

(Artificial) Intelligence in Society



Nitin Saxena

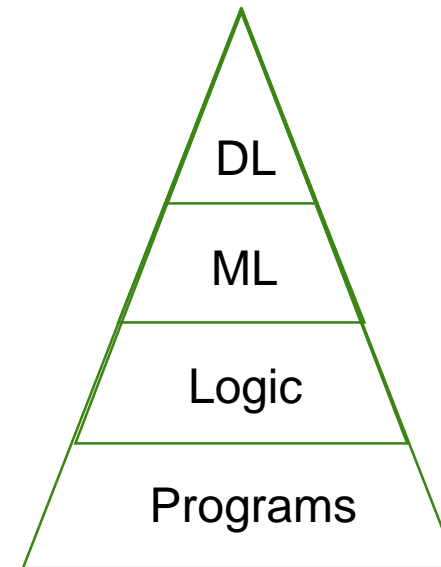
(joint works with Nisheeth Srivastava)

CSE & **CDIS** & AIRAWAT CoE
(Center for Developing Intelligent Systems)

IIT Kanpur

What is machine intelligence?

- **Simple programs**
 - If the password matches the database entry, let the person in
- **Logical reasoning**
 - If someone tries to buy a ticket, make sure there are tickets available before charging them
- **ML** (Machine Learning)
 - If your database row has this mean/average, you can put them in this bucket
- **DL** (Deep Learning)
 - Just give me labelled data and get out of my way



AI – a layperson's definition

- Any computing system that
 - does something that machines couldn't do before.
- *Corollary: the AI effect*
 - Anytime machines start doing something **intelligent, en masse**, it is no longer considered AI!
- Examples of AI systems that are **no longer** considered AI
 - Chess solvers
 - OCR (Optical character recognition)
 - Automated assembly lines
 - Automated CNC lathes (Computer Numerical Control)

AI and complexity

- The AI effect: **if you understand it, it isn't AI.**
- Consequence: apply AI to everything we don't understand how to do.
 - AI for health-care
 - AI for mental-health
 - AI for music-writing
 - AI for governance
- Apparent logic:
 - We don't understand AI
 - We don't understand how to do X
 - AI will understand how to do X.

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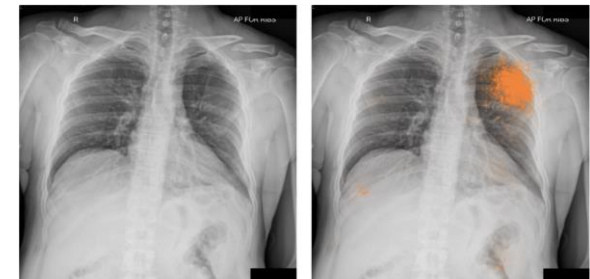


(a) Three samples in criminal ID photo set S_c .



(b) Three samples in non-criminal ID photo set S_n .

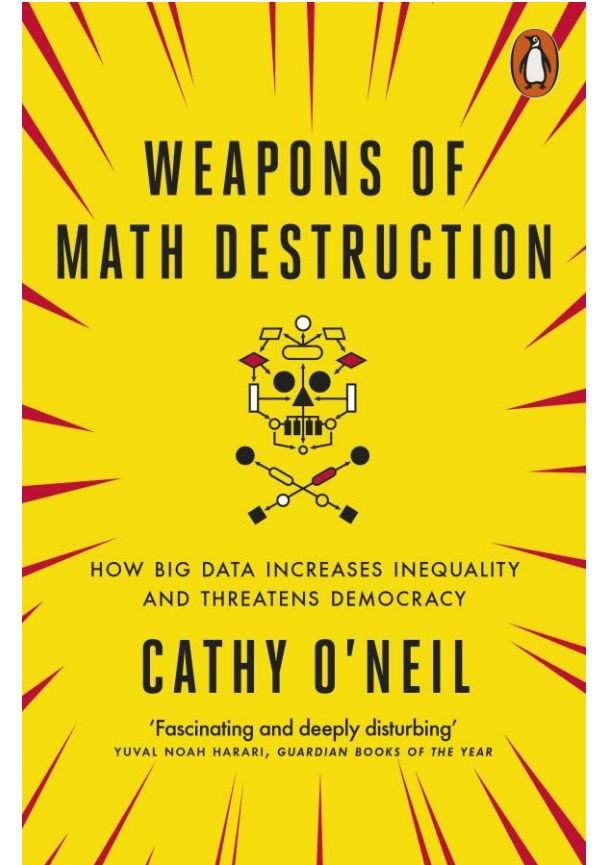
Figure 1. Sample ID photos in our data set.





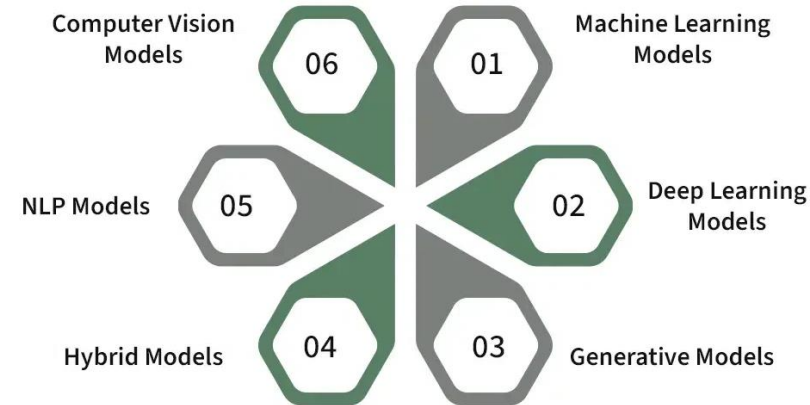
Seeing like an AI

- Replace math rigor with plausible guesswork -



What does the AI see?

