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Automating E-Government Services with Artificial Intelligence

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Abstract

Artificial Intelligence (AI) has recently improved state-of-art results in an ever growing number of domains. Yet, there are still a number of issues that prevent its use in e-government applications, both for enhancing e-government systems and citizen interactions. In this paper, we discuss the problems with e-government systems and suggest a paradigm for automating and facilitating e-government services. Specifically, wrest outline a framework for the management of e- government information resources. The second step is to create a collection of deep learning models with the goal of automating various e-government services. Third, we suggest an intelligent e-government platform architecture that enables the creation and execution of AI e-government applications. Our overarching goal is to utilize trust worthy AI techniques in advancing the current state of e-government services in order to minimize processing times, reduce costs, and improve citizens satisfaction.

Keywords: *Artificial Intelligence(AI), state-of-art, e-government, Deep learning*

1.INTRODUCTION

Artificial intelligence (AI) has been around for a while in a variety of theoretical forms and complex systems, but it has only recently been made possible by breakthroughs in computing power and massive data to achieve spectacular outcomes in an expanding range of disciplines. For instance, AI has made significant progress in a number of fields, including computer vision [1], medical applications [2], natural language processing [3], reinforcement learning [4], and others. The ability of a computer to mimic the intelligence of human behaviour while enhancing its own performance is known as artificial intelligence (AI).

AI is not only robotics, rather an intelligent behaviour of an autonomous machine that describes the brain of the machine and not its body; it can drive a car, play a game, and perform diverse sophisticated jobs. AI is a field that sits at the nexus of a number of other fields, such as Context Awareness [7], Deep Learning [6], Natural Language Processing [3], Machine Learning [5], and Deep Learning [6].

Machine learning (ML) refers to an algorithm's capacity to gain knowledge from the past in order to develop intelligent behaviour and reach the right conclusions in a variety of situations that it has never encountered before. The process of exposing an algorithm to a huge dataset (such as the demographics of citizens) in order to anticipate future behaviour is known as training a computational model (e.g., employment rates). Supervised learning is the process of learning from historical datasets. Unlike customary Deep Learning, a branch of machine learning, has arisen to address the shortcomings of earlier ML algorithms, in contrast to regular ML methods. Deep learning can be defined as a mapping function that converts unprocessed input data (such as an image of a medical condition) into the intended output (such as a diagnosis) by minimizing a loss function using an optimization strategy like stochastic gradient descent. descent (SGD) [9]. Deep learning algorithms, inspired by the neural networks in the human brain, are built with a large number of hierarchical artificial neural networks that map the raw input data (inserted at the input layer) to the desired output (produced at the output layer) through a large number of layers (known as hidden layers), and thus the name deep learning. The hidden layers are responsible for the actual mapping process, which is a series of simple but nonlinear mathematical operations (i.e., a dot product followed by a nonlinear process). The main advantage of deep learning is that it does not require feature engineering. Despite the fact that deep learning has improved the state-of-art results in several domains, it is still evident that e-government applications face several challenges regarding adapting deep learning [10]. First, given the recent and rapid advances in the deep learning domain, it is becoming more difficult to non experts of this technology who are capable of developing efficient and reliable AI applications, especially in third world countries. Second, the development life cycle of artificial intelligence projects, especially deep learning, has brought with it new development challenges. Traditional software development focuses on meeting specific functional and non-functional requirements; in the contract, the development of deep learning focuses on the optimization of a certain metric based on a large set of parameters, which is carried out by an unsystematic search method. Third, the integration of artificial intelligence and deep learning applications into e-government services requires strong policies and measures regarding information security and privacy. However, there are still challenges that hinder the creation of concrete standards for data security and privacy, including citizen-government trust, transparency, and other technical difficulties related to developing and implementing secure systems.

1.1.Existing System:

Trust: Trust in online services is highly dependent on several factors, including citizens' trust in the government itself, the quality of online services and personal belief. Lack of experts: To implement quality web services, it is necessary to have the right team of experts covering all relevant fields of activity from web development to security and privacy.
Accessibility: Many third world countries still have serious problems with the availability of the Internet and its services.

