Journal of Science and Technology
ISSN: 2456-5660 Volume 06,Special Issue 01, August 2021,

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i04.pp06-10*

Classifying Houses suitable for Electric Vehicle Charging Point using Neural Network

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To Cite this Article

Akash Maurya, Prof. Nandini Babbar, "Classifying Houses suitable for Electric Vehicle Charging Point using Neural Network", Journal of Science and Technology, Vol. 06, Special Issue 01, August 2021, pp06-10: .

Article Info

Received: 15.07.2021 Revised: 24.07.2021 Accepted:10.08.2021 Published: 16.08.2021

Abstract: *Electric Vehicles (EVS), which appears to be the leading green transport in various countries such as the United Kingdom, it is very important for us to understand that the availability of infrastructure for electric vehicles. In such a multi-disciplinary paper, we demonstrate the workflow with the help of deep learning is to make an automated " urban research, research, research, research to identify the property that is suitable for the charging of electric vehicles. comfortable and easy. A unique open-source database of images for Google Street View (GSV) images were used for training, and to compare them with those of the three-deep neural network, and represents an attempt to distinguish between natural habitats, the availability of street-level imagery. We are going to show you with full-service delivery in the two cities, and the accuracy of 87.2% of the data, and 89.3%, respectively. In this proof-of-concept, showing that it is an exciting new way to use Deep learning in the field of remote sensing, remote sensing, urban planning, and was a significant step in this direction by exploring the use of artificial intelligence, self-confidence, and a built-in strategy guide.*

Key Word*: learning, Google Street View, electric vehicles, remote sensing.*

I. INTRODUCTION

With the design of smart devices, neural networks, and computer vision, it explains the latest methods of image separation in remote experiments, and learning techniques [1]. The Computer vision algorithms have been known to be a very powerful set of tools, mainly due to their diversity, distribution, and low cost. With the Electric Vehicle, which is used as an important kind of environmentally friendly modes of transportation in the United Kingdom, we have to address this research gap is to gain a better understanding of the existing infrastructure in the region, in order to support the acquisition of these vehicles. Battery based Electric vehicles and rechargeable Electric Vehicles will be subject to the removal of the CO2, the management, the financing of the connection of the motor vehicle in order to be available for customers in the United Kingdom.

In the UK, the government finds that access to affordable, low-cost housing, at reasonable costs, charges, options, what's important is that the increase in the availability of the jack and the vehicle. While the two sets of data, and will include the construction of characteristic features, such as the type of the structure, function, front, square, plans, etc., as a part of this information, it can be difficult to do so for a variety of reasons for this. First of all, the entrance is on the street in front of the traditional method is costly and time-consuming, and so this information is a complex one, and stay up-to-date. On the other, at the end of the 1960s, following the development of air-to-air testing, design, print, and digital technology, they have to do it through the insertion of maps on paper.

Distinguishing residential areas by using remote sensing is very difficult task. And also for classifying houses that has road in front of them which cannot be used for electric vehicle charging point is difficult in aerial remote sensing. Various map agencies such as Open Map Street, which has large amount of image data contain images of city and towns, also to calculate that the accuracy and attention of data on various scales varies from various places depending on the skills. These problem causes difficulty for various companies to obtain information about suitable houses for electric vehicles charging facilities. We overcome these challenges by introducing workflows based on in-depth research to identify appropriate EV charging homes. This workflow has five steps to solve this problem. Methods used to select, train, test, and expand two CNNs namely what is

used within this workflow are also discussed in a way. The results of CNN's performance and full workflow demonstration of both urban areas.