- It sees **models** of the world
 - Models can be simple or **COMPLEX**
 - Simple programs see simple models
 - **COMPLEX** programs see **COMPLEX** models
-
- All models are wrong, some are useful.
 - Understanding and fixing simple models is easier than doing this for complex models.



Trusting AI systems can be hard

- AI systems *cannot* be evaluated using software engineering quality testing
 - Governance of AI systems must recognize this basic fact
- Modern AI systems can sometimes fail in unexpected ways
- AI systems must demonstrate that they do what they claim to do, to show they are trustworthy

AI will not necessarily be bad or good.

All we know for sure is that it will be alien and it will be fallible.

-Yuval Noah Harari





Use-cases:

AI for ...

- Sensing
- Deciding
- Acting

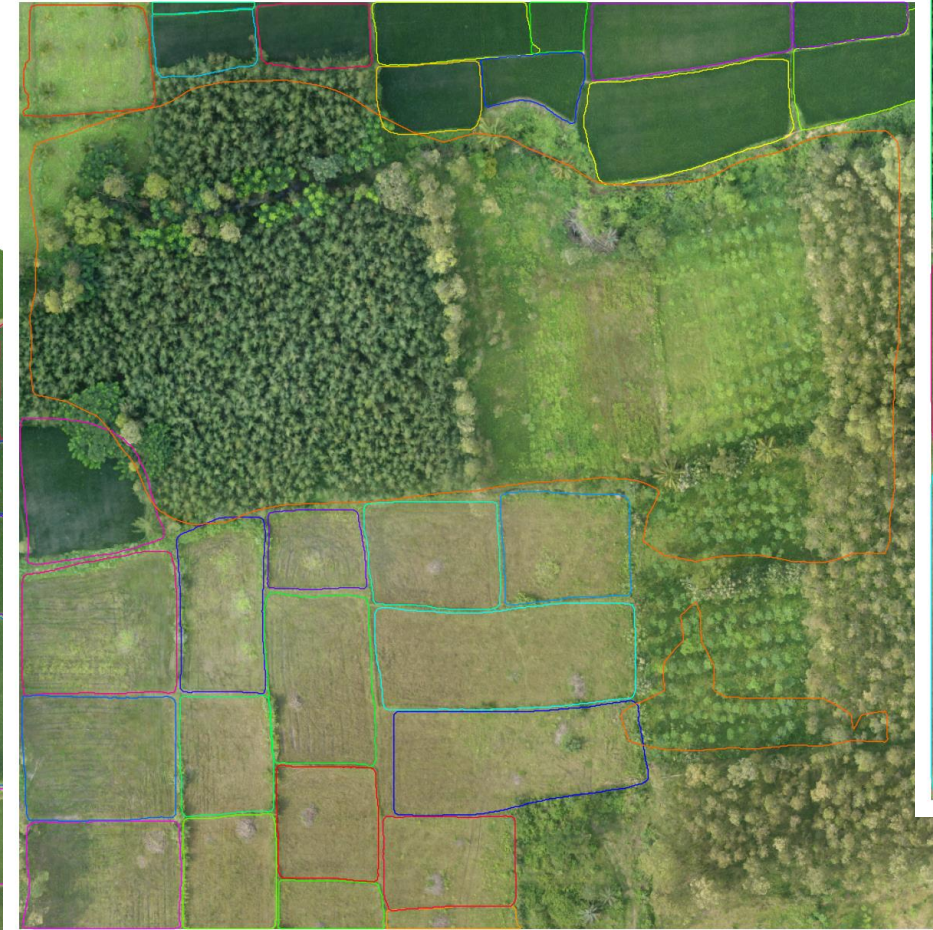


AI for sensing

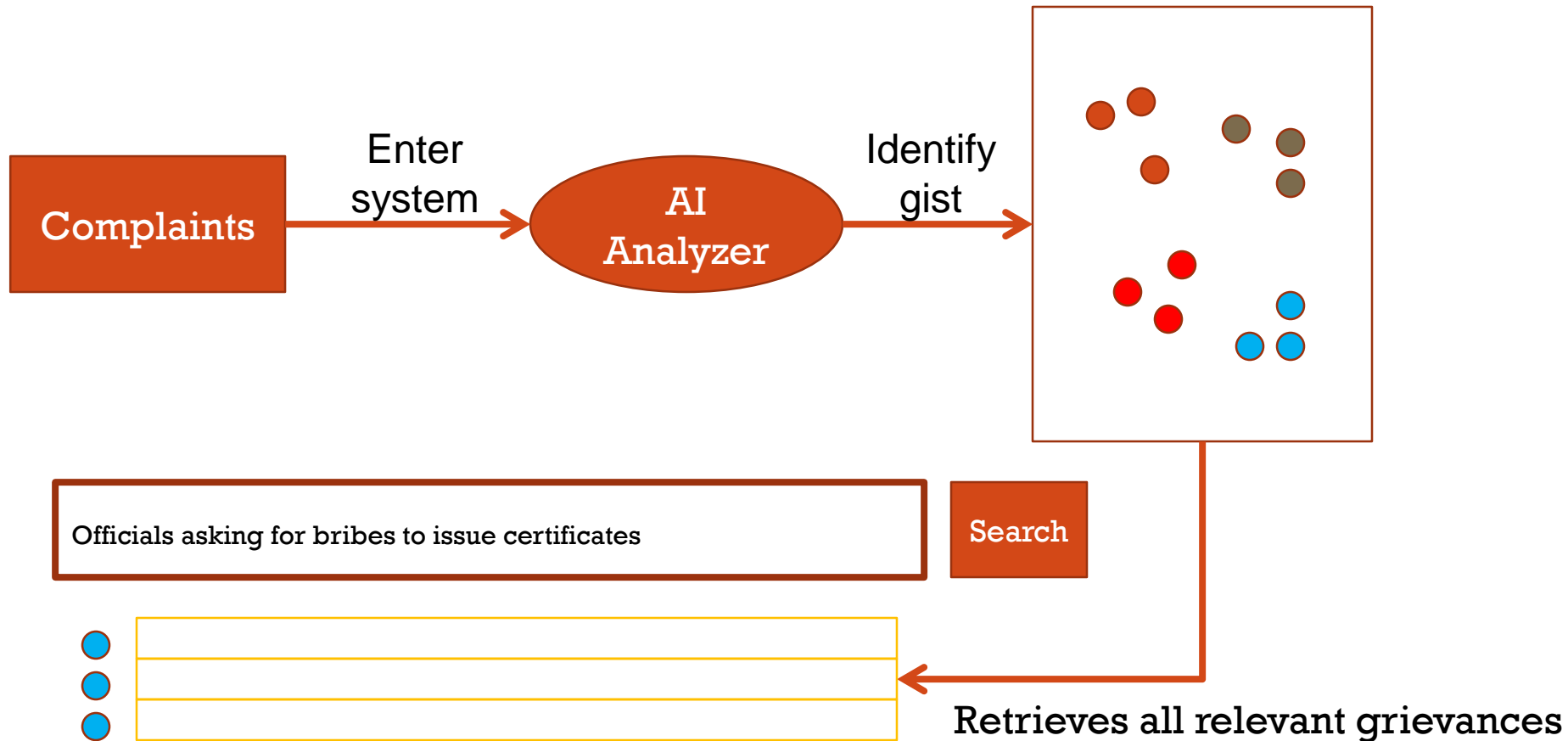
- IoT-based sensing of *environmental* parameters
 - Camera-based sensing of *traffic* movement
 - RFID-based sensing of *cargo* movement patterns
 - Drone-based sensing of *land parcel* boundaries
- Text-based sensing of citizen *intent*
- Digitization of paper-based *documents*

Automated Land Parcel Detection

Land Parcel Detection from drone imagery



Sensing citizens' intent



Deployed for all central government departments and ministries since Feb 2023



Detecting structure within documents

RAJRATAN GLOBAL WIRE LIMITED
INDIA : THAILAND
Regd. Office: Rajraton House, T-2, Meera Park, Dhule Market, Indore-492001, Madhya Pradesh
India. No. : 91-79-2644017 Fax: 91-79-2644018
Factory: 200-6, Sector-1, Pithampur-491375, Dist. Dist. Madhya Pradesh, India
No. : 91-79-2644018, 233379 Fax: 91-79-233379
CIN No: L27090MP1998PLC004776

