Recharge UP with AI

AI-Manthan 2026 on 28-Jan
@ AKTU, Lucknow

PRESENTED BY: **Prof. Nitin Saxena**

DEPARTMENT: Dean, Wadhwani School of AI & Intelligent Systems ;
Coordinator, CDIS ;
N.Rama.Rao.Chair Professor, CSE

AI Tutor: One-on-one tutoring for K-12 students

AI Tutor

Practice Mode Active

My Answer:
My Answer: Accordin to kepler's first law orbit of each planets follow in form of ellipse

Reference Answer

According to Kepler's first law, the shape of the orbit that planets follow is an ellipse. An ellipse is like a stretched-out circle, and the Sun is located at one of the two special points called "foci" inside the ellipse.

Analysis Report

How Did You Do?

Your Answer Is: Right

What You Did Well:

You correctly identified that according to Kepler's first law, the orbit of each planet is in the form of an ellipse. Great job!

Scale: 144%

2 / 17

128

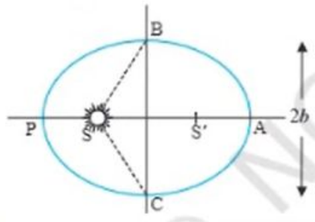
proposed a definitive model in which the planets moved in circles around a fixed central sun. His theory was discredited by the church, but notable amongst its supporters was Galileo who had to face prosecution from the state for his beliefs.

It was around the same time as Galileo, a nobleman called Tycho Brahe (1546-1601) hailing from Denmark, spent his entire lifetime recording observations of the planets with the naked eye. His compiled data were analysed later by his assistant Johannes Kepler (1571-1640). He could extract from the data three elegant laws that now go by the name of Kepler's laws. These laws were known to Newton and enabled him to make a great scientific leap in proposing his universal law of gravitation.

7.2 KEPLER'S LAWS

The three laws of Kepler can be stated as follows:

1. Law of orbits : All planets move in elliptical orbits with the Sun situated at one of the foci



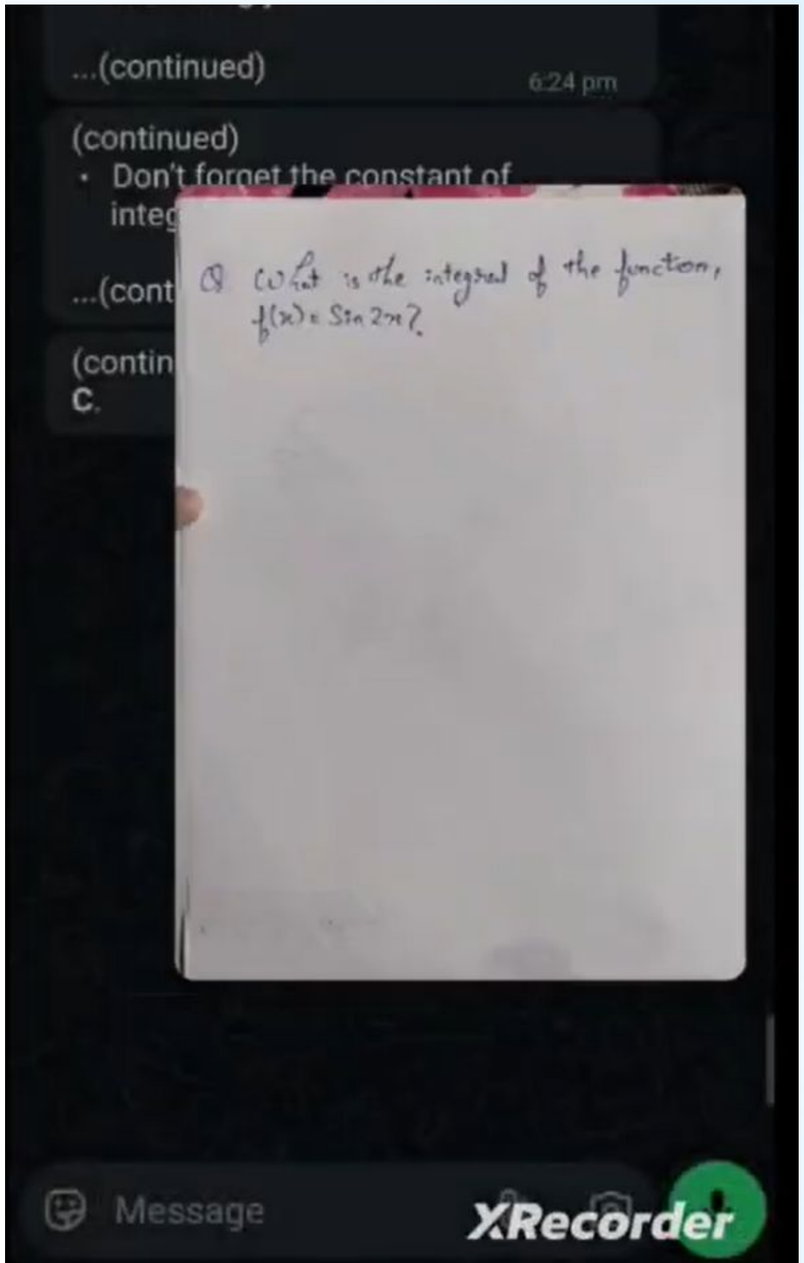
of the ellipse (Fig. 7.1a). This law deviation from the Copernican mode allowed only circular orbits. The ell which the circle is a special case, is a curve which can be drawn very sir follows.

