CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation

5.1.1 Arduino Design Tools

5.1.2 Ultrasonic Sensors Design Tools

From the concept of the device installed, this tool uses three ultrasonic sensors to get a distance. From this tool there is an Arduino that is attached with an Ethernet Shield complete with LAN cable, so that it can send data captured by an Ultrasonic Sensor to the database. The data that has been saved to the database is then performed a machine calculation to get the time difference in the data view, after making the data view a time difference will appear where the machine calculation will be performed to get the counter. The difference in time is less than the same as two seconds then it is still considered the vehicle has not come out of the sensor, the vehicle may stop under the sensor (despite having different height data) or vehicles that are very close. Difference in height data may be obtained from the motorbike tank and helmet driver. A difference of time smaller than two seconds can be assumed to be still on the same vehicle, so the number of vehicles is not added. The time difference is greater than two seconds, then the number of vehicles plus one. Two seconds was based on eye observation of recorded data. Two seconds the calculation results approach the manual method. Two seconds is the deadline for calculating the passing vehicle.

Code Ultrasonic sensor

Ultrasonic sensor function detects the hight of an object.

duration1 = pulseIn(echoPin1, HIGH);   //Receive Ultrasonic Sound

distance1= duration1/58.2;   //Change the duration to distance (cm)

Code above is a formula for calculating distances (value).

Code SendValue

SendValue is a code for sending data generated by Ultrasonic Sensors to php (connection to PHP).

str1 = "GET /CodeExitGate/insert_exit_gate.php?tinggi_mobil=";

str2 = String(t_mobil);

str1.concat(str2);

client.println(str1);

client.println();

client.println();

Code above is used to be able to connect with php, to send data that is processed by Arduino.

Code SendValue to port 80

Code send value, if connected to port 80.

```
int count = 4; //try 4 times before marked as failed

  while(count > 0)

 {

    if(client.connect(server, 80))

    {

      Serial.println("connected");

      if(tinggi_mobil >= tinggiMin && tinggi_mobil <= tinggiMax){

       sendValueMobil(tinggi_mobil);

      }

      if(tinggi_motor1 >= tinggiMin && tinggi_motor1 <= tinggiMax){
```

```
        sendValueMotor1(tinggi_motor1);

    }

    if(tinggi_motor2 >= tinggiMin && tinggi_motor2 <= tinggiMax){

      sendValueMotor2(tinggi_motor2);

    }

    count = -1;

  }

  else

  {

    count--;

    delay(20);

  }

}

if(count == 0)

{

  //FAILED

  Serial.println("connection failed");

}

client.stop();

client.flush();
```
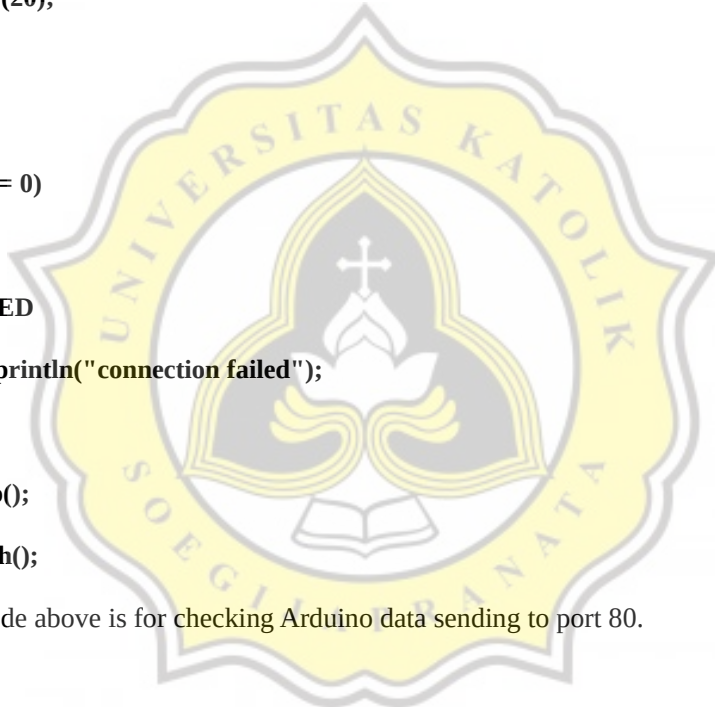
Code above is for checking Arduino data sending to port 80.