SUPPLY CUM TAX INVOICE

ORIGINAL FOR RECIPIENT

GSTIN: 23AABCR4530Q128
PAN No: AABCR4530Q
Ack No: 162110494814881
Ack Date: 31-03-2021 4:09:00 PM
Eway Bill No: 31-03-2021 4:09:00 PM
Eway Bill Date: 31-03-2021 4:09:00 PM
RTN: 61861602411870464558615aac996a081645644427096e3225a4b3204
Date of Supply: 31/03/2021
Invoice No: SIFA20212977
Invoice Date: 31/03/2021
State: MADHYA PRADESH
State Code: 23
DO. No: BOP/ACS 1469
Date: 09-03-2021

Place of Supply: MAHARASHTRA
Details of Receiver/1 Shipped to: Transporter: PITHAMPUR BOMBAY ROADWAYS
Vehicle No: MP09GH6921
P.O. No: EMAIL
Date: 05-03-2021
Destination: BHAYANDAR
State: MAHARASHTRA

Buyers GSTIN No: 27AARFG1763H1Z3
Shipping Address:

Ship Gate:

Name of Product / Service	HSN / ACS	Quantity in Nos.	Quantity in MT	Rate / MT	Amount
BLACK WIRE 1.83MM	72171020	COILS: 25	2.222	21300.00	58428.60
BLACK WIRE 1.50 MM	72171020	COILS: 25	2.257	21800.00	50526.00
BLACK WIRE 1.63MM	72171020	COILS: 32	2.915	21800.00	63629.00
PATENTED BASE WIRE 2.60MM	72171030	COILS: 13	2.368	65100.00	154156.80

Taxable Value: 68395.00
CGST 18.00%: 12310.90
SGST 18.00%: 12310.90
TDS @ 0.075%: 865.29
Round Off: 0.41
Gross WT: 9.795
Packing: 0.033
Net WT: 9.762
GST Payable on Reverse Charge: No
Rupees: Eight Lacs Seven Thousand Six Hundred Forty Nine only
Remarks: For: RAJRATAN GLOBAL WIRE LIMITED
Certified that the particulars given above are true and correct and the amount indicated represents the price actually charged and that there is no flow of additional consideration directly or indirectly from the buyer.
Payment Terms:
1. Interest will be charged @16%, if invoice is not paid by due date.
2. All Disputes shall be subject to Jurisdiction of Indore (M.P.) Courts.
3. Interest on Late Payment will attract to GST.

