

Test Sheet – Ad Hoc Network Communication for Disaster Relief Movement Algorithm Sub-System Test



Location	EE Building D-125	
Date	20 December 2023	
Time	18:00	
Description	This test document is designed for an ad hoc network communication by TechBatch to test movement algorithm sub-system, collect the results and publish them.	
Aim	This test guide aims to show if the base unit can monitor the mobile unit for it to move in specified routes.	
Expected Outcome	It is expected to show that the mobile unit is able to move in different paths according to the directions that are predefined.	
Participants	Eren BALEVİ, Eda ÖZKAYNAR, Hasan Said ÜNAL, Mustafa ÇELİK, Mustafa Kemal ÖZDEMİR, Tuana MERDOL	

Test Devices & Tools

1. Map

Test will be done on a map which contains an 8x8 grid. Mobile unit will be placed on this map.

Calibration: Each tile is adjusted as 12.5 cm x 12.5 cm and it is verified with a ruler.

Test Environment

The test environment for this subsystem will be the map that the base unit and mobile unit will be placed on. This map will be a grid with $1 m^2$ area, and it is divided into 8 x 8 square tiles. Each row is named as (A, B, C, D, E, F, G, H), and each column is named as (1, 2, 3, 4, 5, 6, 7, 8). A robot car (mobile unit) will be placed on the starting tile and a computer with an Arduino IDE will be used to send commands for the movement on the specified route.

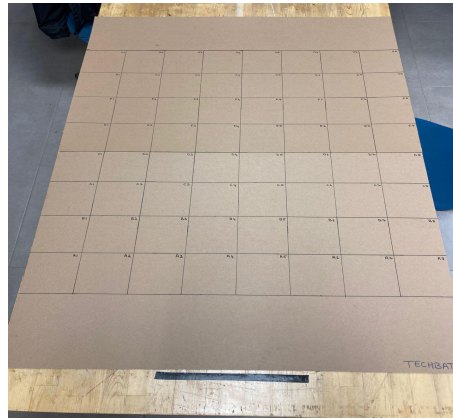


Figure 1: Test environment.

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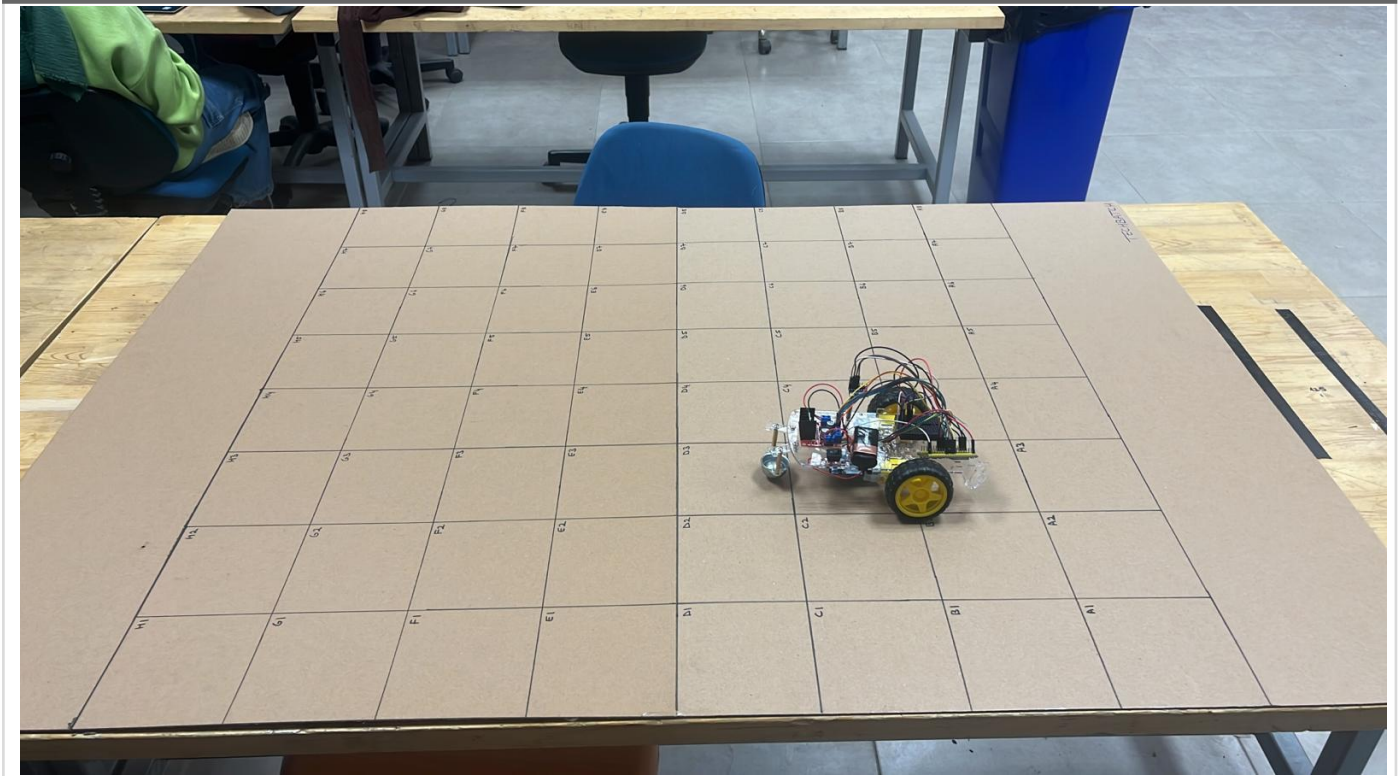


