

A-CAST-Report

SLAMMIE Robot CAST

Title	SLAMMIE Robot CAST
Date and Time	09.08.2016, 07:45:51

Accident Description

Accident	SLAMMIE Robot CAST
Accident Date and Time	5/1/16 8:45 AM
Accident Company	UHCL SLAMMIE Research Lake Haven Independent Living Apartments
Accident Description	On April 1st, 2016 at the Lake Haven Independent Living Apartments (1051 Columbia Memorial Pkwy, Kemah, TX 77565), the UHCL SLAMMIE Robot had a communication failure; resulting in the death of Millie Kiesewetter (age 98). System Description : The system description will describe the detailed functionality the SLAMMIE robot and how it works. The system includes the following components: SLAMMIE robot -Call immediately for help(front desk) during any emergency situations -Communicates with Base station -Maps the surroundings daily Base Station -Charging station for SLAMMIE robot -calls immediately to front desk, as SLAMMIE reports Emergency backup -Front Desk External Sensors -Ping Location (Reports SLAMMIE)

Hazards

No.	Title	Description
1	SLAMMIE Loss Communication with Base Station	
2	Robot shutdown, before it could give information to the emergency services	
3	Floor was slippery due to water from the flower vase	
4	Communication signals got blocked as SLAMMIE got stuck inside the bathroom	

Safety Constraints

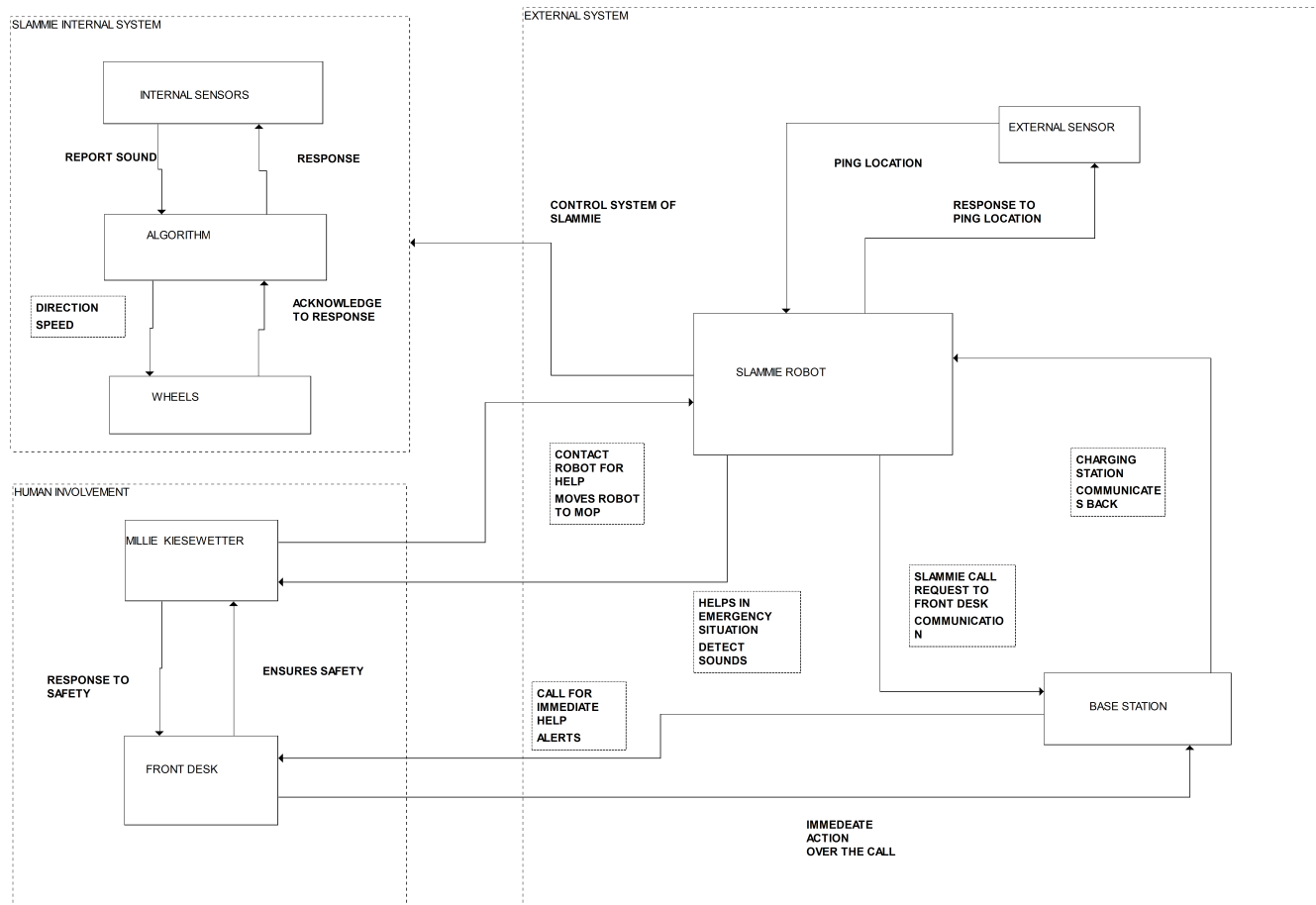
No.	Safety Constraint	Description
1	SLAMMIE shall not Loss Communication with Base Station	SLAMMIE shall not Loss Communication with Base Station. It should have communication with the base station all the time.