AUTHORISED SIGNATORY

Rajasthan State Health Assurance
Swasthya Bhawan, Tilak Marg, C-Scheme, Jaipur
Date: 30-01-2021 05

Challan

Patient / Beneficiary Details

UIN Number: 125012110515304	Patient Name: Amar Singh	Case Type: Normal
Location: Bhamashah Family	Hospital Name: Gwalior Hospital And Trauma Center	Admission Date: 28-Jan-2021
Registration Number: WFBYSS	Hospital Type: Private	Discharge Date: 30/01/2021

Booked Package Details

S No	Package Name	Package Code	Package Category	Package Rate
1	Medical Treatment (ICU) for Unemployed (with Single bed) (Unlabeled)	02100024	Tertiary	INR 15,000.00
Total				INR 15,000.00

Remain Amount

Secondary Wallet	Tertiary Wallet
INR 24,750.00	INR 203,250.00

Note: Your medical treatment is totally free of cost to you under Bhamashah Swasthya Bima Yojana.

Signing Authority: [Signature]
Hospital Name: Gwalior Hospital And Trauma Center

Satisfaction Certificate

Name of Patient: Amar Singh
Mobile No: [Blank]


I/We hereby declare that, I/We have taken medical treatment at aforesaid hospital and hospital has not charged me for any expenses made during for the medical treatment. I/We further giving feedback based on my/our experience as mentioned below.

1. If I/We and money taken charged by the hospital against my/our medical treatment (in yes please state for what purpose money was taken charged by the hospital and how much) Yes / No

2. I/We are satisfied with the medical treatment provided by the hospital (If no please state the reason below) Yes / No

Note: Patients are advised to mandatorily take a duplicate copy of the invoice from the hospital.

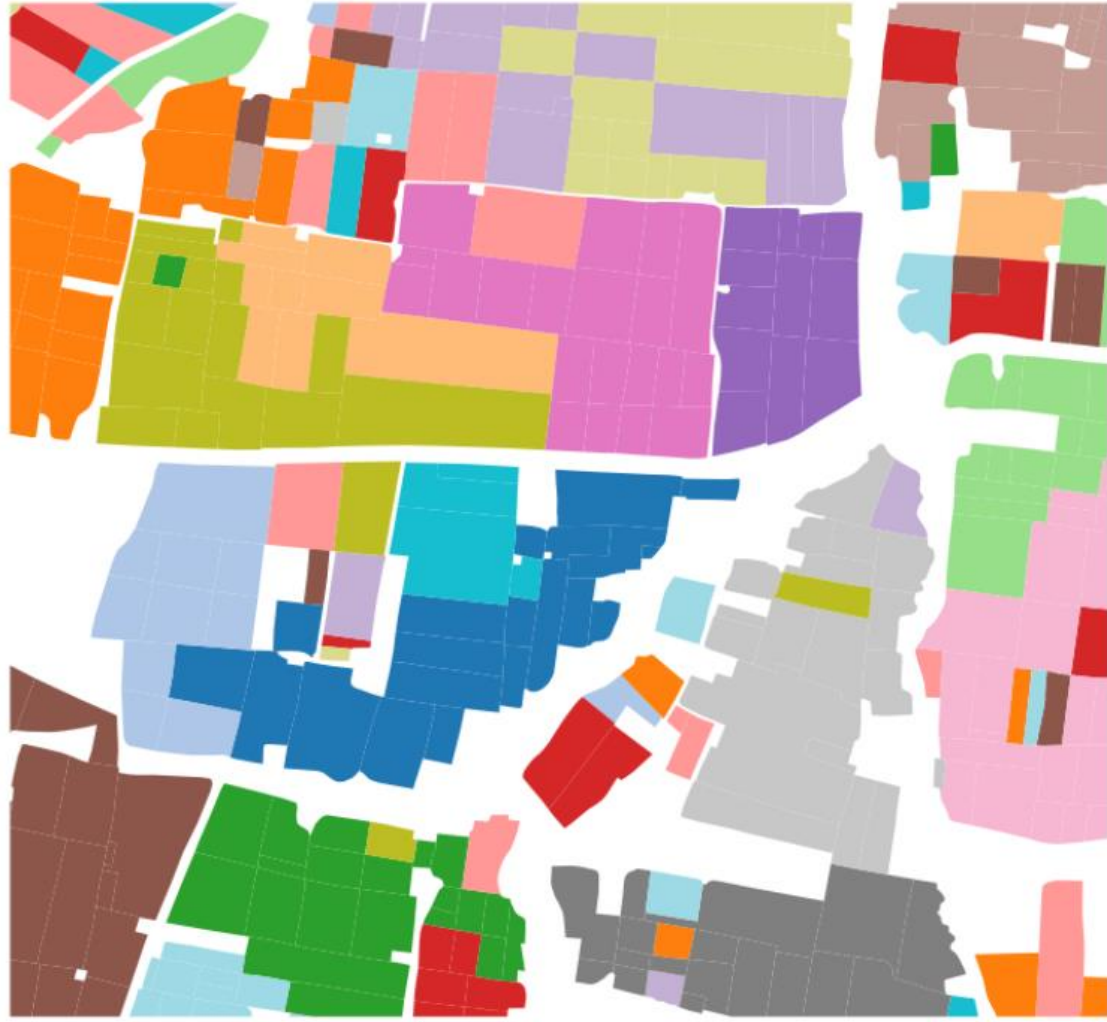
Signature of Patient or Thumb Impression: R. H. Thump

- 
- Pollution source *apportionment*
 - Demand *forecasting*
 - Land parcel *consolidation*
 - *Root-cause* analysis of grievances
 - Health Insurance *fraud* detection
 - Police/Intelligence *investigation*,
n/w analysis

AI for deciding

Automated Land Consolidation

Land **Consolidation** using breadth-first search based on administrative criteria

