

Impact of AI to Reducing Poverty and Hunger in India

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ABSTRACT

This research paper explores the application of Artificial Intelligence (AI) in addressing the social goods of poverty and hunger. Poverty and hunger are global challenges that affect millions of people worldwide, and traditional approaches to solving these issues have been insufficient. AI has the potential to offer new solutions by Analyzing data, identifying patterns, and predicting trends that can help policymakers and organizations make informed decisions. This paper reviews current literature on the use of AI in poverty and hunger reduction, highlights successful case studies, and provides recommendations for policymakers and organizations looking to implement AI solutions. The findings suggest that AI can provide valuable insights to improve the effectiveness and efficiency of poverty and hunger reduction efforts, but ethical considerations must be taken into account to ensure that the benefits of AI are distributed fairly and equitably.

Keywords — predicting trends, traditional approaches, international cooperation, National Rural, Employment Guarantee Act (NREGA), Direct Benefit Transfer (DBT), water scarcity, agricultural productivity, crop monitoring, forecasting, precision agriculture, pest detection, market forecasting, precision agriculture, machine vision, prediction models, remote sensing, pest detection, pest management, market information.

I. INTRODUCTION

The problem of poverty and hunger is a complex and pervasive issue that affects millions of people worldwide. Poverty and hunger are closely linked, with poverty being a leading cause of hunger, and hunger perpetuating poverty.

living in extreme poverty, which is defined as living on less than \$1.90 per day. Poverty and hunger are most prevalent in developing countries, where access to basic resources and services such as food, water, education, and healthcare is limited. The COVID-19 pandemic has further exacerbated the problem of poverty and hunger, pushing millions of people into extreme poverty and food insecurity. The pandemic has disrupted food supply chains, leading to food shortages and price increases, and has resulted in job losses and income reductions, making it harder for families to afford basic necessities.

Addressing poverty and hunger requires a multifaceted approach, including efforts to improve access to education and healthcare, increase job opportunities and income, and strengthen social safety nets. Efforts to improve food security should include increasing agricultural productivity, improving access to markets and finance for small-scale farmers, and promoting sustainable agricultural practices.

International cooperation and collaboration are also essential in addressing the problem of poverty and

hunger. Developed countries can provide aid and support to developing countries, and work towards creating a more equitable global economic system that benefits everyone.

II. USE OF AI TO REDUCE THE PROBLEM OF POVERTY AND HUNGER

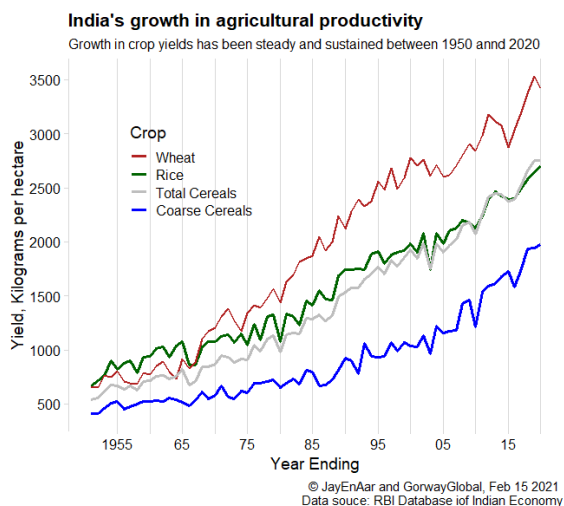
India is one of the largest and most populous countries in the world, with over 1.3 billion people living within its borders. Despite the country's significant economic growth over the past few decades, poverty

and hunger remain significant challenges for millions of Indians. The Indian government has taken several steps to reduce poverty and hunger, including the use of artificial intelligence (AI) technologies.

AI is being used in India to address poverty and hunger in various ways. For instance, AI-powered systems are used to monitor food production, identify areas that need intervention, and help farmers with crop advisories, weather forecasts, pest and disease alerts, and soil health management. Additionally, AI-based programs are being used to target vulnerable populations, such as those living below the poverty line, with health insurance and cash transfer programs.

One of the most significant government-led initiatives in India that use AI to reduce poverty and hunger is the National Rural Employment

Guarantee Act (NREGA), which provides employment opportunities to rural households. The program uses AI-powered solutions to digitize the process of job allocation, which has reduced corruption and increased transparency. Additionally, the government's Direct Benefit Transfer (DBT) program uses AI-powered solutions to identify eligible beneficiaries and transfer funds directly to their bank accounts. AI has the potential to significantly reduce poverty and hunger in various ways.