5.2 Testing

5.2.1 Tools Placement

5.2.2 Apache2 and Mysql activation

5.2.3 Data server is vehicle's data or has height.

5.2.4 Running Program Arduino
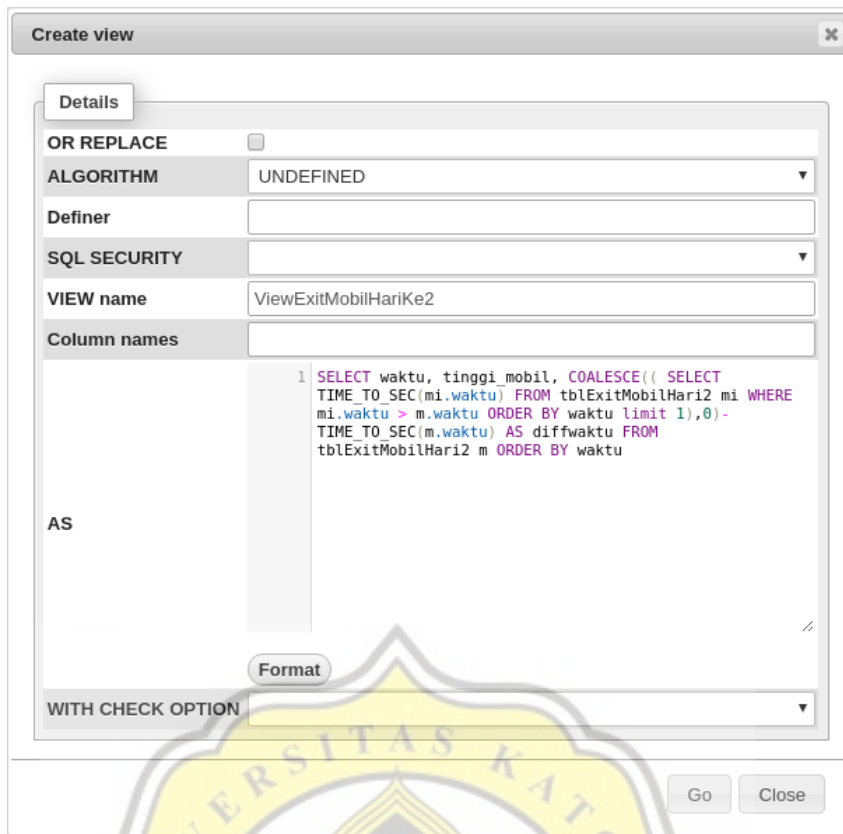
5.2.5 Create views in the database
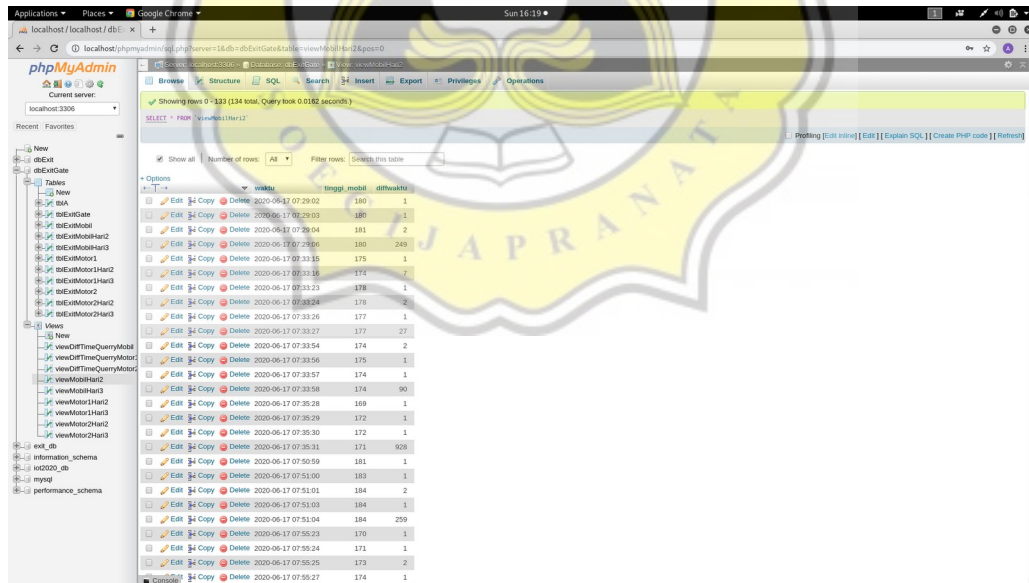
5.2.6 Display of create view