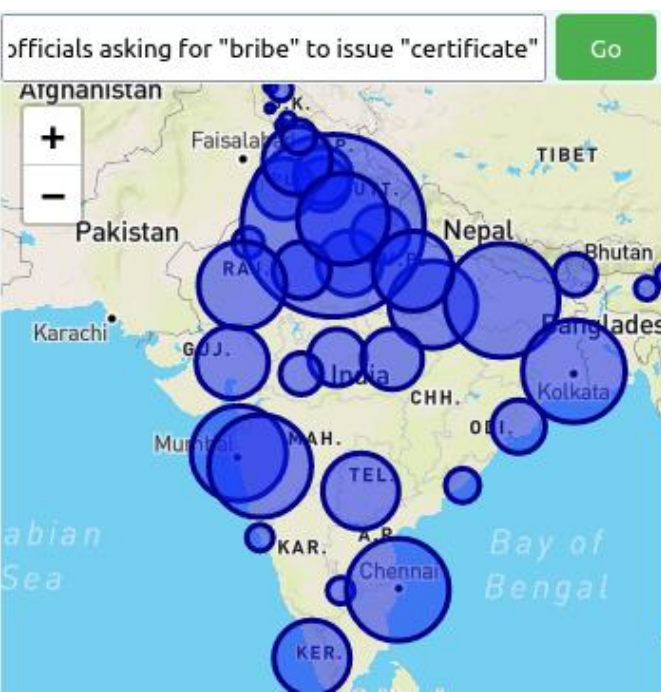




PM INDIA

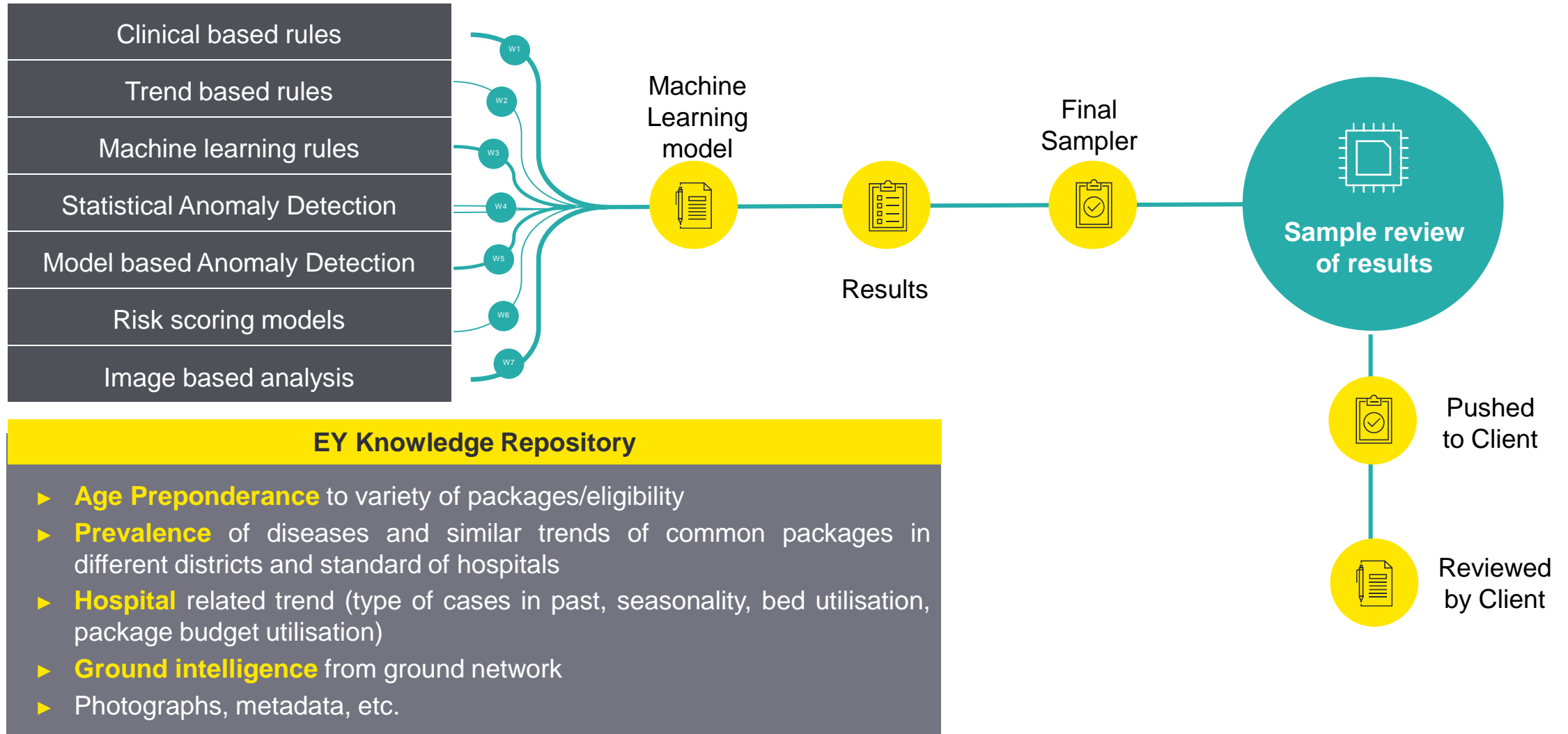
Root-cause analysis

- Automated **detection of topics** in grievance streams
 - Hierarchical labeling of topics using bags of words



