggests a machine-learning approach could be helpful</i> <i>Cost of errors is medium level: not immediately life threatening, but financial and social implications</i>	<i>Local farmers are able to secure loans for supplies and equipment.</i> <i>Banks can make more informed loan decisions.</i>	<i>Privacy of farmer due to increased data collection and sharing.</i> <i>Error or bias in credit scoring could affect livelihood of farmer/ bank sustainability.</i>	<i>Improved data collection on farmer assets, trading, environment and practices.</i> <i>Understanding amongst farmers of how data is being used. Transparency and accountability (incl. appeal) on how decisions made.</i>



**Thank you for your
participation!**



*For any further inquiries or
assistance, please don't hesitate to
reach out to us.*

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