1.2.Proposed Model:

Government can introduce new systems on the internet and people can read news and announcements about such systems and then people can write opinions about such systems and its opinion can help government in taking better decisions. In our extension model, we added another model that can detect human face emotions picture . So our extension can predict emotions from human face images. Advantages: Recognizes the correct emotion based on a person's facial image

2. Litterer Review

Before introducing our proposed approach, we discuss the current state of the e-government industry in several countries around the world. According to United Nation E-Government Survey of 2018 [20], the European Union is leading in implementing e-government applications, followed by the USA, Asia, and then Africa.This reflects the lack of infrastructure in low E-Government Development Index (EGDI) countries. Table 1 shows the country's EGDI and web services indices by region.

Europe is the leader in the development index, technical infrastructure, and online services, while Africa is located at the bottom of the table due to its poor infrastructure, communication systems, and carrier services (especially internet providing services). Table II illustrates the EGDI worldwide ranking for the Gulf Countries–the case study of our paper (i.e., United Arab Emirates, Bahrain, Saudi Arabia, Oman, Qatar, and Kuwait) in 2016 and 2018 respectively. It is evident from the table that e-government services can vary from one year to another depending on several factors, including the fact that some online services can have opposite effect on transparency and user privacy. Investing in both human resources and technical infrastructure are key roles for advancing the development, implementation, and efficiency of e-government systems and services.

Most countries have become aware of the importance of the impact of e-governance; and therefore those countries began to invest more resources - both human and financial - in improving e-government applications. Such countries moved from low-EGDI to medium-EGDI. Other countries moved from high-EGDI to very-high-EGDI. Figure 2 illustrates some of the services that e-government provides based on geographical region, showing the improvement of e-government services between the years 2014 and 2018 [10] . According to the Arab Digital Technology Development Report (2019) [21], Gulf countries have paid particular attention to the integration of artificial intelligence in their e-government services and infrastructures.

In addition, they aim to employ AI to assist policymakers to measure the level of digitization and sophistication in delivering e-government services to citizens. Gulf Countries are leading many advanced projects for developing and applying e-government infrastructures, platforms, and services. Neom [22]–a mega, high-tech, AI city being built in Saudi Arabia–is a good example of the AI-infused projects and advancements towards cutting-edge. Government systems and infrastructures. It’s important to mention here that the underlying back- ground and cultural

believes of the citizens of these countries may also play a critical role in accepting the automated e- government services, especially services that may require transmitting sensitive information and include face recognition techniques. Recently, Saudi Arabia has announced the formulation of an AI government agency.

In this concept to automate government services with Artificial Intelligence technology such as Deep Learning algorithm called Convolution Neural Networks (CNN). Government can introduce new schemes on internet and peoples can read news and notifications of such schemes and then peoples can write opinion about such schemes and these opinions can help government in taking better decisions. To detect public opinions about schemes automatically we need to have software like human brains which can easily understand the opinion which peoples are writing is in favors of positive or negative. To build such automated opinion detection in this chapter we are suggesting to build CNN model which can work like human brains. This CNN model can be generated for any services and we can make it to work like automated decision making without any human interactions. To suggest this technique author already describing concept to implement multiple models in which one model can detect or recognize human hand written digits and second model can detect sentiment from text sentences which can be given by human about government schemes. In our extension model we added another model which can detect sentiment from person face image. Person face expressions can describe sentiments better than words or sentences. So our extension work can predict sentiments from person face images.

3.METHODOLOGY

In this concept to automate government services with Artificial Intelligence technology such as Deep Learning algorithm called Convolution Neural Networks (CNN). Government can introduce new schemes on internet and peoples can read news and notifications of such schemes and then peoples can write opinion about such schemes and these opinions can help government in taking better decisions. To detect public opinions about schemes automatically we need to have software like human brains which can easily understand the opinion which peoples are writing is in favor of positive or negative. To build such automated opinion detection in this chapter we are suggesting to build CNN model which can work like human brains. This CNN model can be generated for any services and we can make it to work like automated decision making without any human interactions. To suggest this technique author already describing concept to implement multiple models in which one model can detect or recognize human hand written digits and second model can detect sentiment from text sentences which can be given by human about government schemes. In our extension model we added another model which can detect sentiment from person face image. Person face expressions can describe sentiments better than words or sentences. So our extension work can predict sentiments from personfaceimages.

