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# Simplismart: Android Driven Home Automation System Using IOT

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**ABSTRACT:** Due to the fast improvement within the field of the Robotization industry, human life is getting to be more progressed and better in all viewpoints. Within the display situation, Mechanized frameworks are being favoured over the non-automated framework. With the fast development within the number of buyers utilizing the web over the past a long time, the Web has gotten to be an imperative portion of life, and IoT is the most current and developing web innovation. Web of things plays an imperative part in human life as well as within the instructive field since they are able to supply data and total the given assignments whereas we are active doing a few other works. In this paper, a model and execution of keen domestic mechanization with Wi-Fi innovation are demonstrated. ESP8266 is utilized as a Wi-Fi innovation. The proposed framework comprises of an equipment interface and computer program interface. Within the equipment interface, the integration of ESP8266 Wi-Fi innovation for controlling domestic apparatuses and sensors is manifested, and an application is given for controlling to different clients of domestic, with shrewd phones, tablets, and tablets. This framework is one of the finest strategies for controlling domestic gadgets with ease with numerous clients and one of the finest strategies for a vitality administration framework. The access to the total framework is given by its admin only to diverse clients. This framework is moreover expandable for controlling different apparatuses utilized at domestic additionally for the security and safety reason of the domestic through sensors as long because it exists on Wi-Fi organize scope.

**KEYWORDS:** - Internet of Things (IoT), Smart Home, Energy Management, Security, Smart Systems, Home Automation, Voice-Assistant, Customizable GUI, Home Appliances Control and monitoring, Remote Controlled, Android Smartphone, Esp. Node MCU, Network Security.

## I. INTRODUCTION

This extend presents the in general plan of Domestic Computerization Framework (HAS) with more taken a tall and remote framework. It particularly centres on the advancement of an IOT based domestic computerization framework that's able to control different components by means of web or be automatically modified to function from encompassing conditions. In this extend, we plan the improvement of a firmware for shrewd control which can effectively be computerized minimizing human interaction to preserve the judgment inside entirety electrical gadgets within the domestic. We used Node MCU, a well-known open source IOT stage, to execute the method of robotization. Diverse components of the framework will utilize diverse transmission mode that will be actualized to communicate the control of the gadgets by the user through Hub MCU to the real machine. The most control framework actualizes remote innovation to supply inaccessible get to from shrewd phone. We are employing a cloud server-based communication that would include to the common sense of the extend by empowering unhindered get to of the machines to the client independent of the separate calculate. We give an information transmission arrange to form a more grounded robotization. The framework expecting to control electrical apparatuses and gadgets in house with moderately low-cost plan, user-friendly interface and ease of establishment. The status of the machine would be accessible, in conjunction with the control on an android platform. This framework is designed to help and give support in arrange to fulfil desires of elderly and impaired in domestic. Too, the keen domestic concept within the framework makes strides the standard living at home.

## II. LITERATURE SURVEY

### 1. “Smart Energy Efficient Home Automation System using IOT”, by Satyendra K. Vishwakarma, Prashant Upadhyaya, Babita Kumari, Arun Kumar Mishra.

This paper presents a step-by-step procedure of a smart home automation controller. It uses IOT to convert home appliances to smart and intelligent devices, with the help of design control. An energy efficient system is designed that accesses the smart home remotely using IOT connectivity. The proposed system mainly requires, Node MCU as the microcontroller unit, IFTTT to interpret voice commands, Adafruit a library that supports MQTT acts as an MQTT broker and Arduino IDE to code the microcontroller. This multimodal system uses Google Assistant along with a web-based application to control the smart home. The smart home is implemented with main controller unit that is connected with the 24-hour available Wi-Fi network. To ensure, that the Wi-Fi connection do not turn off, the main controller is programmed to establish automatic connection with the available network and connected to the auto power backup.

### 2. “IOT Based Smart Security and Home Automation”, by Shardha Somani, Parikshit Solunke, Shaunak O Ke, Parth Medhi, Prof. P. P. Laturkar.