II. LITERATURE SURVEY

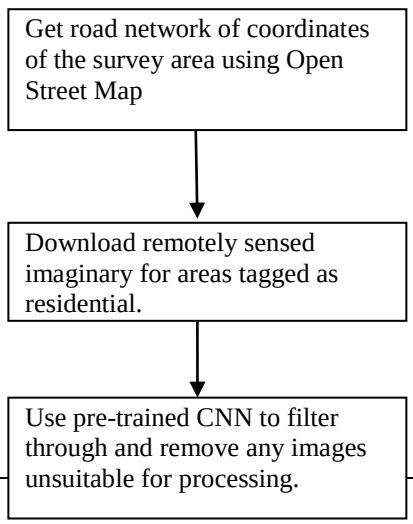
"Using Convolutional Neural Networks to Map Houses Suitable for Electric Vehicle Home Charging". Using deep learning to perform automated research of urban areas in order to identify the houses that is suitable for charging electric vehicles. A new perspective applies to Deep Learning, remote sensing, spatial analysis, planning, design and urbanism, and an important step to fully discover artificial intelligent methods to build the environment [1] . "Artificial Intelligence Image Recognition Method Based on Convolutional Neural Network Algorithm". To increase the convergence rate and accuracy, recognition of the CNN algorithm, a new convolutional neural network (CNN) algorithm is proposed, as well as various characteristics, photos, and accuracy of feature recovery, detection, recognition, and image capabilities for convolutional neural networks. [2] . "Solving Location Problem for Electric Vehicle Charging Stations-A Sharing Charging Model". In order to solve the location problem, it is necessary to find out the battery stations for public electric vehicles (PEMPS) to facilitate exchange, the charge level and optimization of existing modes to improve the restrictions on the minimum number of charging stations; and the proposed models can be used to place charging stations at home in a densely populated metropolitan area of the country. [3.] "Remote Monitoring of Electric Vehicle Charging Stations in Smart Campus Parking Lot". Implements network models for electric vehicle charging station using OPNET modeler as parking lots can be used as charging points for electric vehicles. This is remote monitoring of smart campus parking areas (consists of parking area network and campus area network). [4.]
"Intelligent Vehicle-to-Vehicle Charging Navigation for Mobile Electric Vehicles via VANET-Based Communication". Proposes a smart navigation V2V charging strategy for a wide range of mobile phones was not the case. In particular, using ad-hoc hybrid transport networks (VANETs) based on the communication paradigm. based on repeat filling models, it is provided that effectively filling in the navigation system, in order to adaptively choose the optimal route of movement, stopping places for mobile learning, is carried out through the developed Q-learning-based algorithm. A series of simulation and theoretical analysis results will be presented, demonstrating the feasibility and effectiveness of the proposed V2V charging strategy options. [5.]

"Next-Generation Smart Electric Vehicles Cyber Physical System for Charging Slots Booking in Charging Stations". Due to increase in pollution caused by burning of fuels, electric vehicles are best option to overcome this problem and decided to survey on booking of charging slot on electric vehicle charging. these studies are that the development of critical thought for the development of statistics using LTE support in order to use the usual OCPP and encourage the user to manage the model [6.]

III. METHODOLOGY

A. Convolutional Neural Network

Convolutional neural networks (CNNs) special neural networks are specifically designed to capture local data in a database. By explicitly coding that in architecture, CNN is designed to better handle image 2-D data, and in addition, 1D or 3D data. CNN is a type of feed-forward neural network in the Artificial Network. It is mainly used for the purpose of visualizing the image. Entering details on CNN are represented in the form of multidimensional arrays. Works better than large quantities of labeled data. CNN releases each part of the input image, known as the receiving field. The basic structure of the model is shown in fig 1.



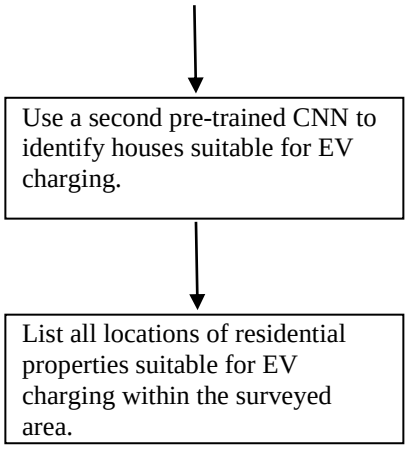


Figure 1. Workflow of Model

First dataset is used to train CNN model to divide Google Street View (GSV) images into one of four categories: car parks, trees and leaves, photos taken from inappropriate blogs, and photos of residential areas. The second dataset is used to train CNN to distinguish between images from first CNN categorized data which are suitable for electric vehicle home charging point, and those that do not. By separating the image in these two different problems we are able to use data sets that are much smaller than we are wanting to train one CNN to do all the work. More details for this the generated data sets are discussed throughout this segment. As large data set can make our model more accurate so we need to use larger dataset to train our model. The MATLAB code is used to request country-specific and image data for the area to be tested. The image data are given as input to the CNN 1, which creates image classification and removes all images except residentials properties and gives it as an output. Then all the classified images are passed as an input to CNN 2 model to create a second image a breakdown to identify which remaining images contain homes suitable for EV charging point installation. Finally, a list of all eligible EV homes is presented with a map of their locations.

