**INHA UNIVERSITY TASHKENT**

**DEPARTMENT OF CSE & ICE**

**SPRING SEMESTER 2020 CAPSTONE DESIGN TEAM REPORT**



**Team name: MasterMinds**

Ochilov Khumoyun U1710188

Kholid Khoshimov U1710190

Farkhadov Khojiakbar U1710207

Tokhirjon Khamdamov U1710217

Mannonov Temur U1710257 \*

**Introduction**

This report provides information regarding the ultrasonic application assignment of autonomous vehicle using Raspberry Pi. Also, some information will be given about team discussions, what every team members did, and the conclusion for this assignment.

**Main**

**Role of team members:**

|  |  |  |
| --- | --- | --- |
| Team name | MasterMinds | Date: 12 March, 2021 |
| Role | Name | Main Responsibility |
| Team leader | Temur Mannonov | As a spokesperson for the team, convene and preside the meeting |
| Recorder | Khojiakbar Farkhadov | Summarize and record group mission reports, and give summarized documentation to all group individuals with the subject of the other assembly. |
| Report creator | Humoyun Ochilov | Organize conclusions of group individuals and make different reports and introductions. |
| Surveyor | Tokhirjon Khamdamov | Create questionnaire materials, perform questionnaires, and share research findings with team members if you need a questionnaire. |
| Data collector | Kholid Khoshimov | Collect and arrange team-related online and offline content, and distribute them to team members two days before the next meeting. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Team minutes** | | | | |
| Team Name | MasterMinds | Leader | Temur Mannonov |  |
| Team purpose | Learning IR Sensor and Ultrasonic Application . | | | |
| Team Operating period | March 15, 2021  14:00-16:00 | | | |
| Team members | ID | Name | Email | Phone number |
| U1710257 | Temur Mannnonov | t.mannonov@student.inha.uz | +998903599940 |
| U1710207 | Khojiakbar Farkhadov | k.farkhadov@student.inha.uz | +998909876297 |
| U1710188 | Humoyun Ochilov | h.ochilov2@student.inha.uz | +998998762404 |
| U1710217 | Tokhirjon Khamdamov | t.khamdamov@student.inha.uz | +998909985890 |
| U1710190 | Kholid Khoshimov | k.khoshimov@student.inha.uz | +998911550022 |

In this assignment we created a program to control autonomous vehicle with the help of ultrasonic application using Raspberry Pi. We implemented several functions in order to control over the car such as going forward, going backward, going left, going right. Our main task was the use of ultrasonic sensors and give the 30cm and 50cm distance from an object. In that situation fundamental steps were, turning the car 180degree with point turn and go forward for 2 seconds. In addition to that we made a method how to correctly give the delay time and stop the car on time.

**Gantt Chart:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WBS NUMBER** | **Week** | **TASK OWNER** | **Tasks** | **Start date** | **end** | **PCT OF TASK COMPLETE** | **PHASE ONE** | | | | | | | | | | | | | | | **PHASE TWO** | | | | | | | | | | | | | | |
| **WEEK 1** | | | | | **WEEK 2** | | | | | **WEEK 3** | | | | | **WEEK 4** | | | | | **WEEK 5** | | | | | **WEEK 6** | | | | |
| **M** | **T** | **W** | **R** | **F** | **M** | **T** | **W** | **R** | **F** | **M** | **T** | **W** | **R** | **F** | **M** | **T** | **W** | **R** | **F** | **M** | **T** | **W** | **R** | **F** | **M** | **T** | **W** | **R** | **F** |
| **1** | **Working on Ultrasonic Application** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.1 | OpenCV Installation | Kholid Khoshimov | 2/23/21 | 2/26/21 | 3 | 100% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.2 | Meeting rules | Khojiakbar Farkhadov, Humoyun Ochilov | 2/27/21 | 3/1/21 | 4 | 90% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.3 | Motor Control | Temur Mannonov, Kholid Khoshimov | 3/2/21 | 3/5/21 | 3 | 100% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.4 | Working on Sensors | Tokhirjon Khamdamov, Kholid Khoshimov | 3/5/21 | 3/9/21 | 4 | 30% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **2** | **IR sensor application** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.1 | Ultasonic sensor | Temur Mannonov, Kholid Khoshimov | 3/10/21 | 3/15/21 | 4 | 100% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.2 | Back line tracing and obstacle detection | Khojiakbar Farkhadov, Kholid Khoshimov | 3/15/21 | 3/19/21 | 3 | 90% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.3 | Brainstorming for mission | Tokhirjon Khamdamov, Humoyun Ochilov | 3/15/21 | 3/19/21 | 0 | 80% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Conclusion**

In the IR sensor part period, we conducted diverse experiments on how turn the car when on the road has obstacle using infrared (IR) sensor. We learned, detect obstacles ahead with ultrasonic sensor and move the car forward left or right to avoid the given object. We understood that while using the functions of turning and moving, time delays played an essential role to make proper actions of the car.

**Appendix**

Ultrasonic application 1 video link: <https://www.youtube.com/watch?v=QwU2QxK5iGs&ab_channel=%D0%A2%D0%B5%D0%BC%D1%83%D1%80%D0%9C%D0%B0%D0%BD%D0%BD%D0%BE%D0%BD%D0%BE%D0%B2>

Ultrasonic application 2 video link: <https://www.youtube.com/watch?v=2gbtLtHEFa0&ab_channel=%D0%A2%D0%B5%D0%BC%D1%83%D1%80%D0%9C%D0%B0%D0%BD%D0%BD%D0%BE%D0%BD%D0%BE%D0%B2>