This paper focuses on a system that provides features of Home Automation relying on IOT to operate easily, in addition to that it includes a camera module and provides home security. The android application basically converts Smartphone into a remote for all home appliances. Security is achieved with motion sensors if movement is sensed at the entrance of the house; a notification is sent that contains a photo of house entrance in real time. This notification will be received by the owner of the house via internet such that app can trigger a notification. So owner can raise an alarm in case of any intrusion or he/she can toggle the appliances like opening the door if the person is a guest. The system uses Raspberry Pi, a small sized computer which acts as server for the system. The smart home consists two modules. Home automation that consists; fan light and door controller, and security module that consists; smoke sensor motion sensor and camera module.

### 3. “A Dynamic Distributed Energy Management Algorithm of Home Sensor Network for Home Automation System”, by Tui-Yi Yang, Chu-Sing Yang, Tien-Wen Sung.

This paper proposes an optimization of home power consumption based on PLC (Power Line Communication) for an easy to access home energy consumption. This also proposes a Zigbee and PLC based renewable energy gateway to monitor the energy generation of renewable energies. ACS and DDEM algorithm are proposed for the design of an intelligent distribution of power management system to make sure ongoing power supply of home networks. To provide efficient power management the power supply models of home sensor network are classified groups viz. main supply only, main supply and backup battery, rechargeable battery power and non-rechargeable battery power. Devices with particular features are assigned to these groups. It targets to establish real time processing scheme to address variable sensor network topologies.

### 4. “Enhance Smart Home Automation System based on Internet of Things”, by Tushar Churasia and Prashant Kumar Jain.

This paper proposes a system that develops a model to reduce the computation overhead in existing smart home solutions that uses various encryption technologies like AES, ECHD, hybrid, etc. these solutions use intermediate gateway for connecting various sensor devices. The proposed model provides a method for automation with sensor-based learning. The system uses temperature sensor for development but other sensors can also be used as per requirement. These smart home devices with sensors can configure themselves autonomously and can operate without human intervention. This work minimizes encryption decryption and focuses on authentication and automation of smart home devices with learning. The system bypasses local gateway mentioned in existing system to provide better security for smart home devices and sensor data and save computation overhead. The real time broker cloud is directly connected with smart home and manages all incoming and outgoing request between users and devices. The main purpose to use real time broker cloud is save time of cryptographic operations.

### 5. “Visual Machine Intelligence for Home Automation”, by Suraj, Ish Kool, Dharmendra Kumar, Shovan Barman.

The paper presents a vision-based machine intelligence system to sense on/off state of common home appliance. The proposed method of sensing the state of appliances results on a novel home automation system. The accessibility of the suite of devices in the home over a remote network is facilitated by the IP Addressing methods in the IOT. This project uses two boards viz. Raspberry Pi and Intel Galileo Gen 2. The communication between the User devices, Raspberry Pi



and the Intel Galileo boards happens over a wireless network. The UDP protocol is deployed to facilitate the wireless communication of the nodes present in the home automation network. A Pi Cam and a USB Logitech camera attached to the rotating shaft of two different servo motor capture snapshots that are passed as inputs to the Machine Learning based models trained using dlib-C++ to detect the state of the operation of the appliances. The proposed method uses visual modality to automate the appliances, as privacy concerns may emerge while using the images from some specific places, as a counter to this issue, an SPDT switch is added to the Raspberry Pi which when turned off ensures that even if the images are taken from the webcams, they are just passed as inputs to the machine learning models and are not displayed on the website when the users access the website on the server address obtained from Raspberry Pi.

**6. “A Low-Cost Home Automation System Using Wi-Fi based Wireless Sensor Network Incorporating internet of Things”, by Vikram. N, Harish. K. S, Nihaal. M. S, Raksha Umesh, Shetty Aashik Ashok Kumar.**

This paper illustrates a methodology to provide a low-cost Home Automation System (HAS) using Wireless Fidelity (Wi-Fi). This crystallizes the concept of internetworking of smart devices. A Wi-Fi based Wireless Sensor Network (WSN) is designed for the purpose of monitoring and controlling environmental, safety and electrical parameters of a smart interconnected home. The different sections of the HAS are; temperature and humidity sensor, gas leakage warning system, fire alarm system, burglar alarm system, rain sensing, switching and regulation of load & voltage and current sensing. The primary requirement of HAS to monitor and control of devices is accomplished using a Smartphone application. The application is developed using Android Studio based on JAVA platform and User Interface of those are exemplified. The primary focus of the paper is to develop a solution cost effective flexible in control of devices and implementing a wide range of sensors to capture various parameters.