No.	Safety Constraint	Description
2	Robot should not get shutdown, it should give information to the emergency services	Robot should not get shutdown, it should have minimum charging and also a backup system for the robot. This backup system will be helpful in emergency situations.
3	Floor should not be slippery	Floors should not be slippery, because moisture on the floor makes someone fall on the floor.
4	Communication signals shall not get blocked anytime	Communication signals shall not get blocked, the communication should be maintained between the SLAMMIE and the BASE STATION all the time.

Proximal Events

ID	Date	Time	Description
1	01.04.2016	07:00:00	Millie Kiesewetter woke up and, as usual, had breakfast and a cup of coffee on the veranda
2	01.04.2016	07:15:00	SLAMMIE has a daily task of mapping the apartment at this moment
3	01.04.2016	07:45:00	Millie walked into the bedroom to have a bath, meanwhile she turned on the radio to her favorite station.
4	01.04.2016	08:05:00	Millie finished her bath, walks out of the bathtub, dripping water on the floor. She exits the bathroom and gets dressed.
5	01.04.2016	08:35:00	Millie hears something fallen in the living room
6	01.04.2016	08:45:00	Millie Kiesewetter died hurting her hip and cracking her skull on the table.

Control Structure Diagram



Roles and Responsibilities

Safety Related Responsibilities: FRONT DESK

ID	Description
1	FRONT DESK shall always have backup arrangement in case of any emergency

Unsafe Decisions and Control Actions: FRONT DESK

ID	Description
—	—

Process/Mental Model Flaws: FRONT DESK

ID	Description
—	—

Context in which decisions made: FRONT DESK

ID	Description
—	—

Feedback: FRONT DESK

ID	Description
—	—

Coordination: FRONT DESK

ID	Description
—	—

Safety Related Responsibilities: MILLIE KIESEWETTER

ID	Description
1	MILLIE KIESEWETTER shall always report for help in any emergency situations / unusual activity
2	MILLIE KIESEWETTER should take help of someone in cleaning the broken vase