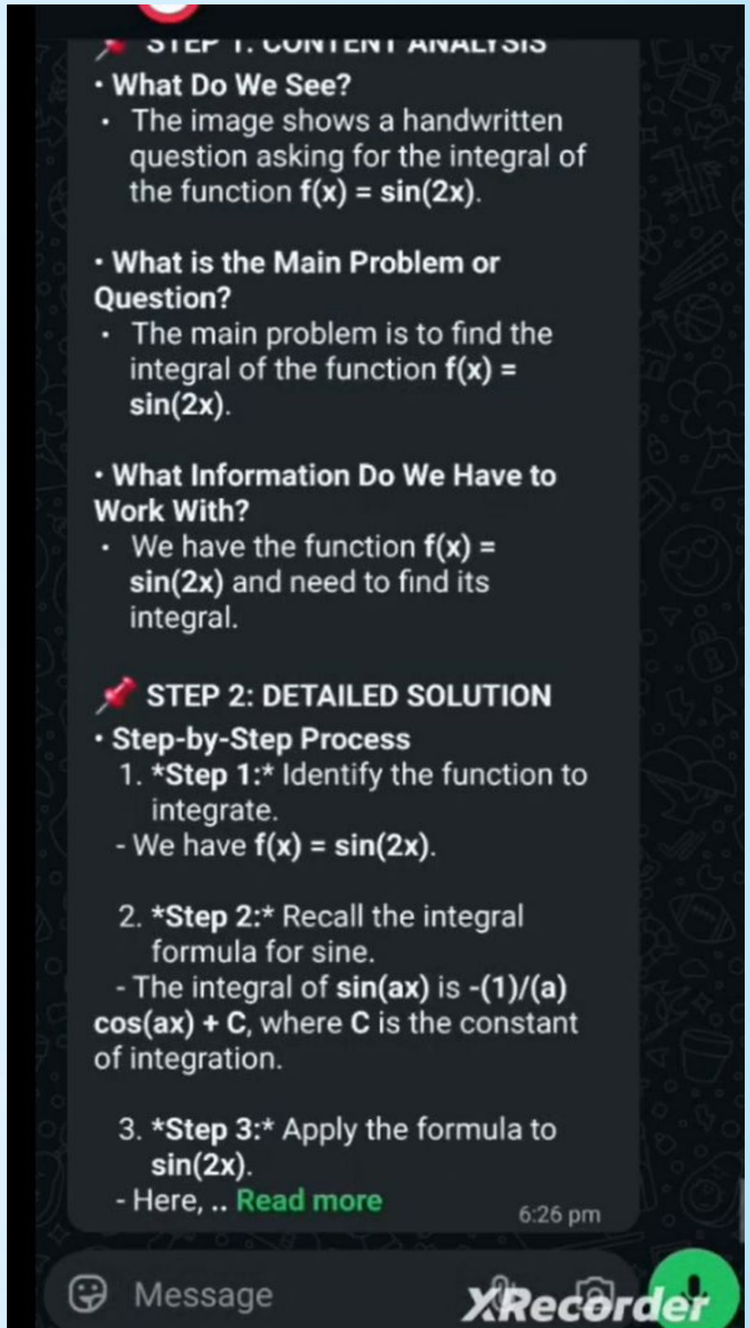
Select two points F_1 and F_2. Take a of a string and fix its ends at F_1 an pins. With the tip of a pencil stretch th taut and then draw a curve by mov pencil keeping the string taut through 7.1(b)) The closed curve you get is ca ellipse. Clearly for any point T on the the sum of the distances from F_1 and constant. F_1, F_2 are called the foci. points F_1 and F_2 and extend the intersect the ellipse at points P and A a in Fig. 7.1(b). The midpoint of the lir the centre of the ellipse O and the leng AO is called the semi-major axis of the For a circle, the two foci merge into c the semi-major axis becomes the radiu circle.

2. Law of areas : The line that joins an to the sun sweeps equal areas in intervals of time (Fig. 7.2). This law con the observations that planets appear slower when they are farther from than when they are nearer.