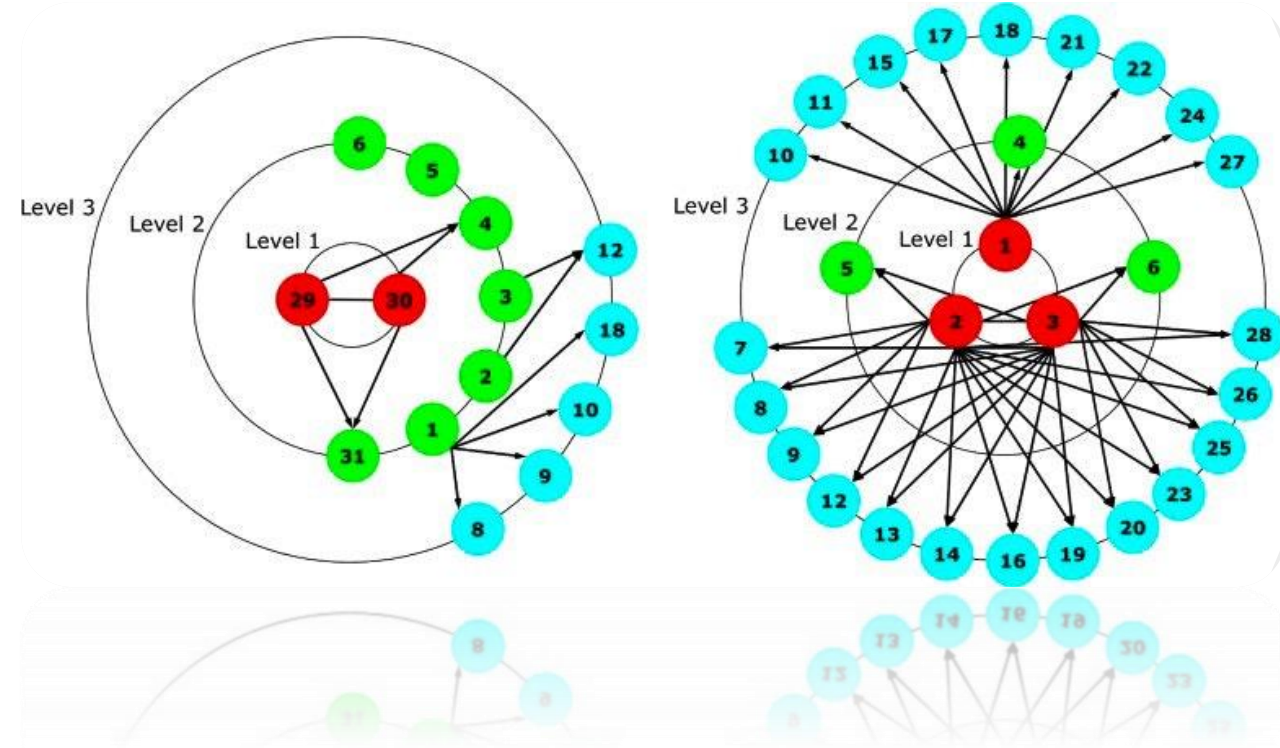
NHA: Health insurance fraud detection

EY solution has more than 50 rules which are broadly bifurcated in following categories:



Network analysis in intelligence agencies

- Detection of the *central agent*
- Analyze records to find his/her *acquaintance network*
 - Access call-data, mobile adtech
- Get *holistic persona* of the target
 - Furnish exhaustive evidence in the charge sheets/ reports.