A. Improving agriculture efficiency

Agriculture is the backbone of the Indian economy, employing over 50% of the country's population and contributing significantly to its GDP. However, the agricultural sector in India faces several challenges such as declining yields, climate change, and water scarcity, which limit the potential for growth and development. The use of artificial intelligence (AI) in agriculture has the potential to address these challenges and improve productivity and efficiency in the sector.

AI is being used in agriculture to improve crop yields, reduce waste, and optimize resource usage. AI-powered systems can help farmers monitor soil moisture, nutrient levels, and crop health, allowing them to make informed decisions about when to plant, water, and fertilize crops. Additionally, AI can help farmers identify the best crop varieties to plant based on factors such as soil type, climate, and market demand. By Analyzing this data, farmers can optimize their crop selection and maximize their profits.

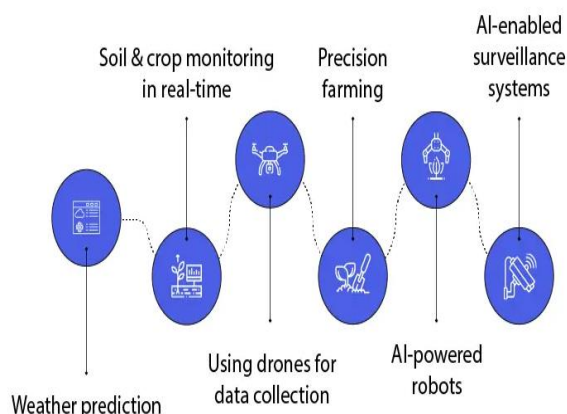
AI can also be used to detect crop diseases early, allowing farmers to take action before the disease spreads and causes significant damage. This technology can also help farmers identify the best

treatment options for their crops, reducing the use of harmful pesticides and other chemicals.

Moreover, AI can also improve efficiency in the harvesting process by automating the identification and harvesting of ripe crops. This technology can reduce the need for manual labor and increase productivity in the field.

the use of AI in agriculture has enormous potential to improve productivity, reduce waste, and protect the environment. With the help of AI, farmers in India can optimize their crop selection, improve their yields, and contribute to the country's economic growth and development.

What are the Applications of Artificial Intelligence In Agriculture?



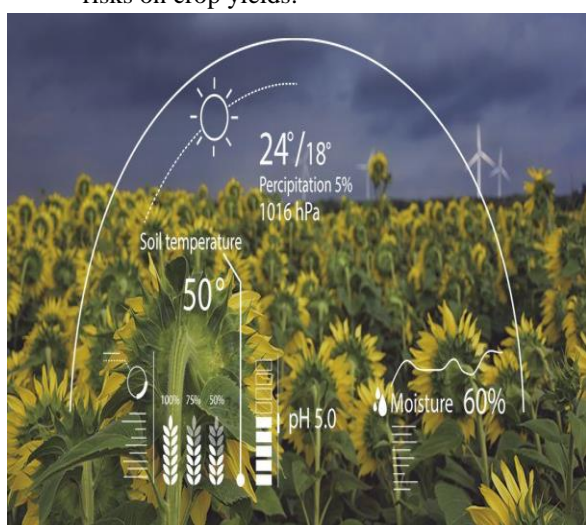
B. Crop monitoring and forecasting:

India, being an agrarian economy been actively exploring ways to leverage Artificial Intelligence (AI) to improve crop monitoring and forecasting. AI is being utilized to provide solutions to the challenges faced by the Indian agricultural sector such as predicting weather patterns, crop yields, and soil quality. The following are the ways AI is being utilized in crop monitoring and forecasting in India

- 1) Precision Agriculture:** AI is being utilized to aid farmers in optimizing crop yield by creating personalized plans based on the specific needs of their land, weather patterns, and soil quality. This is being done through predictive analytics that can detect crop diseases, monitor soil quality, and predict crop yields, enabling farmers to take corrective measures in a timely manner.
- 2) Image processing:** Satellite imagery and drone imagery are being used to gather data

on crop growth, soil moisture levels, and pest infestations. This data is then processed using AI-powered algorithms that can provide detailed insights into the current state of crops, enabling farmers to take corrective measures to prevent crop damage.

- 3) **Weather forecasting:** AI-based weather forecasting systems are being utilized to provide accurate information on weather patterns such as rainfall, temperature, and humidity. This information is critical for farmers as they can adjust their crop planning based on the weather forecast, minimizing the impact of weather-related risks on crop yields.