Source Pages: 2 13 11 3

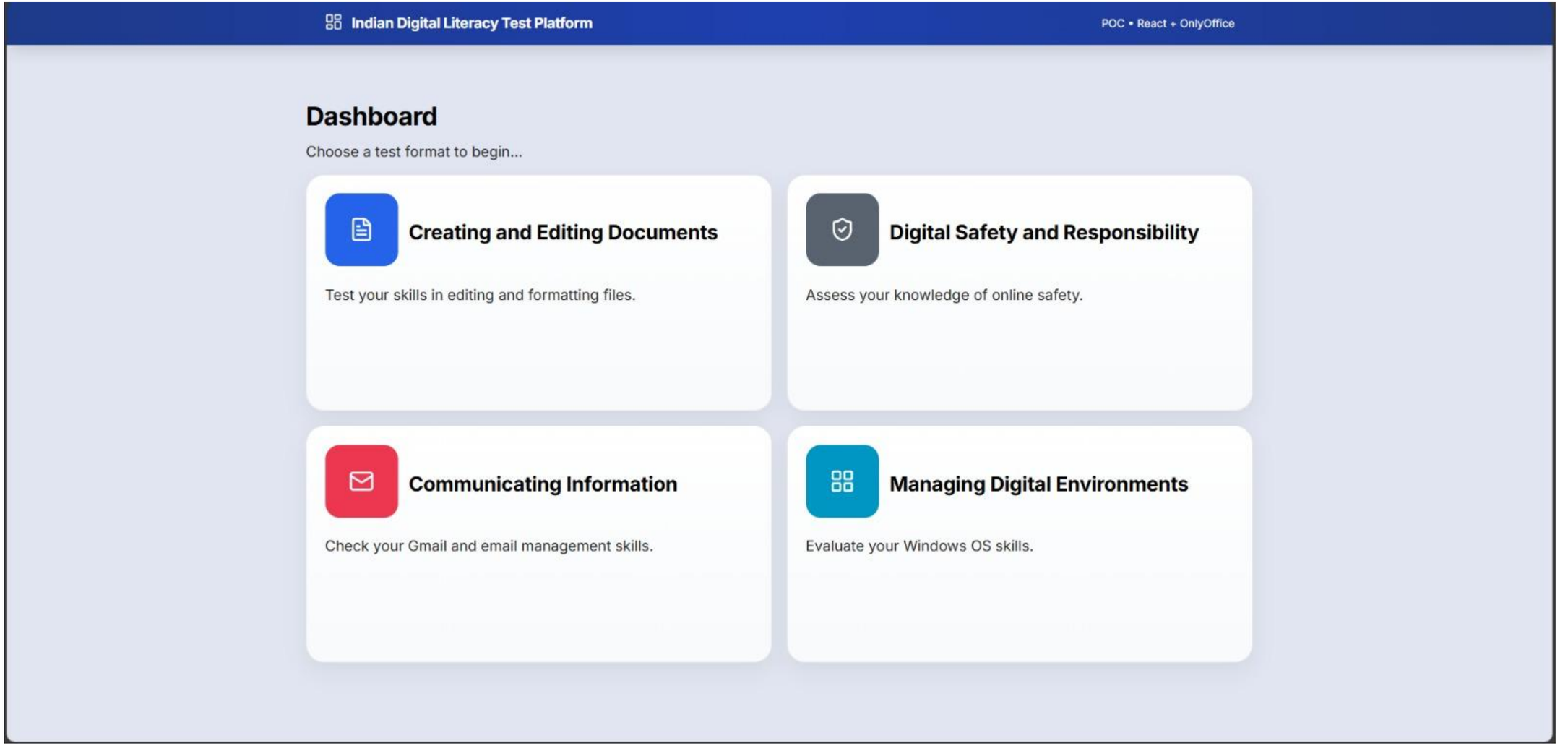
AI Tutor: Accessibility for parents and students via Whatsapp

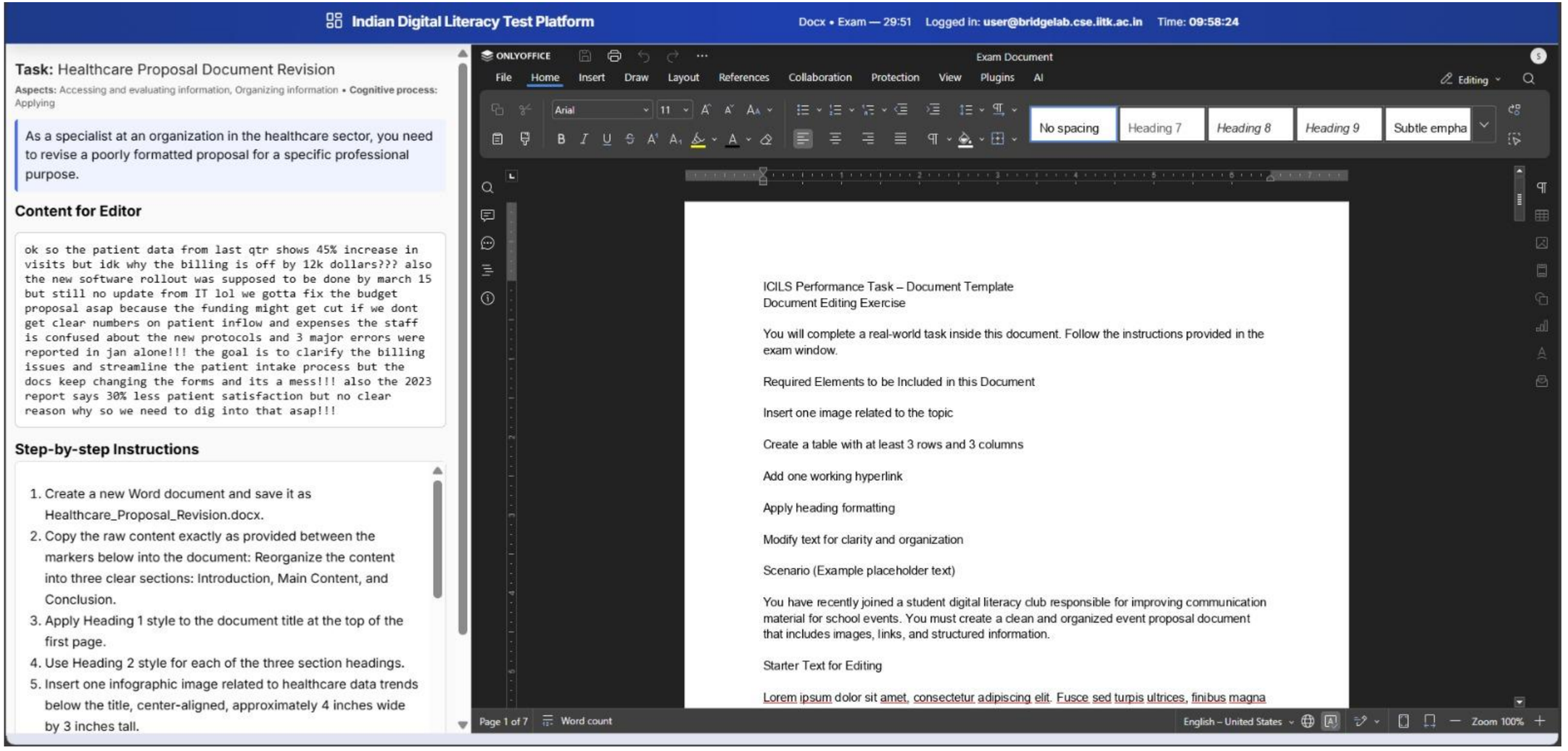




AI-based Testing: Digital Skills Assessment

- Skills = ability to **“do stuff”**
- NEP → importance of “digital skills”,
  no curriculum or assessment in India
- We are developing India’s first:
  - Digital skills curriculum & assessment framework
  - Web-based, AI-powered platform for assessing digital skills (ability to “do stuff”)
  - Practice sessions with detailed feedback available for learners
- Will be piloted with K-12 teachers starting March