3.1.Model

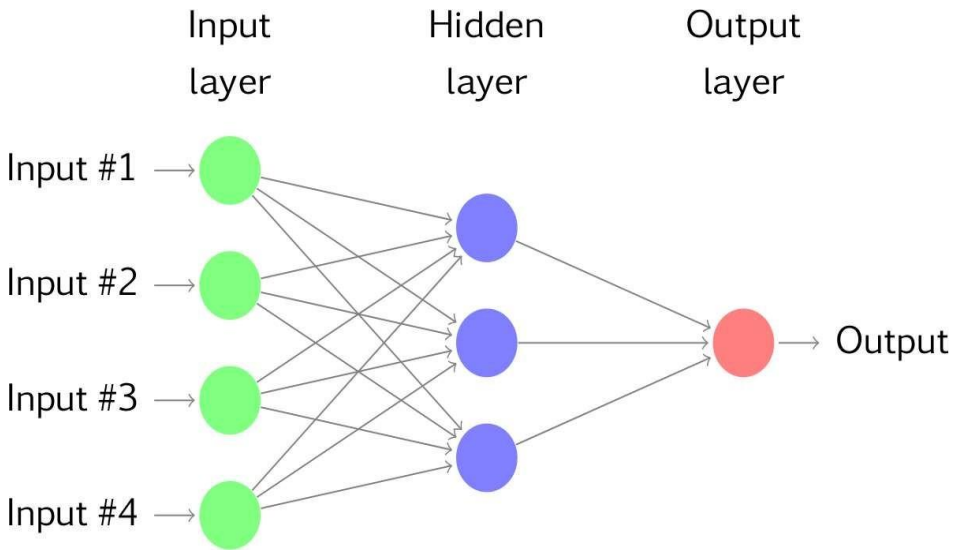
Generate Hand Written Digits Recognition Deep Learning Model: using this model we are building CNN based hand written model which take digit

image as input and then predict the name of digit. CNN model can be generated by taking two types of images called train (train images contain all possible shapes of digits human can write in all possible ways) and test (Using test images train model will be tested whether its giving better prediction accuracy). Using all train images CNN will build the training model. While building model we will extract features from train images and then build a model. During testing, we also extract features from the test image and then apply a train model to this test image to classify it. Generate Text & Image Based Sentiment Detection Deep Learning Model: using this module we will generate text and image based sentiment detection model. All possible positive and negative words will be used to generate text based sentiment model. All different types of facial expression images will be used to generate image based sentiment model. Whenever we input text or image then train model will be applied on that input to predict its sentiments. Upload Test Image & Recognize Digit: By using this module we will upload text image and apply train model to recognize digit. Write Your Opinion About Government Policies: using this module we will accept user's opinion and then save that opinion inside application to detect sentiment from opinion. View Peoples Sentiments From Opinions: using this module user can see all users opinion and their sentiments detected through CNN model. Upload Your Face Expression Photo About Government Policies: using this module user will upload his image with facial expression which indicates whether user is satisfy with this scheme or not Recognize Emotions by Facial Expression: This module allows different users to see the facial expression uploaded by previous users and the detected emotion.

3.2.CNNworkingprocedure

To demonstrate how to build a convolution neural network based image classifier, we shall build a 6 layer neural network that will identify and separate one image from other. This network that we shall build is a very small network that we can run on a CPU as well. Traditional neural networks that are very good at doing image classification have many more parameters and take a lot of time if trained on normal CPU. However, our objective is to show how to build a real-world convolution neural network using TENSORFLOW.

Neural networks are essentially mathematical models for solving an optimization problem. They consist of neurons, which are the basic computing unit of neural networks. A neuron takes an input (say x), computes it (say: multiply it by a variable w and add another variable b) to get a value (ez= wx + b). This value is passed to a non-linear function called activation function (f) to produce the final output (activation) of a neuron. There are many kinds of activation functions. One of the popular activation function is Sigmoid A neuron that uses a sigmoid function as an activation function is called a sigmoid neuron. Depending on the activation functions, neurons are named and there are many kinds of them like RELU, TanH. If you stack neurons in a single line, it's called a layer; which is the next building block of neural networks. See below image with layers



Several layers work together to predict the class of image, to achieve the best fit,and this process continues until treatment stops.