Figure 2: Test environment with MU.

Test Parameters

Parameter	Range	Step Size	Number of Measurements
# of tiles MU traverses in direct path	1-7 tile	2 tile	4
# of tiles in a side of the square MU traverses in square path	4-6 tile	1 tile	3

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1. Test Procedure

1. Movement algorithm test for direct path in different distances is planned. The procedure is as follows:

1. The MU is powered on.
2. The ESP32 microcontroller on the MU will be connected to a phone via Bluetooth, using the Dabble application the connection is established.
3. The mobile unit will be placed on a predetermined tile and directions which is indicated in Figure 3. The paths below will be repeated for 5 times. The command is sent to the MU to start the movement. For navigating MU in the specified paths commands in below must be sent:
 - a. 1: Go straight for 1 tile
 - b. 3: Go straight for 3 tiles
 - c. 5: Go straight for 5 tiles
 - d. 7: Go straight for 7 tiles
 - e. 4: 4x4 square path
 - f. 6: 5x5 square path
 - g. 8: 6x6 square path
4. Error is defined as whether or not the MU is stopped at the target tile. If it didn't stop then this trial would count as a failure.

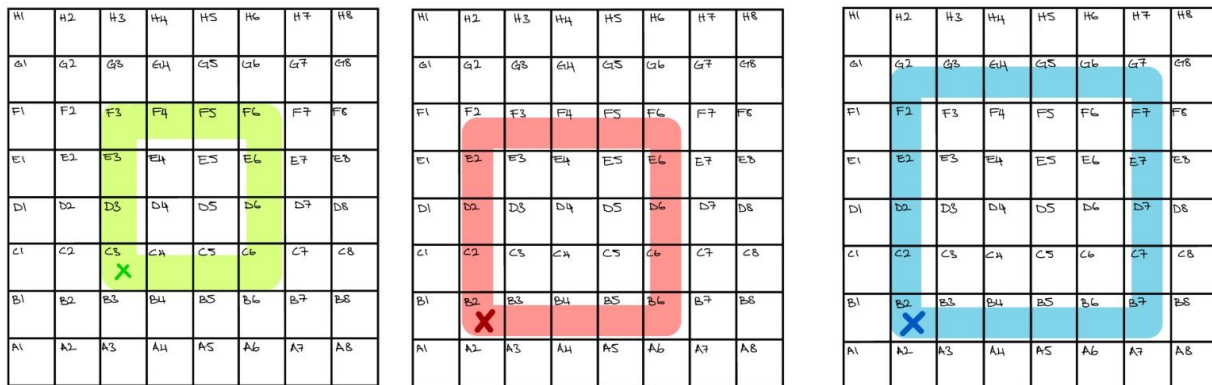


Figure 3: Test paths for square movement.

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Test Data

Table 1: # of tiles MU traverses in direct path

Parameter Value	Actual Performance	Expected Performance	Error
1		5 successful missions out of 5 trials	
3		5 successful missions out of 5 trials	
5		4 successful missions out of 5 trials	
7		4 successful missions out of 5 trials	

Table 2: # of tiles in a side of the square MU traverses in square path

Parameter Value	Actual Performance	Expected Performance	Error
4		4 successful missions out of 5 trials	
5		3 successful missions out of 5 trials	
6		3 successful missions out of 5 trials	

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Data Analysis

(To be filled after the test)

Determine appropriate methods for analyzing and presenting the test data (plots, diagrams, tables, etc.). Provide meaningful statistical analysis.

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Results and Discussion

(To be filled after the test)

Interpret the results of your test by providing a detailed assessment of the performance and data analysis. Determine whether your tests are successful or not. Deduce meaningful conclusions and determine the next steps.