Indian Digital Literacy Test Platform
POC • React + OnlyOffice
Dashboard
Choose a test format to begin...
Creating and Editing Documents
Test your skills in editing and formatting files.
Digital Safety and Responsibility
Assess your knowledge of online safety.
Communicating Information
Check your Gmail and email management skills.
Managing Digital Environments
Evaluate your Windows OS skills.


Indian Digital Literacy Test Platform
Docx • Exam — 29:51
Logged in: user@bridgelab.cse.iitk.ac.in
Time: 09:58:24
Task: Healthcare Proposal Document Revision
Aspects: Accessing and evaluating information, Organizing information • Cognitive process: Applying
As a specialist at an organization in the healthcare sector, you need to revise a poorly formatted proposal for a specific professional purpose.
Content for Editor
ok so the patient data from last qtr shows 45% increase in visits but idk why the billing is off by 12k dollars??? also the new software rollout was supposed to be done by march 15 but still no update from IT lol we gotta fix the budget proposal asap because the funding might get cut if we dont get clear numbers on patient inflow and expenses the staff is confused about the new protocols and 3 major errors were reported in jan alone!!! the goal is to clarify the billing issues and streamline the patient intake process but the docs keep changing the forms and its a mess!!! also the 2023 report says 30% less patient satisfaction but no clear reason why so we need to dig into that asap!!!
Step-by-step Instructions
1. Create a new Word document and save it as Healthcare_Proposal_Revision.docx.
2. Copy the raw content exactly as provided between the markers below into the document: Reorganize the content into three clear sections: Introduction, Main Content, and Conclusion.
3. Apply Heading 1 style to the document title at the top of the first page.
4. Use Heading 2 style for each of the three section headings.
5. Insert one infographic image related to healthcare data trends below the title, center-aligned, approximately 4 inches wide by 3 inches tall.
ONLYOFFICE
Exam Document
File
Home
Insert
Draw
Layout
References
Collaboration
Protection
View
Plugins
AI
Editing
Arial
11
No spacing
Heading 7
Heading 8
Heading 9
Subtle empha
ICILS Performance Task – Document Template
Document Editing Exercise
You will complete a real-world task inside this document. Follow the instructions provided in the exam window.
Required Elements to be Included in this Document
Insert one image related to the topic
Create a table with at least 3 rows and 3 columns
Add one working hyperlink
Apply heading formatting
Modify text for clarity and organization
Scenario (Example placeholder text)
You have recently joined a student digital literacy club responsible for improving communication material for school events. You must create a clean and organized event proposal document that includes images, links, and structured information.
Starter Text for Editing
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce sed turpis ultrices, finibus magna
Page 1 of 7
Word count
English – United States
Zoom 100%

Evaluation Result

Total Score: **55/100**

Rule-based Evaluation

- **image_insertion**: passed — Score: 10
- **table_creation**: passed — Score: 15
- **hyperlink_functionality**: failed — Score: 0
- **heading_application**: passed — Score: 10
- **text_formatting**: passed — Score: 5
- **content_organization**: passed — Score: 15
- **professional_elements**: failed — Score: 0

Download Evaluation Report

Project: IGMS/ Grievance Systems

Objectives

- One of the first deployments of AI in the Indian Government at national scale (Feb 2023)
- To speed up grievance resolution for citizens
- To show departments pain points in their processes from the citizens' viewpoint: **Root-cause anlaysis**

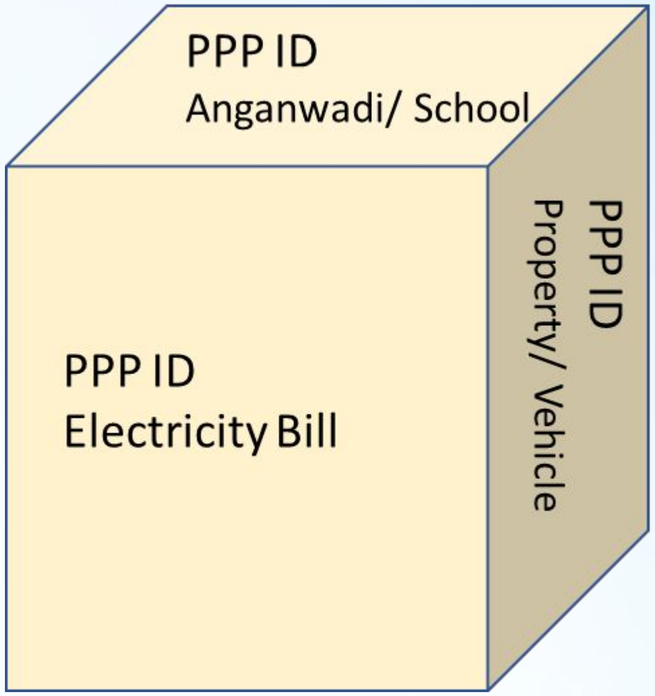
Product/solution features

- Developed an intelligent system for CPGRAMS to comprehend the natural language grievances submitted by citizens and classify, summarize and prioritize them for faster action and follow up
- **Automatic Classification**: Uses NLP techniques to classify public grievances based on user written context as well as information extracted from supporting PDF documents
- **Ministry Prediction**: Utilizes AI models to route public grievances to their actual department with high accuracy
- **Spatio-temporal filters**: Enables localized views and analyses of public grievances

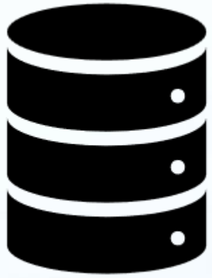
Impact

- Deployed for all central government departments since Feb 2023
- Actively used in public grievance discussions at the PMO
- **Awarded a National Award for e-Governance in 2022**
- Implemented in more than 19 Indian languages.

