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){</pre>

```
sendValueMobil(tinggi_mobil);
```

}

if(tinggi_motor1 >= tinggiMin && tinggi_motor1 <= tinggiMax){</pre>

```
sendValueMotor1(tinggi_motor1);
    }
    if(tinggi_motor2 >= tinggiMin && tinggi_motor2 <= tinggiMax){
     sendValueMotor2(tinggi_motor2);
    }
    count = -1;
  }
  else
  {
    count--;
    delay(20);
  }
}
                                                 K
if(count == 0)
{
  //FAILED
  Serial.println("connection failed");
}
                    s
client.stop();
                      0
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

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dbExit	2020-06-17 07:2	29:04	1	81												
dbExit	2020-06-17 07:2	29:06	1	80												
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- B New	2020-06-17 07:3	33:23	1	78												
+ tbIA	2020-06-17 07:3	33:24	1	78												
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	2020-06-17 07:3	33:27	1	77												
	2020-06-17 07:3	33:54	1	74												
+- tblExitMobilHari2	2020-06-17 07:3	33:56	1	75												
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ItblExitMotor1	2020-06-17 07:3	33:58	1	74												
+ MthExitMotor1Hari2	2020-06-17 07:3	35:28	1	69												
	2020-06-17 07:3	35:29	1	72												
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+ tblExitMotor2	2020-06-17 07:3	35:31	1	71												
ItblExitMotor2Hari2	2020-06-17 07:5	50:59	1	81												
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information_schema	2020-06-17 07:5	55:23	1	70												
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	2020-06-17 07:	55:29	1	70												
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5.2.3 Data server is vehicle's data or has height.

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(CodeExitGate Arduino 1.8.12	000
localnost / localnost / db E	× +		Eile Edit Sketch Tools Help	
← → C ① localhost/ph	pmyadmin/sql.php?server=1&db=dbExitGate&table=tblExitMotor	2Hari3&pos=0 🕶 🖈 😁 🗄		Q
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Current server:	waktu tinggi motor2		#include <spi.h></spi.h>	
Incellinest 2206	2020-06-26 07:48:16 156		#include <ethernet.h></ethernet.h>	
10(3)(05)(3000	2020-05-26 07:48:18 157			
Recent Favorites	2020-06-26 07:48:19 157		String readString,	
	2020-06-26 07:48:21 152		readStringTheCommand;	
- New	2020-06-26 07:48:24 166			
B-3 dbExit	2020-06-26 07:48:25 167		<pre>byte mymac[] = { 0x1C, 0xB7, 0x2C, 0xDF, 0xA8, 0x37 };//nac address</pre>	
B-B dbExtGate	2020-05-26 07:48:26 168		byte mylp[] = { 192, 168,1,177};7/1p arcuino	
- Tables	2020-05-26 07:48:29 165		EthernetClient client://untuk nengeset ardwing geniadi klient	
-B New	2020-06-26 07:48:31 165			
B-M BA	2020-06-26 07:48:32 164		int trigPin1 = 2;//untuk Mobil	
tblExitGate	2020-05-26 07:48:33 166	4 7	<pre>int echoPin1 = 3;//untuk Mobil</pre>	
tblExitMobil	2020-06-26 07:48:32 155	JAP	int trigPin2 = 4;//untuk Motor 1	
B St tblExitMobilHari2	2020-05-26 07:48:35 150	- A I	int echoPin2 = 5;//untuk Motor 1	
B-34 tblExitMobilHari3	2020-06-26 07:48:36 151		int chighing = $\frac{7}{7}$ /untuk Notor 2	
tblExitMotor1	2020-06-26 07:48:37 151		long duration1.duration2.duration3:	
BLy tblExitMotor1Hari2	2020-06-20 07:48:38 155		int distance1, distance2, distance3;	
tblExitMotor1Hari3	2020-05-26 07:48:41 151			
tbiExitMotor2	2020-05-26 07:48:42 150		<pre>int tinggi_nobil = 0;</pre>	
to/ExitMotor2Hari2	2020-06-26 07:48:43 154		int tinggi_motor1 = 0;	
tblExitMotor2Hari3	2020-06-26 07:48:44 156		int imlah mohil = 0://untuk Nohil	
I Views	2020-06-26 07:48:47 160		int jumlah motor = 0://untuk Motor	
(m-3 ent_co	2020-05-25 07:48:48 150		int jumlah_motor2 = θ;	
m-3 information_schema	2020-05-26 07:48:49 154			
(B-3 102020_00	2020-06-26 07:48:51 170		<pre>bool tempHitung1 = false;//untuk Mobil</pre>	
B C materia	2020-06-26 07:48:53 45		bool temphitung2 = false;//untuk Motor 1	
B-3 performance_scrienta	2020-06-26 12:18:58 163		int hitunal = 8://untuk Mohil	
	2020-05-25 12:18:59 169		int hitung2 = 0;//untuk Motor 1	
	2020-05-26 12:18:00 169		int hitung3 = 0;//untuk Motor 2	
	2020-06-26 12:18:02 164			
	2020-06-26 13:07:55 174		int tinggiMin = 10;	
	2020-06-26 13:07:56 177		int tinggimax = 200;	
	2020-06-26 13:07:57 172		void setup()	
	2020-06-26 13:07:59 170		1	
			Serial.begin(9600);	
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5.2.4 Running Program Arduino

21

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ALGORITHM	UNDEFINED
Definer	
SQL SECURITY	۲ 🗸
VIEW name	ViewExitMobilHariKe2
Column names	s
AS	<pre>1 SELECT waktu, tinggi_mobil, COALESCE((SELECT TIME_T0_SEC(mi.waktu) FROM tblExitMobilHari2 mi WHERE mi.waktu > m.waktu ORDER BY waktu limit 1),0)- TIME_T0_SEC(m.waktu) AS diffwaktu FROM tblExitMobilHari2 m ORDER BY waktu</pre>
WITH CHECK C	Format v
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S'à	5.2.5 Create views in the database
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22

5.2.6 Display of create view



5.2.8 Display of select count

xxiii

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	←T→ ▼ waktu tinggi_mobil diffwa
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2020-06-26 07:47:32	177	Copy Cedit Copy Delete 2020-06-26 07:47:30 174
2020-06-26 07:47:33	176	☐ 2 Edit ≩ Copy
	1 10	Copy Copy Delete 2020-06-26 07:47:33 176

5.2.9 Data row

5.2.1<mark>0 Data</mark> 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.

APR

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	🥔 Edit	- Сору	Delete	2020-07-08 12:28:10	141	1
	🥔 Edit	🖌 Сору	🤤 Delete	2020-07-08 12:28:11	147	1
	🥔 Edit	🖌 Сору	Delete	2020-07-08 12:28:12	180	2
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	🥔 Edit	- Сору	🤤 Delete	2020-07-08 12:37:40	167	3
	🥔 Edit	🖌 Сору	🤤 Delete	2020-07-08 12:37:43	119	1
	🥔 Edit	з Сору	Delete	2020-07-08 12:37:44	144	1
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	🥔 Edit	🖌 Сору	🤤 Delete	2020-07-08 12:55:58	181	1
	🥔 Edit	🖌 Сору	Delete	2020-07-08 12:55:59	181	1
	🥔 Edit	🖌 Сору	🤤 Delete	2020-07-08 12:56:00	180	829
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51 - 12:22:54 12:28:14 12:37 : 45 12:55: 13:09:52 13:15 13

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.