- 4) **Pest detection:** AI-powered pest detection systems are being developed to detect pests and diseases that can damage crops. These systems use image recognition and machine learning algorithms to identify pests and diseases, enabling farmers to take corrective measures in a timely manner.
- 5) **Market forecasting:** AI-powered market forecasting tools are being used to predict market trends, enabling farmers to make informed decisions on what crops to grow, and when to sell them for maximum profit. Some of the initiatives that have been implemented in India include the use of AI-powered chatbots for farmers, satellite imagery to monitor crop growth, and weather forecasting systems. For example, the Indian Council of Agricultural Research (ICAR) has developed an AI-powered chatbot called "Krushak" that helps farmers in Odisha by providing them with information on crop management, weather

forecasts, and market prices. Another initiative is the use of satellite imagery by the Indian Space Research Organization (ISRO) to provide information on crop growth and soil moisture levels. AI-powered systems are being used to monitor crops and predict yields. These systems analyze satellite imagery, weather data, soil moisture, and other factors to provide accurate information on crop health and yield predictions.

C. Soil testing:

Soil testing using AI in India involves leveraging artificial intelligence techniques and technologies to analyze soil samples and provide valuable insights for agricultural purposes. Here are some key aspects and applications of soil testing using AI in India:

- 1) **Soil analysis:** AI-powered soil analysis systems use machine learning algorithms to analyze soil samples and provide farmers with accurate information on soil fertility, nutrient deficiencies, and soil health. These systems can analyze multiple soil samples simultaneously, which helps to save time and resources.
- 2) **Precision agriculture:** AI-powered precision agriculture tools are being used to monitor soil health and provide real-time feedback to farmers. These tools can detect soil moisture levels, nutrient deficiencies, and other soil health indicators, enabling farmers to take corrective measures in real time.
- 3) **Machine vision:** Machine vision technology is being used to analyze images of soil samples and provide farmers with real-time information on soil health. These systems use image recognition algorithms to detect soil fertility, nutrient deficiencies, and other soil health indicators.
- 4) **Prediction models:** AI-powered prediction models are being developed to predict soil health based on weather patterns, crop rotation, and other factors. These models can help farmers plan their crop cycles, fertilizer application, and other farm activities based on soil health predictions.
- 5) **Remote sensing:** AI-powered remote sensing technologies such as satellite imagery and drone mapping are being used

to gather data on soil health indicators such as soil moisture levels, nutrient deficiencies, and pH levels. This data is then analyzed using AI-powered algorithms to provide farmers with detailed insights into their soil health. Soil testing is an essential component of farming, and AI-powered systems are being used to analyze soil samples and provide recommendations for fertilizer use, irrigation, and other factors that affect crop growth.

- 6) Image recognition:** AI-powered image recognition tools are being used to detect pests in crops. These tools analyze images of crops and identify pests based on their shape, color, and other characteristics. Automated monitoring: AI-powered monitoring systems are being used to monitor pests in real time. These systems use sensors to detect changes in crop health and send alerts to farmers when pests are detected.

D. Market information:

AI-powered systems are being used to provide farmers with real-time market information. These systems analyze market trends and provide information on prices, demand, and supply, helping farmers make informed decisions about when to sell their crops.

- 1) Price prediction:** AI-powered price prediction models are being developed to predict market prices based on historical data, weather patterns, and other factors. This information can help farmers make informed decisions about when to sell their crops and at what price.
- 2) Market analysis:** AI-powered market analysis tools are being used to analyze market trends and identify opportunities for farmers to sell their crops. These tools analyze data from various sources such as social media, news websites, and government reports.
- 3) Mobile apps:** AI-powered mobile apps are being developed to provide farmers with real-time market information. These apps use AI algorithms to analyze market trends and provide farmers with information about prices, demand, and supply.

- 4) Chatbots:** AI-powered chatbots are being used to provide farmers with instant responses to their queries about market information. These chatbots can provide farmers with information about prices, demand, and supply, and can also help them make informed decisions about selling their crops.

- 5) Big data analytics:** AI-powered big data analytics tools are being used to analyze large amounts of data about market trends and prices. This information can help farmers make informed decisions about when and where to sell their crops. In India, various initiatives have been launched to promote the use of AI in market information. For example, the Ministry of Agriculture and Farmers Welfare has launched an AI-powered mobile app called "Kisan Suvidha". This app provides farmers with real-time market information, weather updates, and other agricultural-related information.