5.2.7 Display to do the select count after creating create views

5.2.8 Display of select count

waktu	tinggi_mobil
2020-06-26 07:39:40	177
2020-06-26 07:39:42	174
2020-06-26 07:39:43	175
2020-06-26 07:39:44	177
2020-06-26 07:39:45	175
2020-06-26 07:47:05	180
2020-06-26 07:47:06	182
2020-06-26 07:47:07	183
2020-06-26 07:47:09	183
2020-06-26 07:47:12	183
2020-06-26 07:47:13	182
2020-06-26 07:47:14	182
2020-06-26 07:47:18	178
2020-06-26 07:47:19	180
2020-06-26 07:47:20	180
2020-06-26 07:47:22	180
2020-06-26 07:47:23	175
2020-06-26 07:47:24	180
2020-06-26 07:47:25	180
2020-06-26 07:47:27	180
2020-06-26 07:47:28	179
2020-06-26 07:47:29	178
2020-06-26 07:47:30	174
2020-06-26 07:47:32	177
2020-06-26 07:47:33	176

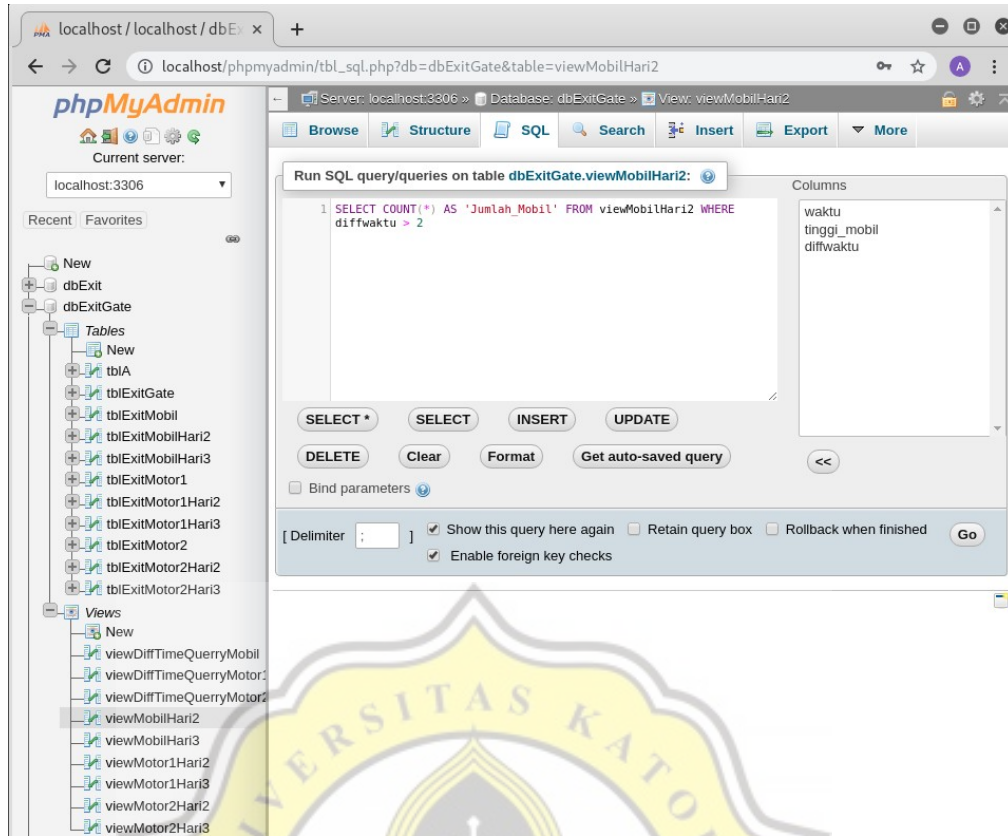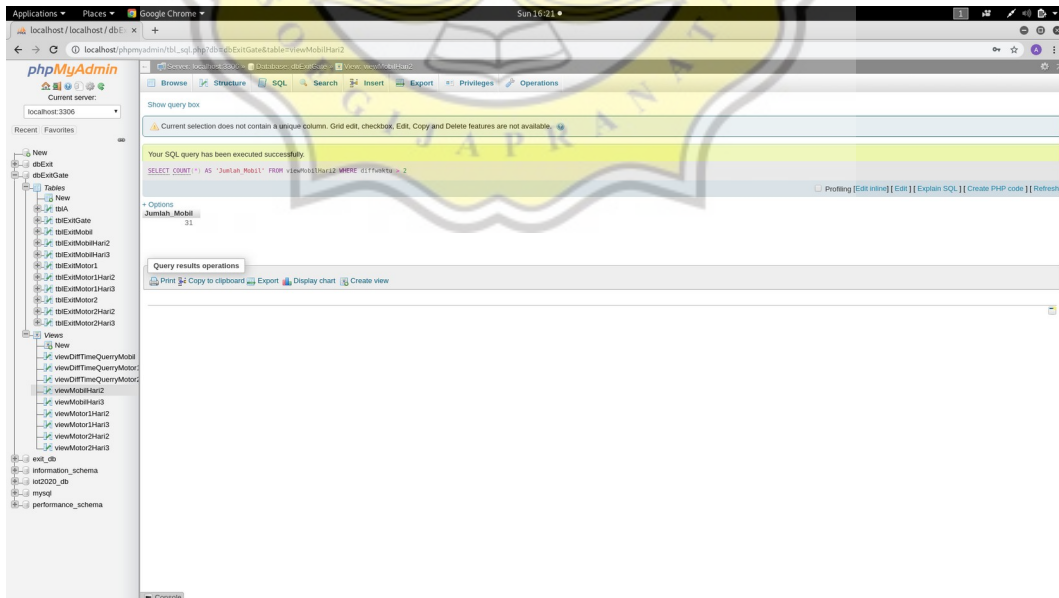|	waktu	tinggi_mobil	diffwaktu
Edit Copy Delete	2020-06-26 07:39:40	177	2
Edit Copy Delete	2020-06-26 07:39:42	174	1
Edit Copy Delete	2020-06-26 07:39:43	175	1
Edit Copy Delete	2020-06-26 07:39:44	177	1