**7. “Voice Controlled Home Automation System using Natural Language Processing and Internet of Things”, by Mrs. Paul Jasmin Rani, Jason Bakthakumar, Praveen Kumaar.B, Praveen Kumaar.U, Santhosh Kumar.**

The paper focuses on the construction of a fully functional voice-based home automation system that uses Internet of Things, Artificial Intelligence and Natural Language Processing (NLP) to provide a cost-effective, efficient way to work together with home appliances using various technologies such as GSM, NFC, etc. it implements a seamless integration of all the appliances to a central console, i.e. the mobile device. The prototype uses Arduino MK1000, known as Genuino MK1000. The NLP in this project gives the user the freedom to interact with the home appliances with his/her own voice and normal language rather than complicated computer commands. The appliances are connected to the mobile device through an Arduino Board that establishes the concept of Internet of Things. The Arduino Boards are interfaced with the appliances and programmed in such a way that they respond to mobile inputs.

### III. PROPOSED SYSTEM

The proposed model of home automation system contains server, actuators, sensors and microcontrollers. The high-end server of google firebase will be setup to controlling, monitoring of the IOT devices. The proposed home automation system will be remotely control by wireless technological communication devices like smart phones, tabs and other wireless devices remotely through Internet. In this proposed home automation system can be control, managed remotely of room temperature, automatic on and off fans, automatic lights on and off, automatic gas leakage detected by sensors, automatic intrusion detection by sensors, automatic air conditioning system etc.

