

Smart Mirror Activated by User's Face Recognition with Simulation of Artificial Intelligence Classifier

Bing-Yuh Lu*, Jixin Liu*, Zhongyong Wang*, Hongmei Li*, Juhui He*,
Xing Wen*, Peixin Chen*, Jingquan Chen*, Weijun Lai*, Cancheng Huang*

*Faculty of Automation, Guangdong University of Petrochemical Technology, Maoming City, Guangdong, China

franklinlu888@outlook.com, ljxfrog@qq.com, 383858484@qq.com, 2908282553@qq.com,
1361721671@qq.com, 1606523313@qq.com, 435191631@qq.com, 2548383742@qq.com,
1780899413@qq.com, 1260155720@qq.com

Abstract— This paper presented a simple and easy-to-use intelligent mirror with the activated function by face recognition. Firstly, the function of face recognition was realized by the OpenMV platform, and the recognition information was transmitted to the main controller, i.e., Loongson 1C Zhilong development board. The main controller connected to the Django server through the distant communication function of ESP8266 module. The user's schedules were acquisitioned by such a communication pathway and analyzed by the main controller. Finally, the recognized user's business or traveling schedule was shown on a screen located in the rear of a semitransparent mirror. For strangers of this smart mirror, the successful rate of strangers was 100%. For the user, the successful rate of strangers was 90% and accuracy of user's recognition was 100% in 120 times of tests. Furthermore, Adaptive Neuro Fuzzy Inference System supports a nice performance for Automatic classification in computer simulation. The COVID-19 pandemic is still threatening human beings. A smart mirror with the function of face recognition activation is a non-touching solution for avoiding the infections to support an idea for elevating human health.

Keywords—Loongson, RT thread, real-time operating system, OpenMV, wireless transmission, AI, ANFIS



Bing-Yuh Lu received his BS in electrical engineering from National Central University in 1988, MS in electrical engineering from National Taiwan University in 1993, and PhD in electrical engineering from National Taiwan University in 2000. He is currently a professor with Faculty of Automation, Guangdong University of Petrochemical Technology, Maoming City, Guangdong, China. His academic interests focus on acoustics, medical engineering and pulmonary signal processing.



Jixin Liu received the M.S. degree from Northeast Petroleum University, Daqing, China, in 2004, and the Ph.D. degree from Harbin Institute of Technology, Harbin, China, in 2010. He is currently an Associate Professor with the School of Automation in Guangdong University of Petrochemical Technology, Guangdong, China. His research interests include biometric identification, privacy preserving machine learning, pattern recognition, fault diagnosis of petrochemical equipment.



Zhongyong Wang received his BS in electrical engineering from Shandong Agricultural University in 1996, MS in electrical engineering from Huaqiao University in 2003, and PhD in electrical engineering from Guangxi University in 2008. He is currently a Dean with Faculty of Automation, Guangdong University of Petrochemical Technology, Maoming City, Guangdong, China. His academic interests focus on circuit design and digital signal processing.



Hongmei Li is a student with Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China. She won the first prize of the 7th and 8th China's International "Internet +" College Students' Innovation and Entrepreneurship Award of Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China, and served as the head of the 2022 College Students' Innovation and Entrepreneurship Plan. Her interests of research fields are smart mirror and IOT.



Juhui He is a student with Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China. He is the winner of Golden Award in the National Embedded System Design Competition of China in 2021 and Golden Award in the Embedded System Design Competition of Southern China in 2021, respectively. His interests of research fields are IoT, smart mirror and embedded system.



Xing Wen is now a student at Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China. He won the third prize of the 7th National Undergraduate Biomedical Engineering Innovation Design Competition in 2022 and the second prize of the 2022 Guangdong Undergraduate Electronic Design Competition in China. His academic interests focus on the IoT, AI, and fuzzy PID control.



Peixin Chen received his B.S. degree Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China in 2022. He is the winner of Silver Award in the National Embedded System Design Competition of China in 2020 and Golden Award in the Embedded System Design Competition of Southern China in 2020, respectively. His interests of research fields are applications of server, and embedded system. He is now an officer of local city government in Guangdong, China.



Jingquan Chen is a student with Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China. He is a winner of the Golden Award in the National Embedded System Design Competition of China in 2021. His interests of research fields are AIOT, Robot operating system and machine vision.



Weijun Lai is a student with Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China. He is the winner of Silver Award in the Embedded System Design Competition of Southern China and the second prize of Guangdong Engineering College Students' Experimental Comprehensive Skills Competition in 2020. interests of research fields are motor control algorithm, embedded system development.



Cancheng Huang is a student with the Faculty of Automation, Guangdong University of Petrochemical Technology, Guangdong, China. He was the winner of the third prize in the 15th Energy Conservation and Emission Reduction Social Practice and Technology Competition as well as the bronze medalist in the 7th Huaju Cup held at Guangdong University of Petrochemical Technology. His research fields of interest are IC and semiconductor manufacturing process.