Edit Copy Delete	2020-06-26 07:39:45	175	440
Edit Copy Delete	2020-06-26 07:47:05	180	1
Edit Copy Delete	2020-06-26 07:47:06	182	1
Edit Copy Delete	2020-06-26 07:47:07	183	2
Edit Copy Delete	2020-06-26 07:47:09	183	3
Edit Copy Delete	2020-06-26 07:47:12	183	1
Edit Copy Delete	2020-06-26 07:47:13	182	1
Edit Copy Delete	2020-06-26 07:47:14	182	4
Edit Copy Delete	2020-06-26 07:47:18	178	1
Edit Copy Delete	2020-06-26 07:47:19	180	1
Edit Copy Delete	2020-06-26 07:47:20	180	2
Edit Copy Delete	2020-06-26 07:47:22	180	1
Edit Copy Delete	2020-06-26 07:47:23	175	1
Edit Copy Delete	2020-06-26 07:47:24	180	1
Edit Copy Delete	2020-06-26 07:47:25	180	2
Edit Copy Delete	2020-06-26 07:47:27	180	1
Edit Copy Delete	2020-06-26 07:47:28	179	1
Edit Copy Delete	2020-06-26 07:47:29	178	1
Edit Copy Delete	2020-06-26 07:47:30	174	2
Edit Copy Delete	2020-06-26 07:47:32	177	1
Edit Copy Delete	2020-06-26 07:47:33	176	1

5.2.9 Data row   **5.2.10 Data view**

This project **Data row** is the height data generated by the Ultrasonic Sensors.