Project: Income/ Value assessment



Inference

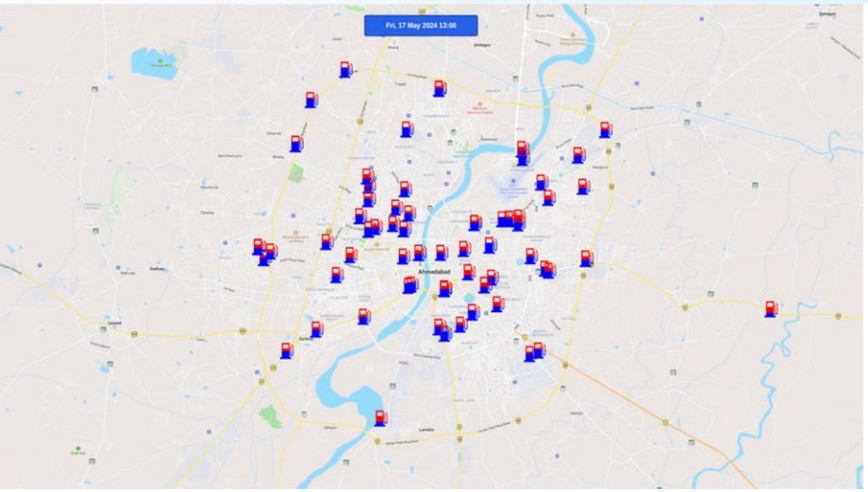


HRMS (Salary labels)

- 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

- Applicable to Property/ **Circle-rate** estimation

Project ARF: AI-COE Sustainable Cities



Objectives

- To create models for predicting energy demand, traffic demand, air quality intervention demand and public service demand
- To schedule interventions optimally

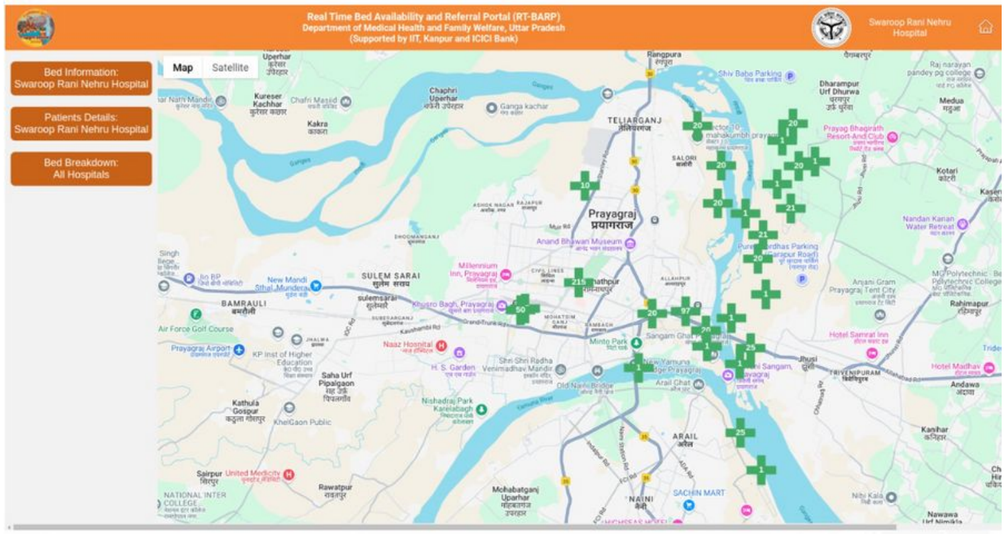
Product/solution features

- **Energy demand forecasting** with high accuracy (depending on the amount of recent data); **Predictive maintenance**
- We extract grievances related to municipal functions from CPGRAMS
- We predict traffic congestion
- We predict source apportionment for air pollution dynamically

Impact

- Approved by Ministry of Education
- IITK **won the national competition** to host the National AI CoE for Sustainable Cities
- The CoE is funded by MoE at Rs 310cr over 4 years to develop algorithmic solutions for urban sustainability problems at scale
- Wadhwani school of AI and Intelligent systems will continue to be a core implementation partner for the CoE

Project: MahaKumbh



Objectives

- To enable **efficient transfers of emergency patients** between hospitals based on medical needs.
- To streamline booking of ambulances and specific bed types while sharing patient information in advance.