4.RESULTS:

4.1.Home Page:

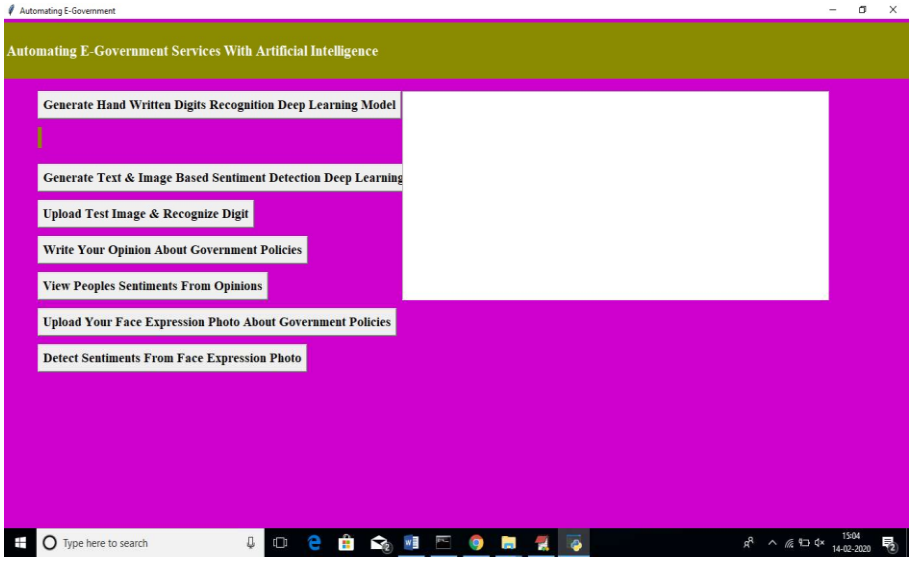


Fig 4.1

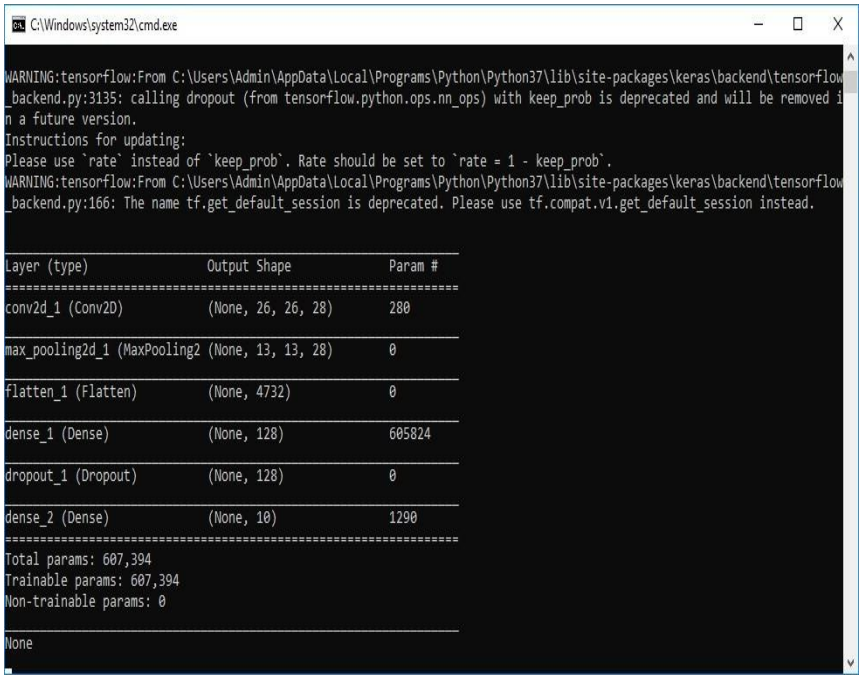


Fig 4.2

4.2.Home 1:

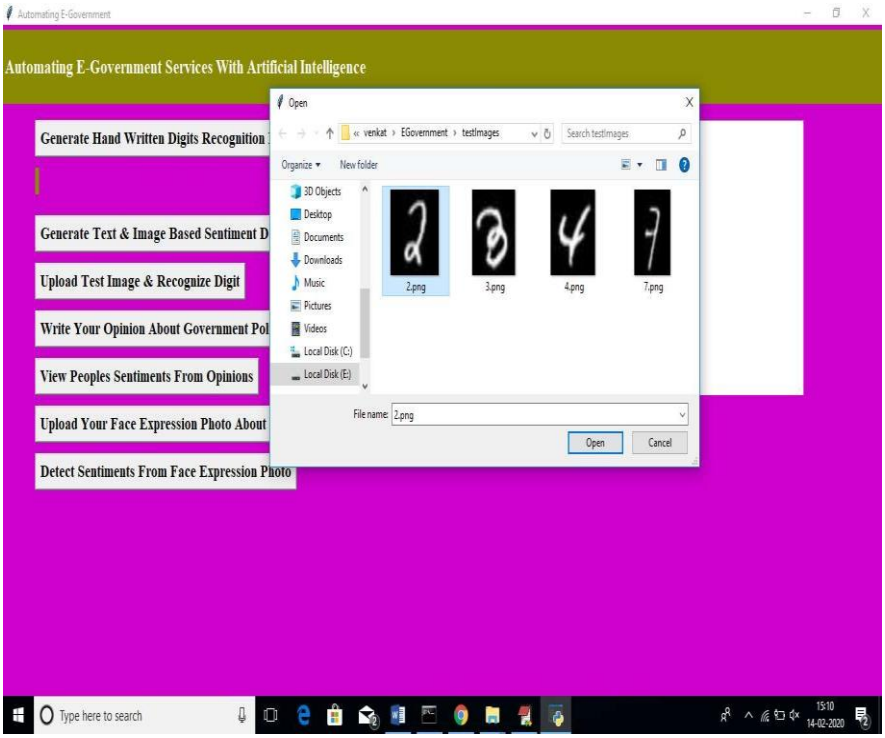


Fig 4.3

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4.3.Home 2:

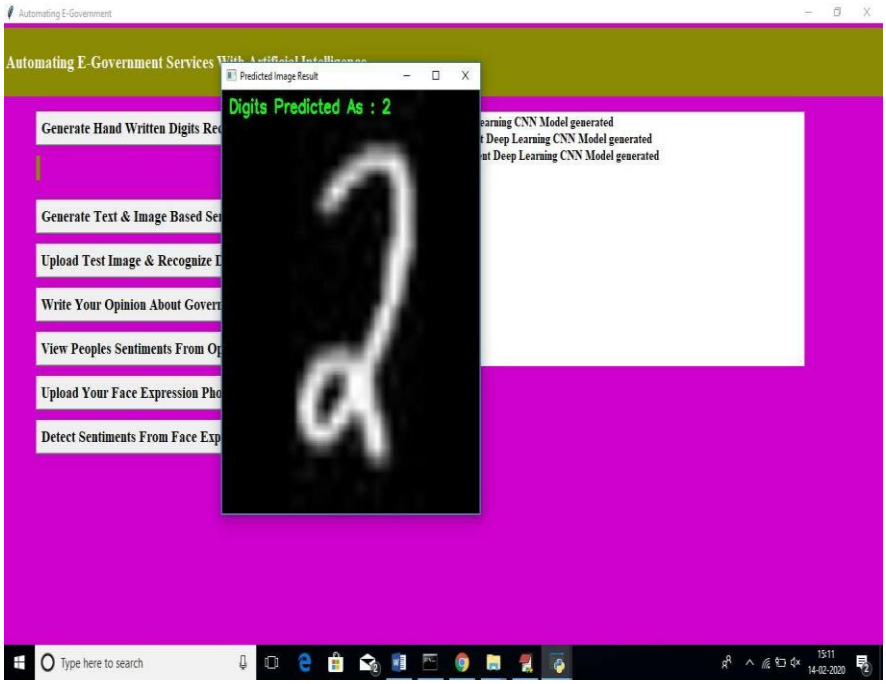

Fig 4.4

4.4.Home 3:

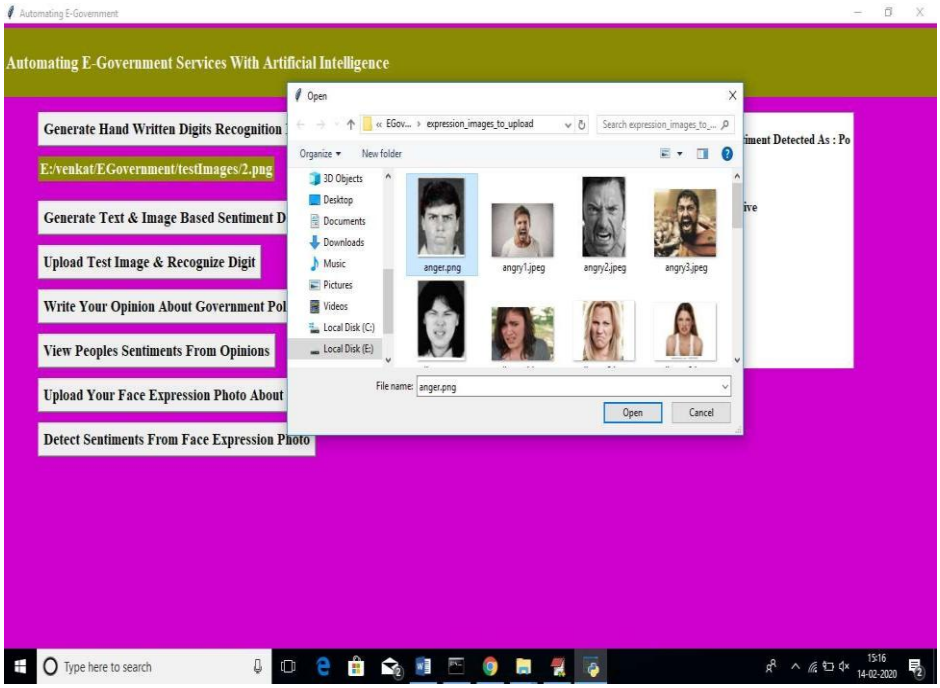

Fig 4.5

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4.5.Home 4:

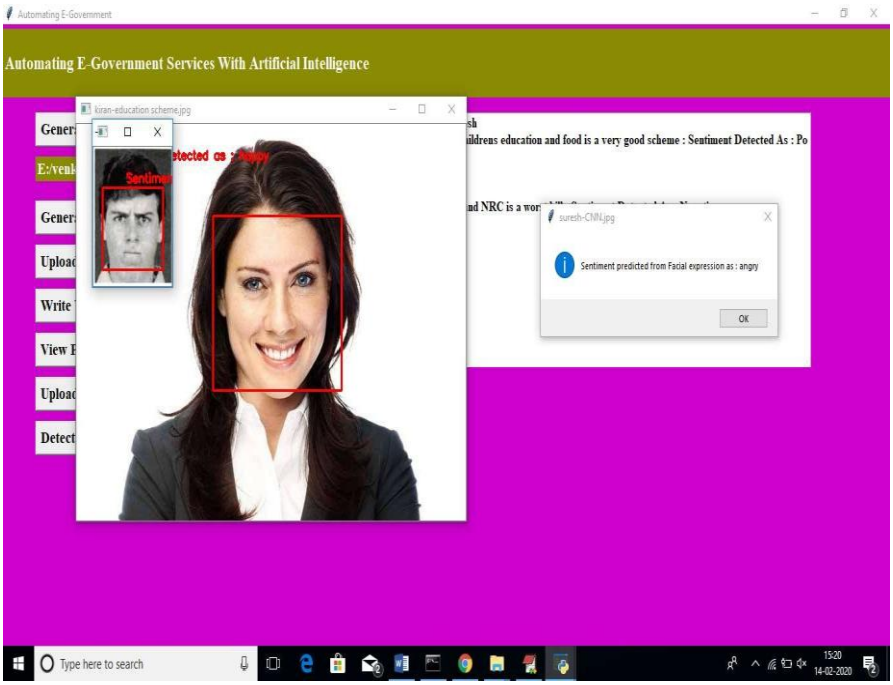

Fig 4.6

4.6.Home 5*:*

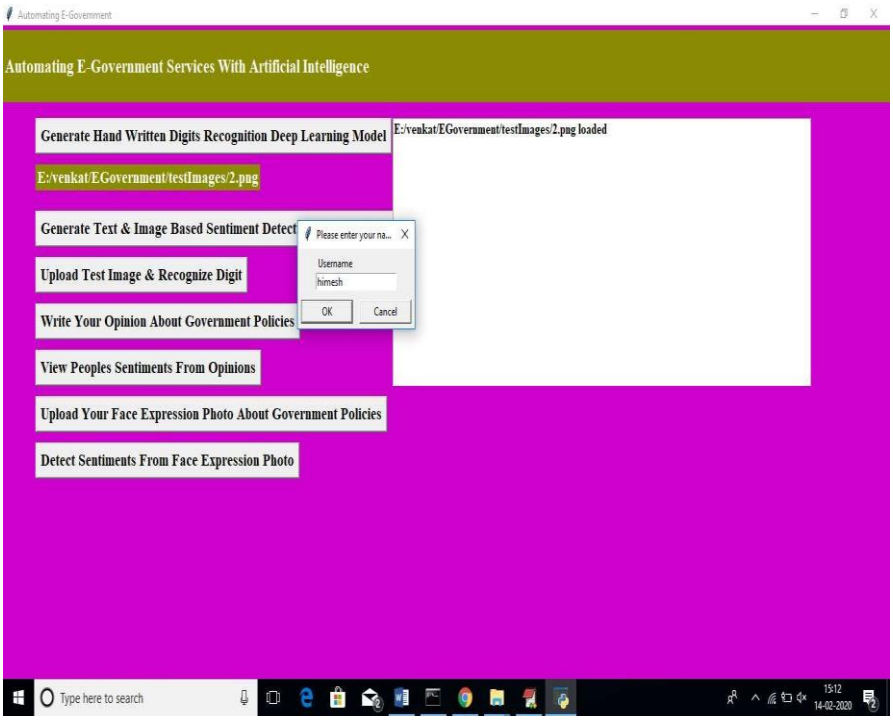

Fig 4.7

4.7.Home 6:

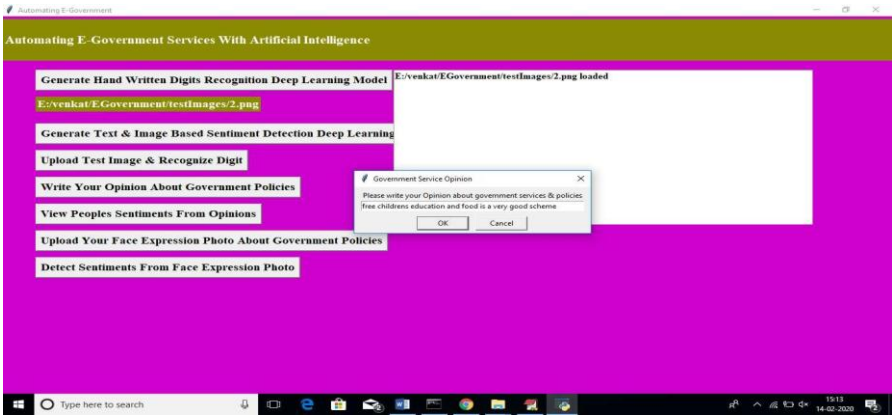

Fig 4.8

5. CONCLUSION

Many government organizations are beginning to adopt AI and deep learning technology to enhance their systems and services as a result of recent advancements in these fields. The deployment of such technologies is, however, hampered by a wide range of issues, such as a lack of specialists, computational resources, trust, and AI interpretability. In this essay, we defined artificial intelligence and e-government, examined global e-government indexes, and then offered our recommendations for improving the existing state of e-government, using the Gulf Countries as a case study. We put out a paradigm for managing government information assets that aids in managing the entire lifespan of e-government. Then, we suggested a collection of deep learning techniques that may assist with and automate a number of e-government process. The overarching goal of this paper is to introduce new frameworks and platform to integrate recent advances in AI techniques in the e-government systems and services to improve the overall trust, transparency and efficiency of e-government.

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