E. Chatbots and virtual assistants:

AI-powered chatbots and virtual assistants can help farmers make informed decisions, increase productivity, and reduce costs. The following are some ways AI is being used in chatbots and virtual assistants in farming in India:

- 1) Crop management:** AI-powered chatbots and virtual assistants are being used to help farmers manage their crops by providing information on soil health, weather patterns, and crop diseases. Farmers can use this information to make informed decisions about fertilizers, pesticides, and other inputs.
- 2) Market information:** AI-powered chatbots and virtual assistants can provide farmers with market information, such as commodity prices and demand forecasts. This information can help farmers make decisions about when to sell their crops and at what price.
- 3) Advisory services:** AI-powered chatbots and virtual assistants can provide farmers with personalized advisory services, such as advice on crop selection, planting techniques, and harvesting practices. This can help farmers improve their yields and reduce costs.

- 4) **Weather alerts:** AI-powered chatbots and virtual assistants can provide farmers with real-time weather alerts and forecasts, allowing them to take proactive measures to protect their crops from weather-related risks.
- 5) **Supply chain management:** AI-powered chatbots and virtual assistants can help farmers manage their supply chain by providing information on logistics, transportation, and storage. This can help farmers reduce waste and increase efficiency in the supply chain. AI-powered chatbots and virtual assistants are being increasingly used in the farming sector in India to enhance agricultural practices and provide farmers with support and assistance. The use of AI can help farmers make informed decisions, increase productivity, and reduce costs. With continued advancements in AI, the use of chatbots and virtual assistants in farming is expected to increase in India in the coming years.

I. **2Reducing the poverty rate by using AI**

- 1) **Agricultural productivity:** The use of AI in agriculture has the potential to increase agricultural productivity and reduce poverty rates. AI-powered technologies can help farmers make informed decisions about crop management, market information, and weather patterns, leading to improved yields and reduced costs. By increasing agricultural productivity, AI can help reduce poverty rates in rural areas, where a significant proportion of the population depends on agriculture for their livelihood. AI is being used to increase agricultural productivity in India through the use of precision agriculture. Precision agriculture involves the use of AI-powered technologies, such as drones and sensors, to monitor crops and provide real-time information on soil health, water availability, and pest infestations. This information can help farmers make data-driven decisions about inputs and irrigation, leading to improved yields and reduced costs.

AI is being used to reduce poverty rates in India through the use of digital platforms that provide farmers with access to market information and advisory services. For example, the "eNAM" platform, launched by the Indian government, uses AI-powered technologies to provide farmers with information on commodity prices and market trends, helping them make informed decisions about selling their crops. Various startups and companies in India are developing AI-powered technologies specifically for smallholder farmers. For example, the startup "Intello Labs" has developed an AI-powered app that can grade and price fruits and vegetables based on their quality and market demand, providing farmers with fair prices for their produce. The use of AI in agriculture has the potential to increase agricultural productivity and reduce poverty rates in India. By providing farmers with real-time information on crop management, market trends, and weather patterns, AI-powered technologies can help farmers make informed decisions, leading to improved yields and reduced costs. With continued advancements in AI, the use of these technologies in agriculture is expected to increase in India in the coming years.

B. Financial inclusion:

A significant portion of India's population lacks access to formal banking services. AI-powered tools such as chatbots and robo-advisors can help bridge this gap by providing financial advice, facilitating digital payments, and enabling access to credit for small businesses and individuals. This can help promote financial inclusion and reduce poverty. Here are some points which elaborate the financial inclusion

- 1) **Digital Lending Platforms:** AI-powered digital lending platforms are being used to assess creditworthiness and provide loans to individuals and small businesses that do not have access to traditional banking services. This can help underserved communities invest in education, health, and business opportunities, leading to

increased income and reduced poverty rates.

- 2) **Chatbots and Virtual Assistants:** AI-powered chatbots and virtual assistants are providing personalized financial advice and support to underserved communities, helping them make informed decisions about savings, investments, and financial planning.
- 3) **Government Initiatives:** The Indian government has launched several initiatives that leverage AI to promote financial inclusion, such as the "Jan Dhan Yojana" scheme, which aims to provide access to banking services for all households in India, and the "Digital India" program, which aims to promote digital payments and reduce transaction costs for individuals and businesses.
- 4) **Financial Literacy:** AI-powered tools are being used to improve financial literacy among underserved communities, helping them understand financial products and services, and make informed decisions about their financial future.
- 5) **Reduced Transaction Costs:** AI-powered technologies are being used to reduce transaction costs for individuals and businesses, making it easier and more affordable to access financial services. This can help reduce poverty rates by providing underserved communities with access to affordable financial services.

C. Healthcare:

India has a large population that lacks access to quality healthcare services. AI-powered tools such as diagnostic algorithms and predictive analytics can help improve healthcare outcomes by enabling early detection of diseases, facilitating remote consultations, and improving the accuracy of medical diagnoses. This can help reduce healthcare costs and improve health outcomes, which can reduce poverty by reducing the financial burden of healthcare on households.