Unsafe Decisions and Control Actions: MILLIE KIESEWETTER

ID	Description
—	—

Process/Mental Model Flaws: MILLIE KIESEWETTER

ID	Description
—	—

Context in which decisions made: MILLIE KIESEWETTER

ID	Description
—	—

Feedback: MILLIE KIESEWETTER

ID	Description
—	—

Coordination: MILLIE KIESEWETTER

ID	Description
—	—

Safety Related Responsibilities: EXTERNAL SYSTEM

ID	Description
—	—

Unsafe Decisions and Control Actions: EXTERNAL SYSTEM

ID	Description
—	—

Process/Mental Model Flaws: EXTERNAL SYSTEM

ID	Description
—	—

Context in which decisions made: EXTERNAL SYSTEM

ID	Description
—	—

Feedback: EXTERNAL SYSTEM

ID	Description
—	—

Coordination: EXTERNAL SYSTEM

ID	Description
—	—

Safety Related Responsibilities: WHEELS

ID	Description
1	If the robot wheel got stuck, the robot shall immediately report for backup

Unsafe Decisions and Control Actions: WHEELS

ID	Description
—	—

Process/Mental Model Flaws: WHEELS

ID	Description
—	—

Context in which decisions made: WHEELS

ID	Description
—	—

Feedback: WHEELS

ID	Description
—	—

Coordination: WHEELS

ID	Description
—	—

Safety Related Responsibilities: INTERNAL SENSORS

ID	Description
1	Internal sound sensors should be record every sound in database including date and time
2	Internal sound sensors should be highly detectable
3	Internal robot camera should record each and every movement for reference

Unsafe Decisions and Control Actions: INTERNAL SENSORS

ID	Description
—	—

Process/Mental Model Flaws: INTERNAL SENSORS

ID	Description
—	—

Context in which decisions made: INTERNAL SENSORS

ID	Description
—	—

Feedback: INTERNAL SENSORS

ID	Description
—	—

Coordination: INTERNAL SENSORS

ID	Description
—	—

Safety Related Responsibilities: SLAMMIE INTERNAL SYSTEM

ID	Description
—	—

Unsafe Decisions and Control Actions: SLAMMIE INTERNAL SYSTEM

ID	Description
—	—

Process/Mental Model Flaws: SLAMMIE INTERNAL SYSTEM

ID	Description
—	—

Context in which decisions made: SLAMMIE INTERNAL SYSTEM

ID	Description
—	—

Feedback: SLAMMIE INTERNAL SYSTEM

ID	Description
—	—

Coordination: SLAMMIE INTERNAL SYSTEM

ID	Description
—	—

Safety Related Responsibilities: HUMAN INVOLVEMENT

ID	Description
—	—

Unsafe Decisions and Control Actions: HUMAN INVOLVEMENT

ID	Description
—	—

Process/Mental Model Flaws: HUMAN INVOLVEMENT

ID	Description
—	—

Context in which decisions made: HUMAN INVOLVEMENT

ID	Description
—	—

Feedback: HUMAN INVOLVEMENT

ID	Description
—	—

Coordination: HUMAN INVOLVEMENT

ID	Description
—	—

Safety Related Responsibilities: SLAMMIE ROBOT

ID	Description
1	SLAMMIE ROBOT should able to call emergency services once it lose communication with the BASE STATION
2	SLAMMIE ROBOT should able to contact before getting switched off
3	SLAMMIE ROBOT should not enter in moist surroundings

Unsafe Decisions and Control Actions: SLAMMIE ROBOT

ID	Description
1	SLAMMIE ROBOT failed to keep communication with the BASE STATION
2	SLAMMIE ROBOT entered the moist bathroom
3	SLAMMIE ROBOT failed to get rid of towel from it's tier

Process/Mental Model Flaws: SLAMMIE ROBOT

ID	Description
1	SLAMMIE ROBOT cannot directly call to the front desk, It should report BASE STATION for calling
2	SLAMMIE ROBOT entereing the moist bathroom

Context in which decisions made: SLAMMIE ROBOT

ID	Description
—	—

Feedback: SLAMMIE ROBOT

ID	Description
—	—

Coordination: SLAMMIE ROBOT

ID	Description
—	—

Safety Related Responsibilities: EXTERNAL SENSOR

ID	Description
1	External sensors should also detect accidents and report to base station
2	Should always report exact location of the accident

