Abstract—In the past, researchers have thought that automat-
ing robots is a far. Some researchers believe that if a better
program is developed with a robot that can automatically move
the robot. Nowadays, various researchers have developed robots
that can be automated and applied to many tasks. This research
has developed an automated robot model. The robot can move
in the lane prepared in the laboratory and predict the direction
accurately. The movement of the robot is moving in the right
lane, representing about 72%.

Index Terms—Robot, Autonomous, Vehicle

I. INTRODUCTION

In the past, researchers were amazed at the computational
power of computers, thinking that if they were writing the
right applications, the computer could become the brain of
the artificial autonomous robot. At that time, the researchers
found that was a distant subject. Although that was in the
1950s [1] robots were used in the automobile industry and
other products. The scientists believe in the future, robots are
developed to move freely and have intellectual capabilities
such as humans.

Later, robots were developed and developed to help people
in their jobs. [2] For example, in Asia, robots are developed
for the elderly. The United States has developed robots to work
with humans and as human assistants in everyday life. Kinect
camera technology to help detect motion and transform into
a 3D image to help detect the face. The researchers have
conceptualized robots based on the infrastructure of Cloud
Computing to access data and have more processing power.
This way, some of which is called cloud robotics helps robots
reduce the workload required for computing such as image
processing and speech recognition.

In addition, robots are used to guide human beings by
moving their robots freely. [3] The interaction between humans
and robots leads to research that encompasses both robot
capabilities and receptivity. Learn the basics of learning,
managing, and navigating. Human Robot Interaction: The HRI
makes it possible for robots to move their positions to different
locations to direct humans, such as navigating human beings
to apartment rooms. The robot moves at the speed that humans
can walk.

The interaction between robots and humans is the develop-
ment of robotic motion. It can be used to track or detect the
target itself. Technological advances make robots smaller in
size and cost. The system consists of a number of robots that
work together called robot swarms. [4] The major advantage of
robot swarms is that they are resistant to each robot failure and
can be upgraded. In addition, Multi-Robot [5-7] can function
independently without coordinating with other robots. Can be
used in many areas such as robots search for victims.

From the above. Researchers have proposed methods and
algorithms to provide robots with automated systems. The
research presents the development of prototype robots and
algorithms used to drive automation with embedded deep
learning.

II. RELATED WORK

A. Robot

A robot is a machine with an internal mechanism. Works
with humans or work instead of humans beings and can be
prioritized or postponed. The robots are classified into two
types, depending on the type of operation: fixed type robots
and mobile robots.

a) fixed type robots: Mostly industrial robots are used
instead of human labor for 24 hours of continuous work,
repetitive tasks, hazardous jobs, hard work, and hard labor.

b) mobile robots: Mostly horizontal robots can be con-
trolled from a distance. Equipment used for moving wheels
or rails. Currently, the legs are used with robots.

c) Autonomous robots: Automated robots are robots that
can operate on their own. There are programs entered into
the memory of the robot.

B. Use robots to exploit

Automated robots are used in a variety of applications,
including road storage, security, such as patrolling, Target
Detection, Target Tracking.

a) Road Dataset: Robots are used to learn the structural
characteristics of roads in an unstructured manner, with no
lane markings, and with dense shadows [10] or roads in semi-
structured environments. [11] In addition, it is used to visualize
the area to be used to create a street scene, which records the
area during driving. [12] Various techniques are used, such as
Neural Network (CNN) to record road characteristics. End-to-
end research has been used as a basis for a model of brain
inspired cognitive model with attention (CMA) [14] to analyze
the relationship between complex traffic and recurrent neural
networks.
b) Robots are used in security: Implementing robots for security [15] has been used in patrols to detect individuals and objects both inside and outside the building. [16] In addition, robots can be used for internal patrols to monitor, detect, and count persons entering the building. [17]

III. METHODOLOGY

This section discusses the modeling process for automated robots. There are 4 steps: Prepare Environment, Collect Dataset, Label and Train Model shown in figure 1.

A. Prepare Environment

This step is to prepare the environment by building a traffic lane in the lab. White lines are the border of the lane and the yellow dashed line is the divided lane. Traffic splice width 55 cm.

B. Image conversion

Bring the RGB color image to a gray level before executing label as shown in figure 3.

The equation is as follows.

\[
\text{Grayscaleimage} = (W_1 \times R) + (W_2 \times G) + (W_3 \times B)
\]  

where

\( W_1 + W_2 + W_3 \) and \( W_1, W_2, W_3 \) \( \in \) 0

C. Collect Dataset

Dataset data includes rotation direction of wheel and speed. The image used in the train is approximately 120,000 images shown in Figure 4.
The direction of motion of the wheel is coordinated in vector (x, y, h). Where x, y is the position of the center of gravity, and h is the direction of the vehicle. Shown in figure 5.

![Fig. 5: Wheel motion model.](image)

**D. Labeling**

The information used in the label is the image of degrees and speed as follow table I and II.

- The images used include straight direction, left turn direction, and right turn direction.
- The angle is the angle of the wheel.
- Speed is in the range of 0 - 100%. In this study, the speed was 70-80%

**TABLE I: The data set used in the training.**

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<th>Image array</th>
<th>Throttle</th>
<th>Angle</th>
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**TABLE II: The data set used in the training.**

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E. Train Model

In the training model, the lane data set was used for approximately 120,000 images with the following steps.

- Grayscale image is used to train the model.
- Converts 2D array of gray-scale images into 1-dimensional array.
- Multilayer Perceptron Neural Network Algorithm is used as a tool. The data for Training is 70% and the 30% for Testing has the following equation:

\[ y_i = f \left( \sum_j w_{ji}^{(1)} f \left( \sum_k w_{kj}^{(2)} x_k \right) \right) \]  

Where \( f \) is a sigmoid transfer function used by neurons. \( w_{kj}^{(2)}, w_{ji}^{(1)} \) is a link that leads into the hidden layer and the output respectively. \( x_k \) is the attribute value of the presentation.

The Training Model consists of image data, lane degrees, and speed of movement. The results for the training of model was 67.81%.

IV. EXPERIMENTAL AND RESULT

This experiment is a test of a model obtained from a collection of 120,000 images to produce a dataset. The first step is to convert the RGB color level to grayscale. Next, take the picture in the forward direction, turn left and turn right. Then, the dataset was used to train model and test.

The model was tested to allow the robot to move automatically. In between robots, the robot receives the image and provides the processing model to predict the direction of movement. The forecasts are both accurate and inaccurate.

A. Accurate predictions

The correct predictive direction of model movement. This experiment is an experiment to predict the direction of movement of the robot in the left turn direction. This experiment shows the results of experiments in Figure 6-8.

B. Incorrect predictions

The incorrect predictive direction of model movement. This experiment is a false prophecy in the wrong direction. This experiment is a direct movement, but the movement of the car does not move in the direct direction. The results are shown in Figure 9.

V. CONCLUSION

This research presents models for use with robots to automatically drive them. The lane traffic image was prepared in the laboratory. The stored image will be used as a dataset for the robot. The collected dataset is 160x120px in 40,000 RGB images. Before being used in the train model, take the image into the preparation stage, converting the RGB image to a Grayscale image. Then take the Grayscale image. Model training with MLP algorithm. Models for use with robots.
can be automatically driven. When the model was tested, the movement of the robot is moving in the right lane, representing about 72%. There are some inaccuracies, about 27%. In order to make the movement of the robot traffic more accurate, the lane detection feature should be added to enhance the robot’s ability to perform future work.

REFERENCES