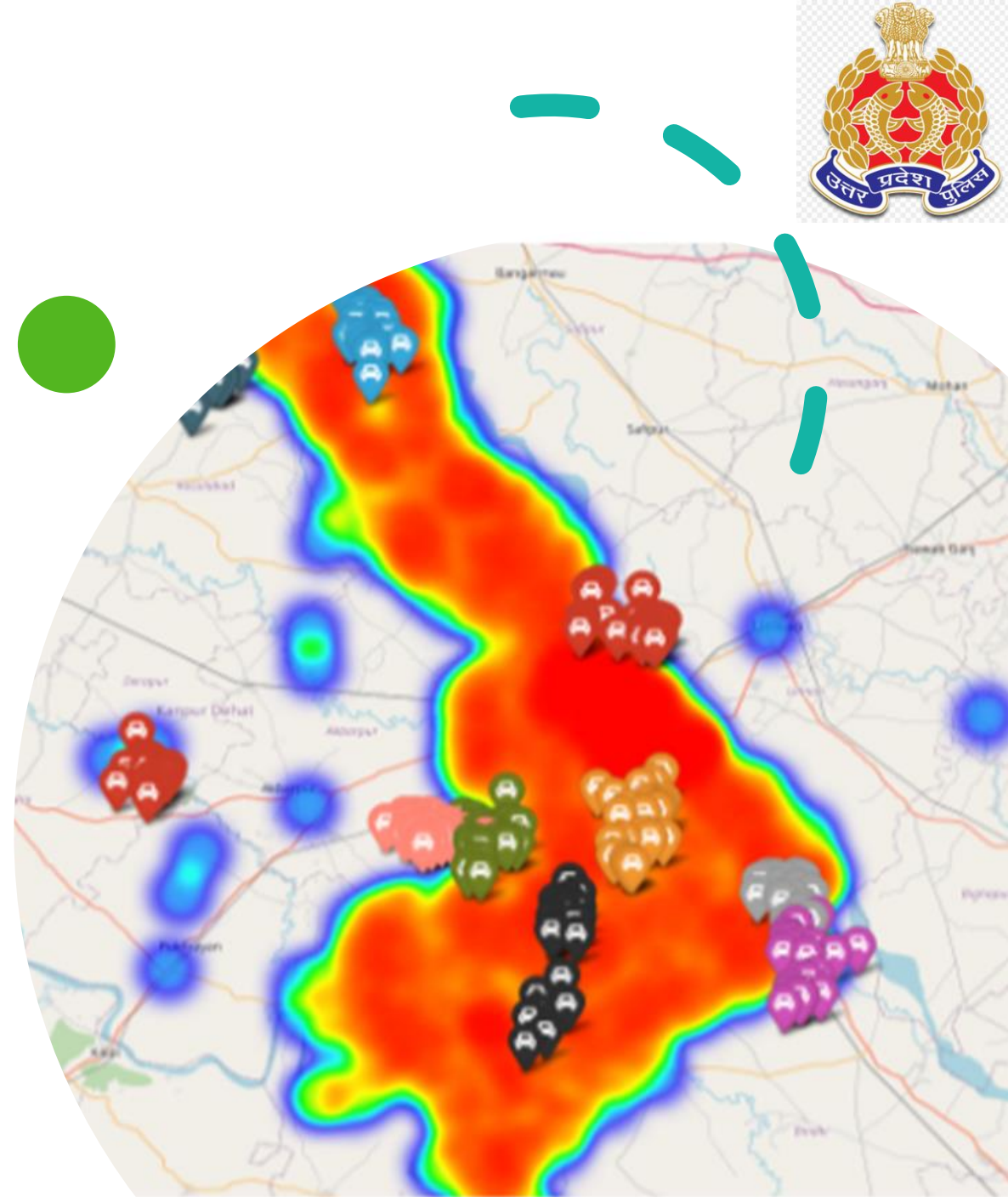


AI for acting

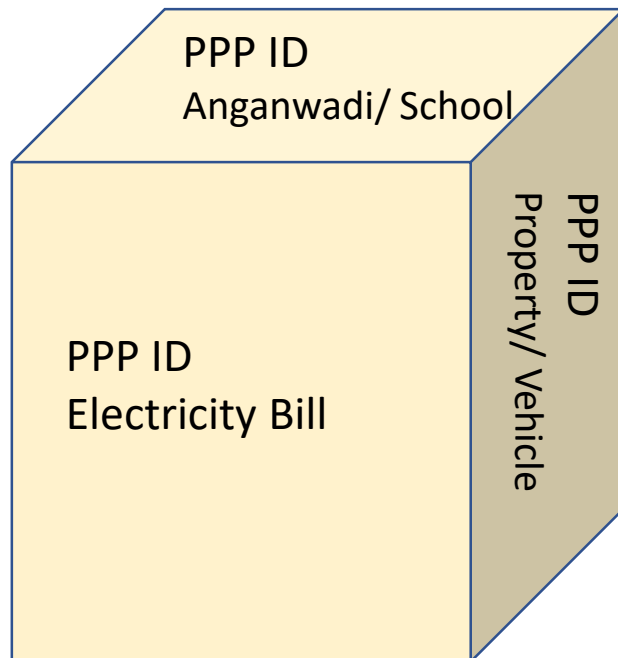
- Emergency *warning* systems
- Automated *compliance* systems
 - Inclusion/Exclusion in *welfare* schemes
- Bureaucracy *process reengineering*

Predictive patrolling

- UP112 has about 700 patrol vehicles that collectively serve a population of about 220 million people
 - UP112 currently receives 50000 calls each day, of which about 10% result in an emergency response
- Average first response times – 20 minutes
 - Average distance driven per patrol vehicle per day – 70 kms
- A **predicting patrolling** system reduces response times by 20% and fuel consumption by 25%
 - Similar idea being used in *allocating* the field engineers in a Bengaluru Internet Provider!



Income assessment



HRMS (Salary labels)



- Use regression modelling to **predict income** levels of households
- **Validate** against held out sample from HRMS, labor, contracts
- **Out-of-sample** validation with **survey** using 2200 respondents from all districts