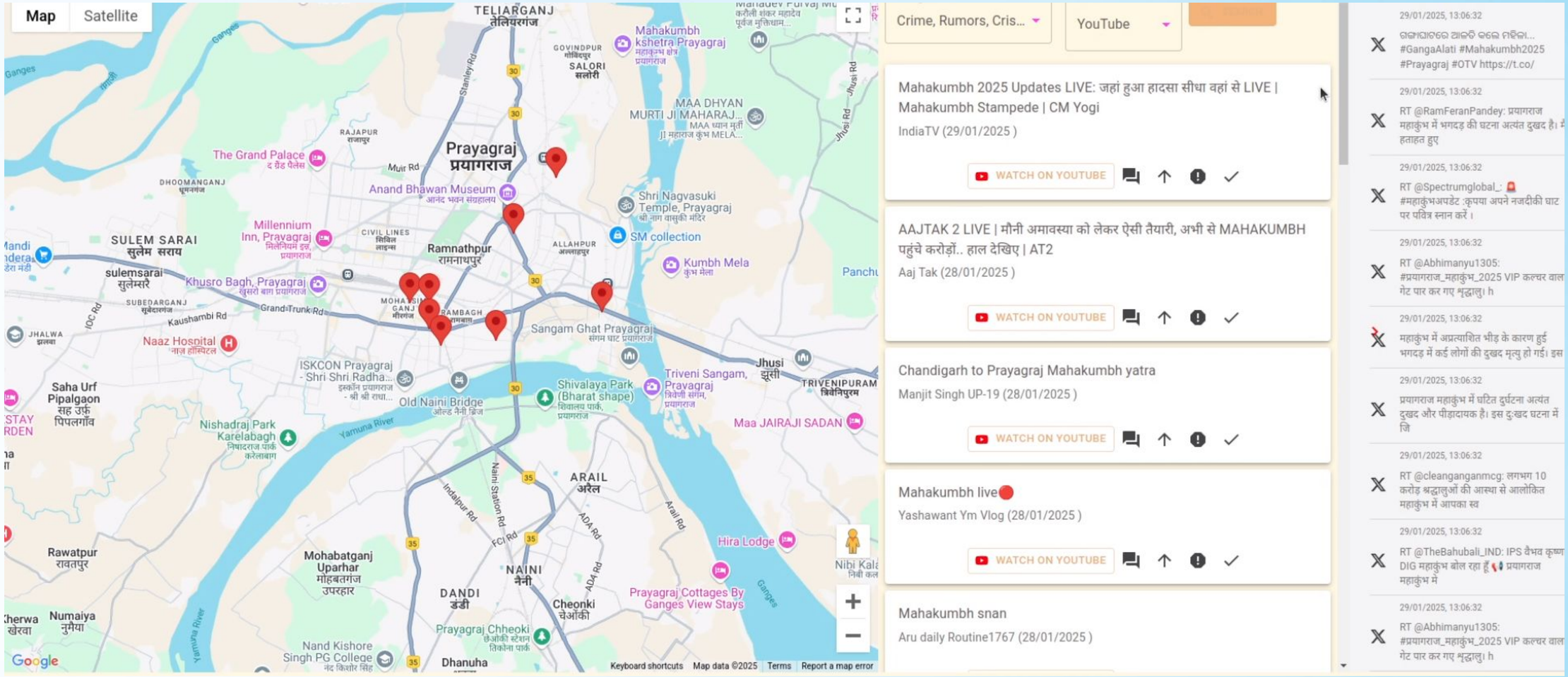
Product/solution features

- Real-time ambulance tracking using GPS for monitoring during transfers.
- Bed type booking system for reserving ICU, burn, infectious, and general beds.
- Patient information sharing through secure data transfer to prepare receiving hospitals.

Impact

- Successfully admitted 10,737 patients through the system
- Implemented across 10 first aid posts, 13 sector hospitals, and 5 major government hospitals in the Kumbh area.
- Slated for statewide rollout as the referral system for all state hospitals

Project: MahaKumbh Social-media analytics



Project: UP Digital Health Stack

Objectives

- To make UP's current healthcare delivery system more efficient, by **increasing utilization of PHCs and CHCs**
- To increase desirability of DHCs and THCs