Unsafe Decisions and Control Actions: EXTERNAL SENSOR

ID	Description
1	External sensors detects less radius

Process/Mental Model Flaws: EXTERNAL SENSOR

ID	Description
1	External sensors cannot directly report to base station

Context in which decisions made: EXTERNAL SENSOR

ID	Description
—	—

Feedback: EXTERNAL SENSOR

ID	Description
—	—

Coordination: EXTERNAL SENSOR

ID	Description
—	—

Safety Related Responsibilities: ALGORITHM

ID	Description
1	Standard process should be maintained including upgrading of system code/process
2	Any internal flaw in process shall be reported immediately

Unsafe Decisions and Control Actions: ALGORITHM

ID	Description
—	—

Process/Mental Model Flaws: ALGORITHM

ID	Description
—	—

Context in which decisions made: ALGORITHM

ID	Description
—	—

Feedback: ALGORITHM

ID	Description
—	—

Coordination: ALGORITHM

ID	Description
—	—

Safety Related Responsibilities: BASE STATION

ID	Description
1	If there is no response from the front desk, BASE STATION should have alternative decisions like making a call to Doctor or next to him

Unsafe Decisions and Control Actions: BASE STATION

ID	Description
1	

Process/Mental Model Flaws: BASE STATION

ID	Description
1	

Context in which decisions made: BASE STATION

ID	Description
—	—

Feedback: BASE STATION

ID	Description
—	—

Coordination: BASE STATION

ID	Description
—	—

Findings and Recommendations

Findings and Recommendations: FRONT DESK

ID	Description
1	FRONT DESK shall always have backup arrangement in case of any emergency
2	FRONT DESK shall have advanced equipment in order to view through the camera (Internal robot camera)

Findings and Recommendations: MILLIE KIESEWETTER

ID	Description
1	MILLIE KIESEWETTER should always be careful
2	MILLIE KIESEWETTER should take help of someone in cleaning the broken vase
3	MILLIE KIESEWETTER shall always report for help in any emergency situations / unusual activity

Findings and Recommendations: EXTERNAL SYSTEM

ID	Description
—	—

Findings and Recommendations: WHEELS

ID	Description
1	Wheels shall have more traction (Grip) on all types of surface. This helps the robot to move easily on floors even they are wet.
2	The diameter of the wheels shall be increased, in order to avoid smaller objects to stop the robot.
3	If the robot wheel got stuck, the robot shall immediately report for backup

Findings and Recommendations: INTERNAL SENSORS

ID	Description
1	Internal sound sensors should be highly detectable
2	Internal sound sensors should be record every sound in database including date and time
3	Internal robot camera should record each and every movement for reference

Findings and Recommendations: SLAMMIE INTERNAL SYSTEM

ID	Description
1	SLAMMIE internal system shall always not have any problem. It should able to communicate between system without any issues

Findings and Recommendations: HUMAN INVOLVEMENT

ID	Description
—	—

Findings and Recommendations: SLAMMIE ROBOT

ID	Description
1	SLAMMIE ROBOT shall able to call emergency services once it lose communication with the BASE STATION
2	SLAMMIE ROBOT shall able to contact front desk before getting switched off due to low battery
3	SLAMMIE ROBOT shall able to work in moist conditions

Findings and Recommendations: EXTERNAL SENSOR

ID	Description
1	External sensors shall also detect accidents and report to base station
2	Should always report exact location of the accident

Findings and Recommendations: ALGORITHM

ID	Description
1	Standard process should be maintained including upgrading of system code/process
2	Any internal flaw in process shall be reported immediately

Findings and Recommendations: BASE STATION

ID	Description
1	If there is no response from the front desk, BASE STATION shall have alternative decisions like making a call to Doctor or next to kim
2	BASE STATION should have flawless communication with the Robot
3	BASE STATION