#### IV. SYSTEM ARCHITECTURE

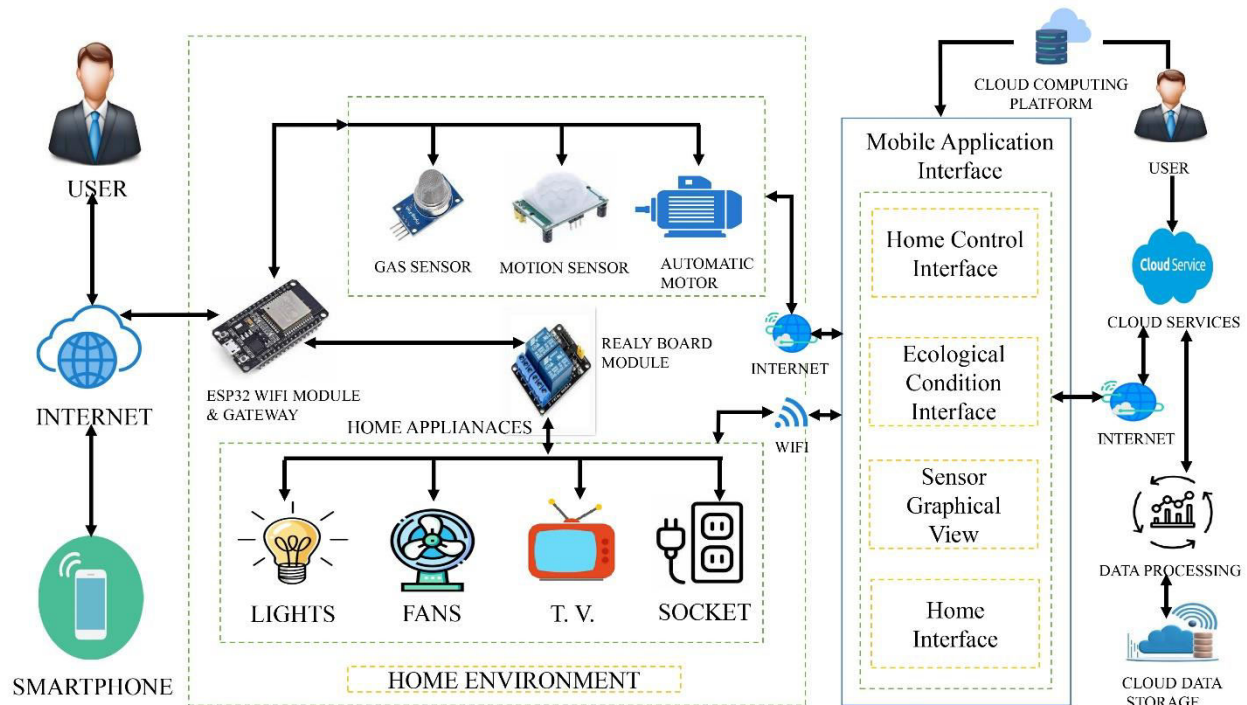


Fig 1. Proposed System Architecture

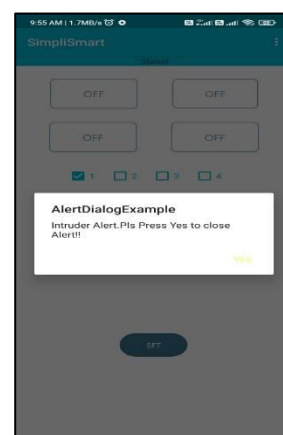
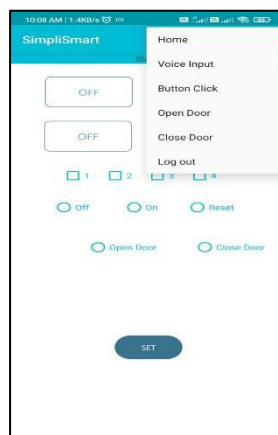
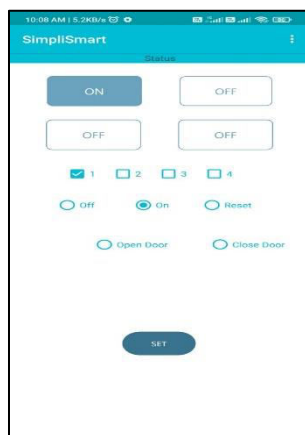
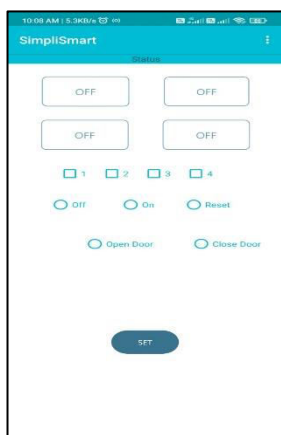
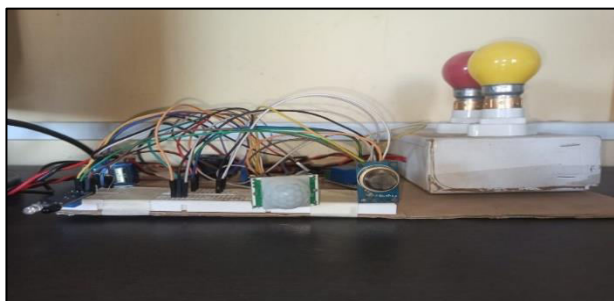
- The home automation system especially managing the house hold appliances remotely for convenient to human being.
- This system contains for notifying occur any violation for providing security and violating dangerous things will not be happened in the home.
- The system connected with Buzzer Alarm system can sound alarm for notify human in a home for signaling any problem happened.
- And also, there is an alert SMS to user mobile or e-mail can be sent to the concerned user for alert for safety in home.
- A voice-controlled switch system to create an automated and comfortable home environment.
- The aim of this device is to create a cost-effective, dependable, and measurable home automation system that can be used to switch it on or off any electrical device remotely by a microcontroller and simple hardware.
- The project's aim is to configure and build a home automation system which can response to any command given to household appliances with a single click, using a microcontroller and an Android app on a tablet.

#### V. OBJECTIVES OF SYSTEM

- **Design of an independent Home Automation System**  
Home Automation System to formulate the design of an interconnected network of home appliance to be integrated into the Home Automation System. The objective to account for every appliance and its control to be automated and integrated into the network further formulated into the Home Automation System.
- **Wireless control of home appliances (Switch and Voice mode)**  
To develop the application that would include features of switch and/or voice modes to control the applications.
- **Monitoring status of appliances remotely**  
Being able to view the status of home appliances on the application, in order have a better Home Automation System.
- **Secure connection channels between application and Node MCU**  
Use of secure protocols over Wi-Fi so that other devices are prevented to achieve control over the HAS. Secure connections are obtained by SSL over TCP, SSH.