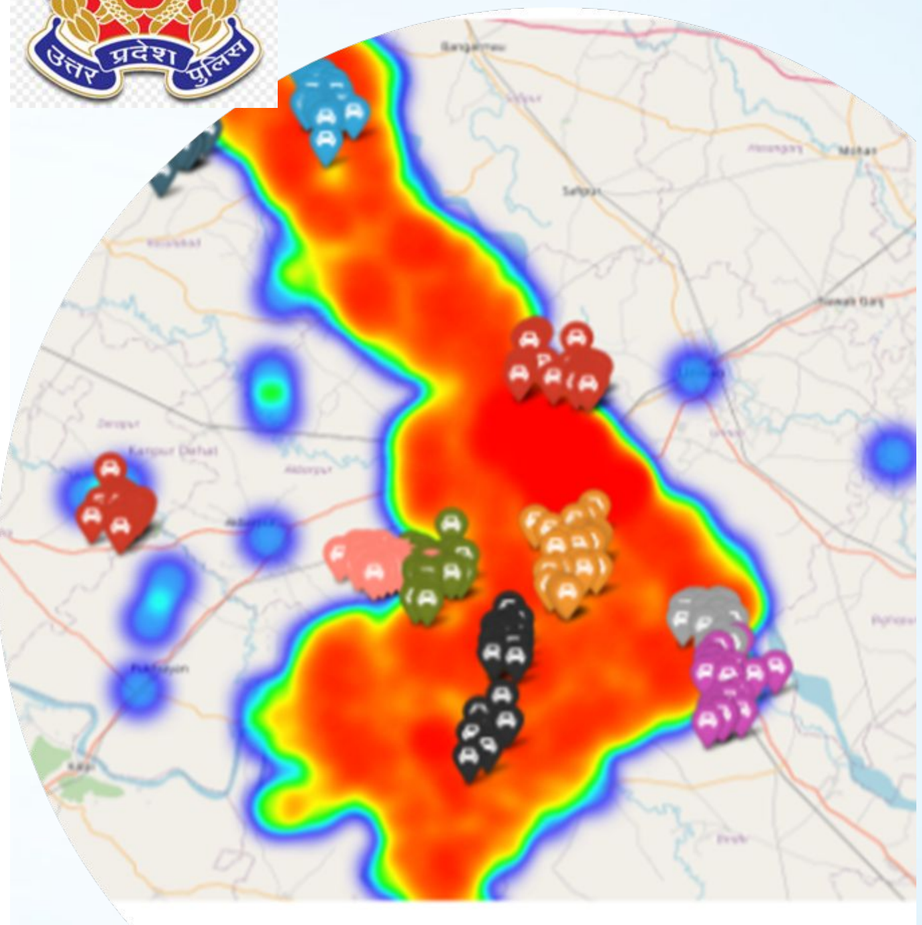
Product/solution features

- **AI based diagnostics**
- **Geospatial inference**
- **AI DPGs**: A new design for AI DPGs (including HIE) for nationwide adoption, approved by NHA
- App-OPD and grievance system to make doctors accessible
- POC-telemedicine and EHR make patients accessible
- **Auto-escalation to next center, non-repudiable record of absence**
- **Complete patient records**
- **Chatbot**: Users can input their symptoms into the chatbot and receive a list of potential diseases ranked by probability, powered by advanced algorithms

Impact

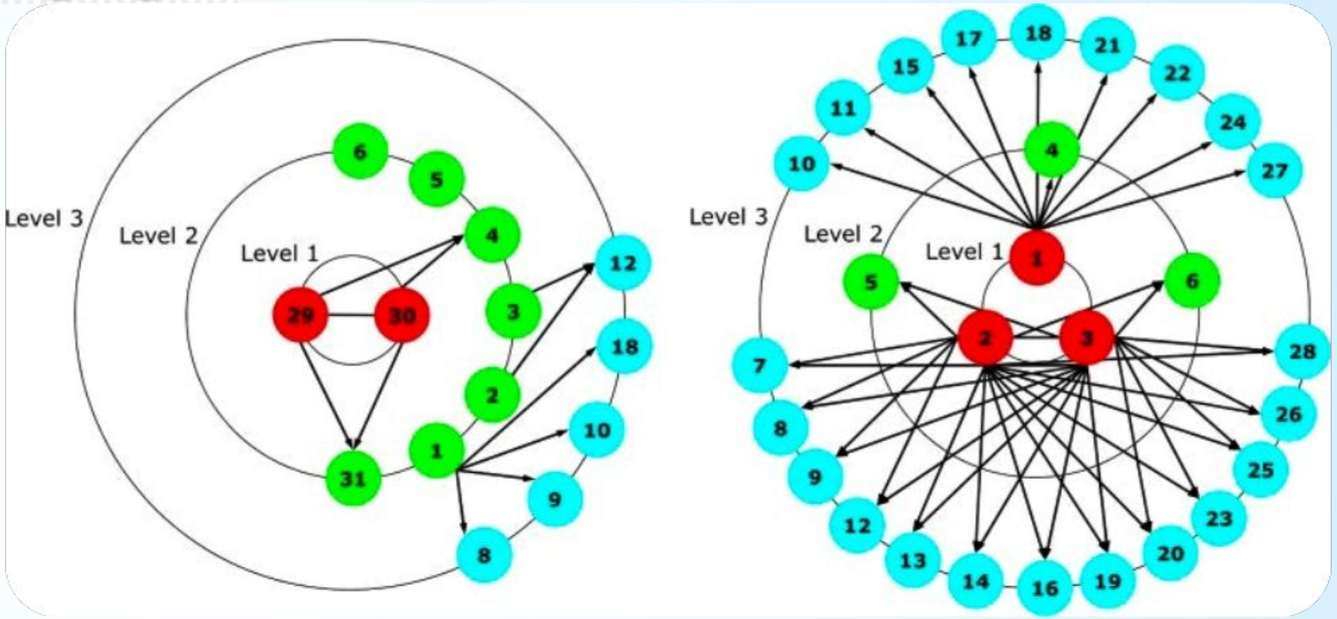
- Intended to be a 360 degree revamp of digital health infrastructure for UP
- Received CSR funding of INR 36Cr

Project: 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!

Project: 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.

Project: NHA

EY

national health authority
सत्यमेव जयते

Objectives

- To **identify instances of fraud and abuse** in the PMJAY health insurance scheme

Product/solution features

- Project done for National Health Authority (NHA), being used internally by NHA since 2022
- Cross-modal information extraction from unstructured and structured data
- Image and document forgery, morphing and splicing detection algorithms
- Clinical and statistical anomaly detection models
- Omnibus information fusion model with interpretable fraud risk assessment outputs

Impact

- Implemented; processes over 50k claims per day
- Has saved the NHA more than Rs 150cr since launch
- **Selected as a case study at the MIT Sloan School**
- Currently being utilized by EY globally

Project: ECHS

Objectives

- To create a unified system that **consolidates multiple existing systems into one streamlined solution**
- To automate **scrutiny of claims** that are typically not manually checked

Product/solution features

- Implementation of Optical Character Recognition (OCR) technology to accurately read and extract critical information from documents
- Automatic categorization and segregation of claims based on the claim amount, with controlled access depending on user role and privileges
- Advanced fraud detection algorithms to identify suspicious patterns and prevent fraudulent claims based on various predefined criteria, such as historical data and claim anomalies

Impact

- ECHS serves over 66 lakh cardholders, with 17 lakh of them being primary beneficiaries; thousands of empaneled hospitals are also part of ECHS, and this system simplifies the entire process
- The massive volume of claims means only a small percentage are manually checked, limiting fraud detection. The new system ensures every claim is automatically verified, reducing the risk of overlooked errors.