B. Training and Testing of Data Acquisition

The initial data created for this paper is used to train and test CNN 1 identification photos of accommodation. The second database is used to train and test CNN 2 to distinguish between residential facilities suitable for EV charging, and those which are not suitable for EV charging. Both of these data sets are developed using the practices described in this clause, and contains only GSV image data. Separation of the number of individual images like car parks, trees and foliage, road views and residential front view. The example of dataset used for training and testing of CNN 1 are given in figure 2. In figure 2, It shows residential front views, unsuitable road views, car parks and trees and foliage. The database containing images of residentials houses with or without front spaces were collected from various cities and towns of United Kingdom as shown in Figure 3 [1] . Image data were also collected from two more cities which are used carry out a full workflow assessment, presented as various case studies. Figure 3 consists of houses which are suitable for EV charging and houses which are not suitable of EV charging. All cities and towns were chosen for their diverse history, overcrowding area, and available locations, affecting sizes, ages, and style of housing. By collecting various images in a targeted domain or area, we can create a file of various training details without the small size and therefore download the various features found in our target section. Open Street Map provides open source location information of targeted domain and was used to obtain location information for these required urban areas. In every location, described through the period and period of the rectangle, the information is dispatched in XML layout earlier than the usage of the integrated approach to extract the community hyperlinks. In all avenue community hyperlinks 4 distinct pics have been taken the usage of the Google Street View API in headings of 0, 90, 180, and 270 degrees, every picture with a length of 600 × 400 pixels [1]. The tone became continually maintained at zero degrees. This is the identical approach used to gain all education and trying out details, despite the fact that take a look at information is a way of connecting a avenue community that became included to lessen the space among one region and any other to make sure the set up of a whole avenue community. Test data collected at three locations: Oswestry, Petersfield and Birmingham. Oswestry data is used for hyper-parameter and

efficiency and network selection, while data from Petersfield and Birmingham data are used as case studies to demonstrate the use of workflow to assess the city's location suitable for EV charging [1]. Various images including houses, car parks, roads, garages and various other images of Petersfield and Birmingham are passed to model are classification.