- **Controlled by any device capable of Wi-Fi (Android, iOS, PC)**  
To achieve flexibility in control of the home appliances, and device capable of Wi-Fi connectivity will be able to obtain a secure control on the Home Automation System.
- **Extensible platform for future enhancement**  
With a strong existing possibility of adding and integrating more features and appliances to the system, the designed system needs to be highly extensible in nature.
- **Security**  
This system contains for notifying occur any violation for providing security and violating dangerous things will not be happened in the home. The system connected with Buzzer Alarm system can sound alarm for notify human in a home for signalling any problem happened. And also, there is an alert SMS to user mobile or e-mail can be sent to the concerned user for alert for safety in home

## V. RESULTS



## VII. CONCLUSION

This paper introduces a smart home automation model that makes use of the Internet of Things. This work will be enhanced by adding transfers to the Esp 32 board for managing home appliances from a remote location in a real-world scenario. In addition, the creators suggest a traditional IoT structure with a distributed computing architecture for interfacing and supervision.

## REFERENCES

- [1] Thoraya Obaid, Haliemah Rashed, Ali Abu El Nour, Muhammad Rehan, Mussab Muhammad Saleh, and Mohammed Tarique, "ZigBee based voice controlled wireless smart home system", International Journal of Wireless & Mobile Networks (IJWMN) Vol. 6, No. 1, February 2014.
- [2] Dhawan S. Thakur and Aditi Sharma, "Voice Recognition Wireless Home Automation System Based On Zigbee", IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834, p-ISSN: 2278-8735, Volume 6, Issue 1 (May. - Jun. 2013), PP 65-75.