- 1) **Early Diagnosis:** AI-powered diagnostic tools are being used to detect diseases and illnesses at an early stage, which can help reduce healthcare costs and improve patient outcomes. This can be particularly

important for underserved communities that may not have access to regular healthcare services.

- 2) **Remote Healthcare:** AI-powered telemedicine platforms are being used to provide remote healthcare services to underserved communities, particularly in rural areas where access to healthcare is limited. This can help reduce healthcare costs and improve patient outcomes by providing timely access to healthcare services.
- 3) **Personalized Medicine:** AI-powered tools are being used to develop personalized treatment plans for patients, based on their individual characteristics and medical history. This can help reduce healthcare costs and improve patient outcomes by providing more effective and targeted treatments.
- 4) **Health Monitoring:** AI-powered wearable devices and monitoring systems are being used to track patient health and provide early warning signs of potential health issues. This can help reduce healthcare costs and improve patient outcomes by enabling earlier interventions and treatments.
- 5) **Drug Discovery:** AI-powered drug discovery tools are being used to accelerate the development of new drugs and treatments for diseases and illnesses. This can help reduce healthcare costs and improve patient outcomes by providing more effective and targeted treatments. Overall, the use of AI in healthcare has the potential to reduce poverty rates in India by improving access to affordable and effective healthcare services for underserved communities.

I. CONCLUSIONS

In conclusion, India is exploring various ways to use AI to reduce poverty and Hunger. By leveraging the power of AI, India can improve agricultural productivity, promote financial inclusion, improve healthcare outcomes, and create new job opportunities, which can help reduce poverty Hunger and promote economic growth.

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REFERENCES

- [1] Dr. Himanshu Aora, Kiran Ahuja, Himanshu Sharma, Kartik Goyal , Gyanendra Kumar (2021). Artificial Intelligence and Machine Learning in Game Development. Turkish Online Journal of Qualitative Inquiry (TOJQI), 12(8), 1153-1158.
- [2] P. Jha, D. Dembla and W. Dubey (2023). Comparative Analysis of Crop Diseases Detection Using Machine Learning Algorithm," 2023 Third International Conference on Artificial Intelligence and Smart Energy (ICAIS), 569-574.
- [3] Dr. Himanshu Aora, Kiran Ahuja, Himanshu Sharma, Kartik Goyal, Gyanendra Kuma, "Artificial Intelligence and Machine Learning in Game Development", Turkish Online Journal of Qualitative Inquiry (TOJQI), pp. 1153-1158, 2021.
- [4] Abhinav Agarwal, Himanshu Arora, Shilpi Mishra, Gayatri Rawat, Rishika Gupta, Nomisha Rajawat, Khushbu Agarwal, "Security and Privacy in Social Network. Sentiment Analysis and Deep Learning", Advances in Intelligent Systems and Computing 1432, pp. 569-577, 2023.
- [5] Shweta Pachauri, Deeksha Sharma, Dr. Rahul Misra (2022). Role of Computer Education in Indian Schools. International Journal of Recent Research and Review, XV(3), 15-18.
- [6] H. Arora, M. Kumar, T. Rasool and P. Panchal, "Facial and Emotional Identification using Artificial Intelligence", 2022 6th International Conference on Trends in Electronics and Informatics (ICOEI), pp. 1025-1030, 2022.
- [7] A. Dhoka, S. Pachauri, C. Nigam and S. Chouhan, "Machine Learning and Speech Analysis Framework for Protecting Children against Harmful Online Content", IEEE 2023 Second International Conference on Electronics and Renewable Systems (ICEARS), pp. 1420-1424, 2023.
- [8] Rahul Misra, Dr. Ramkrishan Sahay, "Evaluation of Student Performance Prediction Models with TwoClass Using Data Mining Approach", International Journal of Recent Research and Review, XI(1): pp. 71-79, 2018.
- [9] Dr. Himanshu Arora, Shilpi Mishra, Manish Dubey, "Development of the Framework for the Solution of the Security Problems in Data Transmission Involving Advanced Asymmetric Algorithm", International Journal of Emerging Technology and Advanced Engineering 8: pp. 18-20, 2018.
- [10] Shweta Saraswat, Bright Keswani and Vrishit Sarasawat " The role of Artificial Intelligence In Healthcare: Applications and Challenges after COVID-19" IJTRS Apr. 2023
- [11] Shweta Saraswat, Bright Keswani and Vrishit Sarasawat "A Survey of Recent Studies Investigating the potential of Deep Learning Algorithms for Identifying and Categorizing Breast Cancer" IJTRS Apr. 2023.