Dashboard



Category Analysis



Spatial Analysis



Root Cause Analysis



History



Saved

Dashboard / Home

Home

LOG O



Fresh

12,321

+55% than last week



Normal

24,231

+55% than last week



Spam

2,300

+3% than last month



Repeat

3,462

-2% than yesterday



+5% than yesterday

Select Ministry

ALL



From

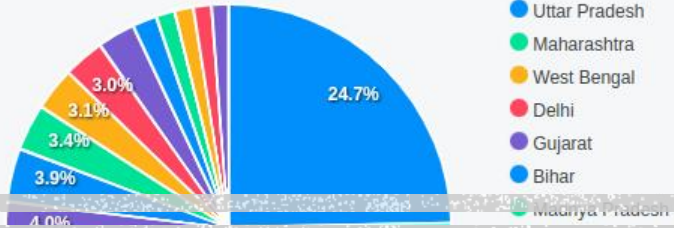
21/07/2023



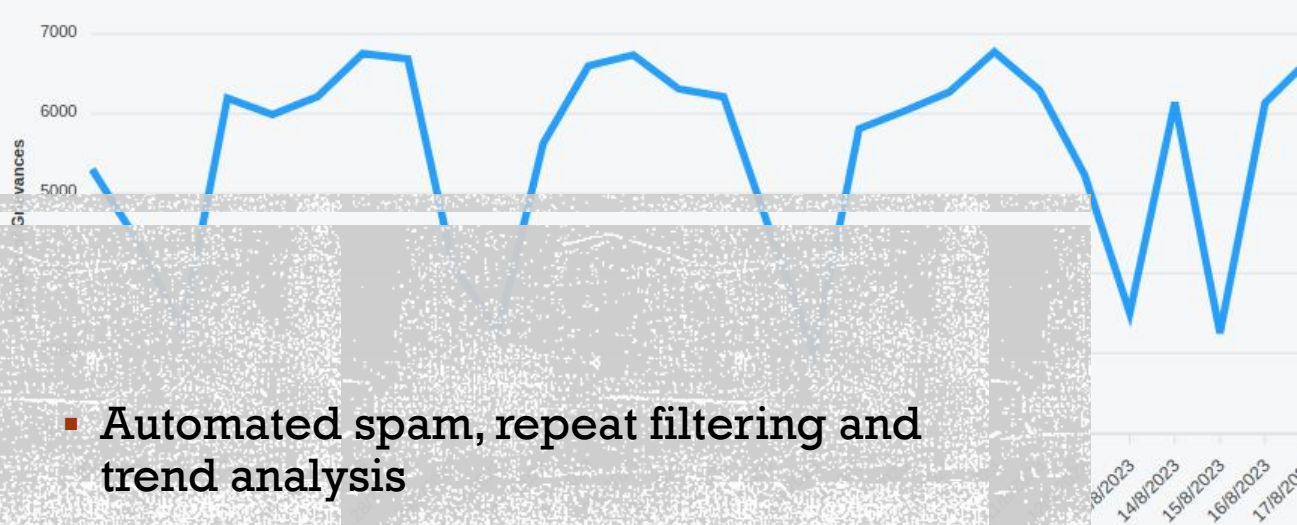
To

21/08/2023

Top 20-States / UT's Grievances



Daily Grievances

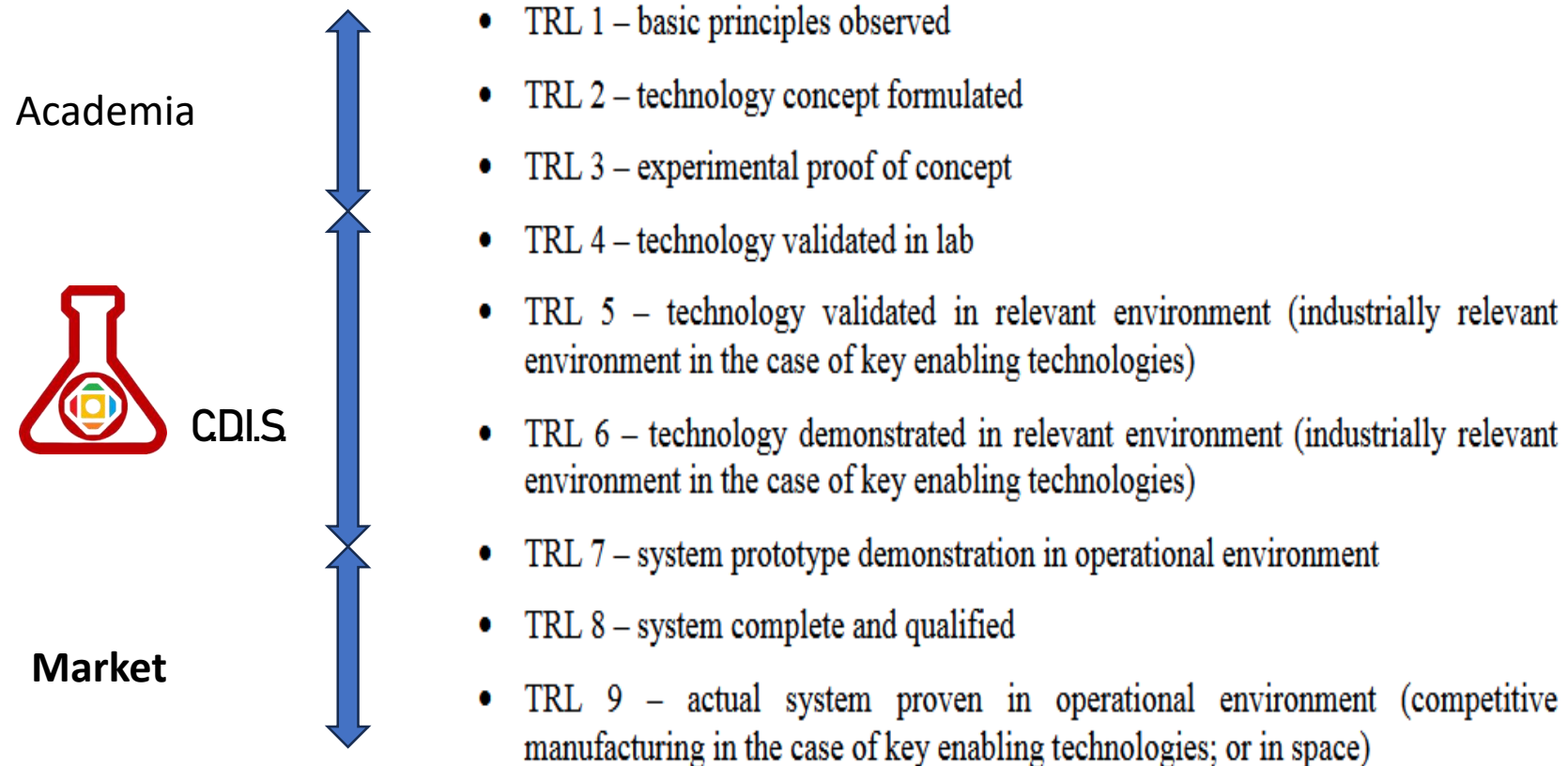


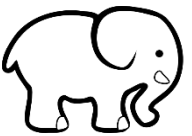
IGMS 2.0

- Automated spam, repeat filtering and trend analysis



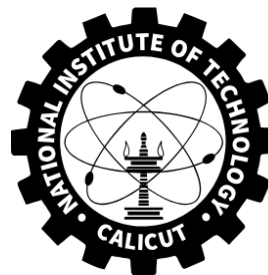
Center for Developing Intelligent Systems





Airawat IITK Consortium – Ministry's AI CoE

Artificial Intelligence
for Robust
Analysis, WArnings
and Treatments



IIT Gandhinagar

Financial Support



KOTAK SCHOOL OF SUSTAINABILITY
Indian Institute of Technology Kanpur



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वाराणसी**
अलौकिक • आध्यात्मिक • आधुनिक



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