Project: Facial Recognition

NATIONAL TESTING AGENCY
Excellence in Assessment

EY
Building a better working world

Objectives

- To hasten the **identification of errors on admit cards**
- Prevent impersonation at exam centers

Product/solution features

- Developed a scalable and intelligent facial recognition system for National Testing Agency (NTA) to process lower image qualities at the time of application submission as well as exam centre entry
- Image verification during admit card registration using AI scripts to detect potential impersonation
- Facial recognition app for verification agents at exam centers, powered by state-of-the-art AI model

Impact

- Significant impact due to the large number of candidates appearing for various exams at different levels (local, district, state, and national)
- For example, JEE (Joint Entrance Examination) has over 1.4 million candidates each year.
- Implemented; has the potential to be scaled across most, if not all, exams and levels.

Project: Anomaly detection (CCTV)

Objectives

- To detect **anomalies from recorded and live camera** streams in examination environments

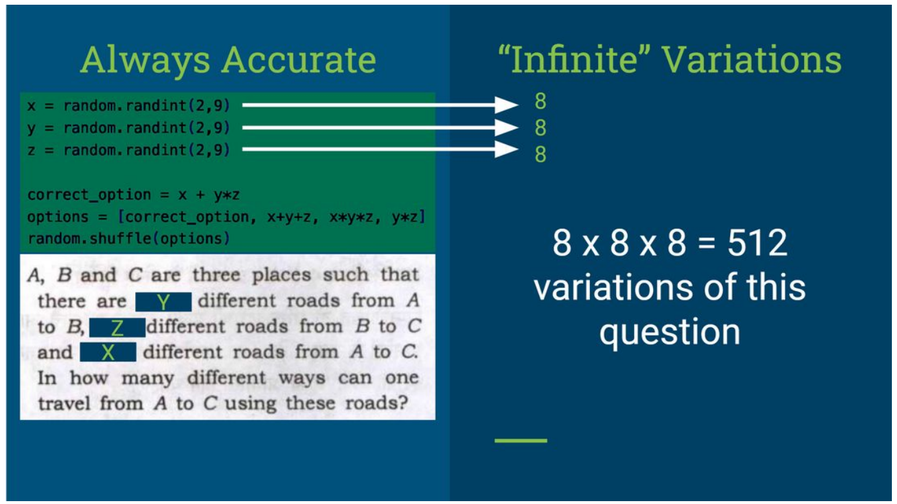
Product/solution features

- Advanced analysis of recorded CCTV footage and live streams to identify anomalies
- Automated evidence collection through screenshots of detected anomalies with detailed reporting categorized by examination center and test session
- Capacity to process multiple video streams simultaneously in real-time
- Instant alert notifications to examination centers and relevant authorities when anomalies are detected

Impact

- Currently undergoing beta testing with Ernst & Young for forensic analysis of examination environments
- Significantly reduces human resources previously required for manual video monitoring
- Streamlines the classification of functional and non-functional camera streams for prompt technical resolution

Project: UPSC Question Generator/ Retrieval-Augmented Generation (RAG)



Objectives

- To create a robust framework for generating exam questions that meet the standards expected by the UPSC
- Self-test one's understanding of a complex document, e.g. tender or manuals

Product/solution features

- Encoded problems into formal mathematical structures (equations, graphs, algorithms) to help LLMs preserve logical relationships and avoid hallucinations by explicitly mapping cause-and-effect connections
- Defined abstract structures and logical relationships before adding contextual details, so that LLMs can generate mathematically sound outputs while ensuring consistency and semantic validity
- Can generate exam papers; consists a monitoring section

Impact

- Ensures logical consistency and accuracy in UPSC exam questions, benefiting millions of aspirants who appear for the exam annually
- Reduces errors and ambiguities in question generation, leading to fairer assessments for the vast number of candidates competing each year

Project: Samar Abhilekh

Objectives

- To **preserve and declassify records**, rare books and photographs on military history
- To make this information accessible to the general public, historians, and enthusiasts.

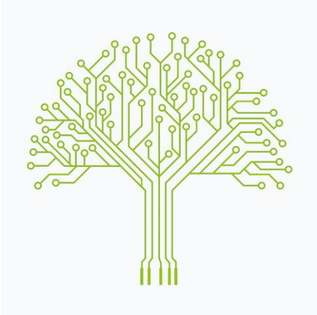
Product/solution features

- **Quick access -** Just requires logging in through OTP verification
- **Precision searching -** Users can utilize advanced search features to find specific documents, books, or photographs; can narrow down results by time period and/or category of the document through an AI-enabled search engine
- **Digital borrowing -** Users can check out and read digital copies of books and records for up to 10 hours
- **Detailed metadata -** Provides users with context and additional information
- **Frequent updates**

Impact

- Contains over 70 lakh pages of declassified records, rare books and photographs on military history
- Being accessed by smartphones of thousands of users; also used by tens of thousands of desktop users

Project: Paper2Bits



Objectives

- To go **paperless via digitizing the paper** forms

Product/solution features

- Accepts PDF/PNG
- Digitization of Forms with Masking Capability
- Automatic Digitization of Forms
- Generating Complete Language specific code
- Customize Drag and Drop Editor

Impact

- Eliminates the use of paper forms
- Now being used in IIT Kanpur; most paper forms have been digitized

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CSE & CDIS & ARF & WSAIS
IIT Kanpur

https://iitk.ac.in/cdis/

THANK YOU