This project **Data View** is the time difference data that is displayed by the data row.

			waktu	tinggi_mobil	diffwaktu
Edit	Copy	Delete	2020-07-08 12:22:52	120	1
Edit	Copy	Delete	2020-07-08 12:22:53	148	1
Edit	Copy	Delete	2020-07-08 12:22:54	148	1
Edit	Copy	Delete	2020-07-08 12:22:55	148	315
Edit	Copy	Delete	2020-07-08 12:28:10	141	1
Edit	Copy	Delete	2020-07-08 12:28:11	147	1
Edit	Copy	Delete	2020-07-08 12:28:12	180	2
Edit	Copy	Delete	2020-07-08 12:28:14	180	1
Edit	Copy	Delete	2020-07-08 12:28:15	180	562
Edit	Copy	Delete	2020-07-08 12:37:37	156	1
Edit	Copy	Delete	2020-07-08 12:37:38	165	1
Edit	Copy	Delete	2020-07-08 12:37:39	184	1
Edit	Copy	Delete	2020-07-08 12:37:40	167	3
Edit	Copy	Delete	2020-07-08 12:37:43	119	1
Edit	Copy	Delete	2020-07-08 12:37:44	144	1
Edit	Copy	Delete	2020-07-08 12:37:45	144	1092
Edit	Copy	Delete	2020-07-08 12:55:57	146	1
Edit	Copy	Delete	2020-07-08 12:55:58	181	1
Edit	Copy	Delete	2020-07-08 12:55:59	181	1
Edit	Copy	Delete	2020-07-08 12:56:00	180	829
Edit	Copy	Delete	2020-07-08 13:09:49	124	1
Edit	Copy	Delete	2020-07-08 13:09:50	149	1
Edit	Copy	Delete	2020-07-08 13:09:51	149	1
Edit	Copy	Delete	2020-07-08 13:09:52	137	329
Edit	Copy	Delete	2020-07-08 13:15:21	140	1
Edit	Copy	Delete	2020-07-08 13:15:22	180	1
Edit	Copy	Delete	2020-07-08 13:15:23	180	475
Edit	Copy	Delete	2020-07-08 13:23:18	134	1
Edit	Copy	Delete	2020-07-08 13:23:19	168	1
Edit	Copy	Delete	2020-07-08 13:23:20	168	1330
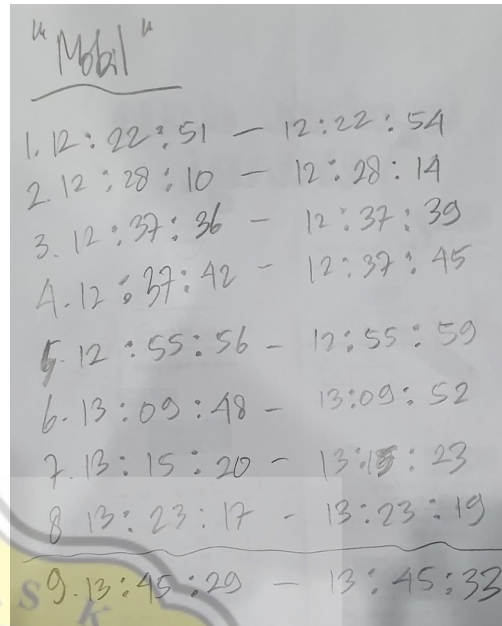
5.2.12 Manual data

5.2.11 System data

The data above is the result a comparison between **System Data** and **Manual Data**. The data above shows that there is a difference of approximately 1 second in data collection between system data and manual data. Manual data to match the calculation of vehicles passing manually to be compared with the calculation in a system. This is to determine whether 2 seconds can be used.