- [3] Alkar, A. Z., & Buhur, "Design and Development of an Automated Home Control System Using Mobile Phone", U. (2005). An Internet Based Wireless Home Automation System for Multifunctional Devices. IEEE Consumer Electronics, 51(4), 1169-1174.
- [4] Armando Roy Delgado, Rich Picking and Vic Grout, "Remote-Controlled Home Automation Systems with Different Network Technologies", Centre for Applied Internet Research (CAIR), University of Wales, NEWI, Wrexham, UK.
- [5] Malik Sikandar Hayat Khiyal, Aihab Khan, and Erum Shehzadi, "SMS Based Wireless Home Appliance Control System (HACS) for Automating Appliances and Security", Issues in Informing Science and Information Technology Volume 6, 2009.
- [6] Faisal Baig, Saira Beg, Muhammad Fahad Khan, "Controlling Home Appliances Remotely through Voice Command", International Journal of Computer Applications (0975 – 888). Volume 48– No.17, June 2012.
- [7] Smart Homes: How Much Will They Support Us? A Research on Recent Trends and Advances, IEEE 2021, Adam Zielonka, Marcin Woźniak, Sahil Garg, Georges Kaddoum, Md. Jalil Piran, Ghulam Muhammad. <https://ieeexplore.ieee.org/document/9335602>
- [8] IoT Smart Home Assistant for Physically Challenged and Elderly People, IEEE 2020, S.K Sooraj, E Sundaravel, Babu Shreesh, K. Sireesha. <https://ieeexplore.ieee.org/abstract/document/9215389>
- [9] Design, Implementation, and Practical Evaluation of a Voice Recognition Based IoT Home Automation System for Low-Resource Languages and Resource-Constrained Edge IoT Devices: A System for Galician and Mobile Opportunistic Scenarios, IEEE 2023, Iván Froiz-míguez, Paula Fraga-lamas, Tiago M. Fernández-caramés. <https://ieeexplore.ieee.org/abstract/document/10151879>
- [10] IoT Based Home Automation System with Customizable GUI and Low-Cost Embedded System, Researchgate.net 2019, Md. Emdadul Haque, Md. Rajibul Islam, Md. Tariqulhasan Fazle Rabbi, Jahir Ibna Rafiq. [https://www.researchgate.net/publication/337274306\\_IoT\\_Based\\_Home\\_Automation\\_System\\_with\\_Customizable\\_GUI\\_and\\_Low\\_Cost\\_Embedded\\_System](https://www.researchgate.net/publication/337274306_IoT_Based_Home_Automation_System_with_Customizable_GUI_and_Low_Cost_Embedded_System)
- [11] Mobile application and Wi-Fi modules for smart home control, Researchgate.net 2020, Mawouena Fongbedji, Nissrine Krami, Mohsine Bouya. [https://www.researchgate.net/publication/348485833\\_Mobile\\_application\\_and\\_Wi-Fi\\_modules\\_for\\_smart\\_home\\_control](https://www.researchgate.net/publication/348485833_Mobile_application_and_Wi-Fi_modules_for_smart_home_control)
- [12] Ranking Security of IoT-Based Smart Home Consumer Devices, IEEE 2022, Naba M. Allifah, Imran A. Zualkernan. <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9698229>
- [13] Portable Gas Detection and Warning System for Olfactory Disabled People, IEEE 2020, Tarun Joseph, Sumedh Naik, Ahmed Shaikh, Rashmi Phadnis, Aabha Karmarkar, Kirti Tyagi, Shailesh Khole, Swati Chaudhari. <https://ieeexplore.ieee.org/document/9154120>
- [14] Modelling of Intelligent Sensor Duty Cycling for Smart Home Automation. IEEE 2021, Murad Khan, Junho Seo, Dongkyun Kim. <https://ieeexplore.ieee.org/document/9451190>
- [15] A Metadata Inference Method for Building Automation Systems With Limited Semantic Information. IEEE 2020, Long Chen, H. Burak Gunay, Zixiao Shi, Weiming Shen, Xiaoping Li. <https://ieeexplore.ieee.org/document/9091854>
- [16] F. Alfaverh, M. Denai, and Y. Sun, "Demand response strategy based on reinforcement learning and fuzzy reasoning for home energy management," IEEE Access, vol. 8, pp. 39310–39321, 2020
- [17] L. Apiecionek, J. M. Czerniak, D. Ewald, and M. Biedziak, "IoT heating solution for smart home with fuzzy control," J. Universal Comput. Sci., vol. 26, no. 6, pp. 747–761, 2020.
- [18] M. Diyan, B. N. Silva, and K. Han, "A multi-objective approach for optimal energy management in smart home using the reinforcement learning," Sensors, vol. 20, no. 12, p. 3450, Jun. 2020.
- [19] M. Wozniak and D. Polap, "Intelligent home systems for ubiquitous user support by using neural networks and rule-based approach," IEEE Trans. Ind. Informat., vol. 16, no. 4, pp. 2651–2658, Apr. 2020.
- [20] G. Muhammad, M. S. Hossain, and N. Kumar, "EEG-based pathology detection for home health monitoring," IEEE J. Sel. Areas Commun., vol. 39, no. 2, pp. 603–610, 2020.
- [21] Z. Xu, Y. Gao, M. Hussain, and P. Cheng, "Demand side management for smart grid based on smart home appliances with renewable energy sources and an energy storage system," Math. Problems Eng., vol. 2020, pp. 1–20, Apr. 2020.
- [22] A. Akbari-Dibavar, S. Nojavan, B. Mohammadi-Ivatloo, and K. Zare, "Smart home energy management using hybrid robust-stochastic optimization," Comput. Ind. Eng., vol. 143, May 2020, Art. no. 106425.
- [23] A. Akbari-Dibavar, S. Nojavan, B. Mohammadi-Ivatloo, and K. Zare, "Smart home energy management using hybrid robust-stochastic optimization," Comput. Ind. Eng., vol. 143, May 2020, Art. no. 106425.



- [24] Y.-H. Lin, “Trainingless multi-objective evolutionary computing-based nonintrusive load monitoring: Part of smart-home energy management for demand-side management,” J. Building Eng., vol. 33, Jan. 2021, Art. no. 101601.
- [25] Z. Zhang, J. Wang, H. Zhong, and H. Ma, “Optimal scheduling model for smart home energy management system based on the fusion algorithm of harmony search algorithm and particle swarm optimization algorithm,” Sci. Technol. Built Environ., vol. 26, no. 1, pp. 42–51, Jan. 2020.
- [26] S. Kazmi, N. Javaid, M. J. Mughal, M. Akbar, S. H. Ahmed, and N. Alrajeh, “Towards optimization of Metaheuristic algorithms for IoT enabled smart homes targeting balanced demand and supply of energy,” IEEE Access, vol. 7, pp. 24267–24281, 2019.





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