Figure 2: CNN 1 Dataset

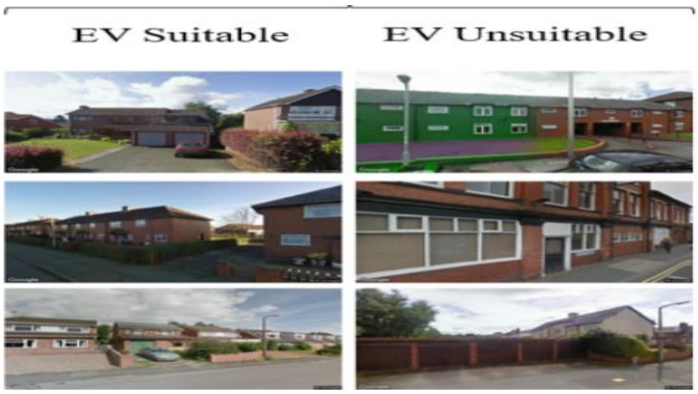


Figure 3: CNN 2 Dataset

C. Testing the full workflow

Petersfield is a rural town in Hampshire, South England with a population of about 15,450, according to the latest census data. After downloading photos on every of the 4 headings and any reproduction photos are removed, this offers price of 6433 photos with inside the Petersfield take a look at database. These pictures are then classified manually with inside the given categories. Image facts for the Petersfield take a look at houses or building having empty space of at least 30 m of all roads inside the marked boundary such as 'Residential', which ended in a complete of 2092 places. At the Petersfield take a look at web website online, CNN 1 acquired 90.7% reminiscence via way of means of picture identity of 'Residential Front Views' appropriate for consideration. Following CNN 1 step, 2851 photos had been transferred to CNN 2 for processing. CNN 2 then diagnosed 1693 photos as suitable for EV charging, achieving 88.6% reminiscence [1]. In total, the gadget detects 1355 of the 1651 photos appropriate for EV charging. Inside the Petersfield checkpoint, 132 lanes are marked with EV-suitable places charging. All the precise systems organized on a avenue community map and the roads restored via way of means of the gadget as those with greater settlements centers appropriate for set up of EV charging point.At second location, we gathered GSV records for a residential location of about four km east of the metropolis of Birmingham. A general of 28,728 hyperlinks alongside the street community downloaded, ensuing in 14,766 on this database after deleting reproduction images. These images are then labeled manually in three test stages. When the images were downloaded, they were forwarded to CNN 1 for further processing. In the Birmingham test site, CNN 1 achieved 96.3% memory when identical included images of Residential Front Views. Following CNN 1 step, 7408 images were transferred to CNN 2 for processing, of which 5376 the images are ready to charge the EV, giving a memory of 89.3%. Overall, the system detects 4617 of a total of 5306 images suitable for EV charging. All relevant EV structures listed on the road network

and road network identified by the system as the highest number of suitable accommodation Installation of EV charging point.

IV. CONCLUSION

We have proven that small-scale outside layout capabilities in metropolitan regions are probable to apply open supply facts. The machine is designed to discover and map appropriate places to price the EV with excessive ranges of accuracy. To reap this, we gift the very last novel the use of Open Street Map facts and Google Street View, processed via way of means of specific CNNs. To pick out the right shape for those tasks, the overall performance of 3 pre-skilled networks as compared to the grid test. GoogleNet has performed nicely for AlexNet and ResNet18 in each image sharing offerings accomplishing extra than 90% clarity. city regions to discover all homes appropriate for EV charging. We also can discover which roads have the best wide variety of appropriate homes. In those surveys, our tactics are being evolved in garages of pre-segmentation efforts from GSV snap shots, accomplishing nearly 90% of the facts. The paper additionally affords the primary case of the use of deep CNN to split residential and photographic lands from remote lands. Provide specific deal with details, in addition to enhance facts recuperation efficiency, its miles cautioned that destiny operations use OS facts and GIS software program while the use of those strategies on a huge scale. Another answer might be to apply on-line snap shots as a destiny database. Apart from those limitations, strategies were evolved on this regard the paper represents a primary step forward that assessments the capacity of computerized far flung sensing to check the constructed environment.

V. FUTURE SCOPE

Charging infrastructure for electric vehicles (EV) is the most important factor in order to ensure a smooth transition to e-mobility. It's going to be one smart charging, vehicle-to-grid (V2G) charging of electric vehicles, photovoltaic cells (PV), the non-contact charging is on the way, and is in charge of the case, the Smart charging of Electric vehicles is expected to increase the market penetration of EVs, renewable energy, the lower the cost, the cost, and provide you with a better usage of the network infrastructure.

REFERENCES

[1] "Using Convolutional neural network for map houses suitable for Electric Vehicle Home Charging", James Flynn, Cinzia Giannetti,2021 MDPI.
[2] "Artificial Intelligence Image Recognition Method Based on Convolutional Neural Network Algorithm" ,Youhui Tian,2020 IEEE
[3] "Solving Location Problem for Electric Vehicle Charging Stations-A Sharing Charging Model", Daqing Gong , Mincong Tang , Boruto Bucgmeister, Hankun,2019 IEEE
[4] "Remote Monitoring of Electric Vehicle Charging Stations in Smart Campus Parking Lot", Mohamed A. Ahmed, Mohamed R. El-Sharkawy, and Young-Chon Kim,2020 MPCE
[5] "Intelligent Vehicle-to-Vehicle Charging Navigation for Mobile Electric Vehicles via VANET-Based Communication", Guangyu Li, Qiang Sun, Lila Boukhatem, Jinsong Wu, (Senior Member, IEEE), And Jian Yang, IEEE020.
[6] "Next-Generation Smart Electric Vehicles Cyber Physical System for Charging Slots Booking in Charging Stations", Suresh Chavhan , (Member, IEEE), Nikhil Dubey, Abhinav Lal, Dev Khetan, Deepak Gupta, Ashish Khanna, Joel J. P. C. Rodrigues (Fellow, IEEE), And Plácido Rogerio Pinheiro (Member, IEEE), IEEE 2020.