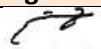
Meeting No.: 1		**Date: 24/1/2024**
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	Yes
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	yes

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	The advisor suggested a change in the project idea/design due to unforeseen challenges in gathering essential data.		N	
2	The advisor shared some papers for designs closely related to our project and urged us to research and decide whether we are going to proceed with the proposed design or stick with the original design.		N	
3	The advisor asked as to split the team into 2 groups to divide the workload and track our progress.		N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		24/1/2024
2	Manaf Abduljabbar		24/1/2024
3	Obada Alhomsi		24/1/2024
4	Ezeddin Ezeddin		24/1/2024
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			24/1/2024

Meeting No.: 2		**Date:** 31/1/2024
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	Yes
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	yes

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
1,2	Based on our discussion as a team and with the advisor we decided that we will proceed with the original design		F	3
3	We split the team into 2 groups as per the advisor requested Mahmoud and Obada are group 1, Ezz and Manaf will be group 2		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	We discussed how to implement the circuit with the advisor and Dr Uvias and what sensors we might need	2,4	N	
2	Installing tensorflow lite for machine learning and deep learning on raspberry pi	1,3	N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: we received the raspberry pi from the advisor By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		31/1/2024
2	Manaf Abduljabbar		31/1/2024
3	Obada Alhomsi		31/1/2024
4	Ezeddin Ezeddin		31/1/2024
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			31/1/2024

Meeting No.: 3		**Date:** 7/2/2024
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	No
2	Manaf Abduljabbar	No
3	Obada Alhomsi	No
4	Ezeddin Ezeddin	No

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
1	We were searching for lithium-ion batteries with different states of health to skip the process of manually degrading these batteries to be able to test our model on real batteries and we found a potential source.		F	3
2	We were searching for devices that could help us in benchmarking our model by comparing our results to real products that measure the state of health of lithium batteries but we couldn't find such devices that work with the same type of batteries that we working on which is 18650.		F	3
3	We looked for devices that would help us in speeding up the process of degradation of lithium-ion batteries by loading the batteries and automating the process of charging and discharging. But, the advisor highlighted that such devices are beyond our budget so we kept looking and we found a potential alternative with lower price.		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	Provide updates on the current state of work and start filling the logbook.		N	
2	Look for related work and investigate other researchers hardware implementations.		N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3

2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		7/2/2024
2	Manaf Abduljabbar		7/2/2024
3	Obada Alhomsi		7/2/2024
4	Ezeddin Ezeddin		7/2/2024
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			7/2/2024

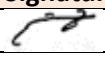
Meeting No.: 4		**Date:** 14/2/2024
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	No
2	Manaf Abduljabbar	No
3	Obada Alhomsi	No
4	Ezeddin Ezeddin	Yes

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
1	We provided the logbook of all previous meetings.		F	3
2	We found a research paper titled "Analysis of Optimal Machine Learning Approach for Battery Life Estimation of Li-ion Cell" by Hassan Haes Alhelou that discussed a similar setup but did not provide real-time state-of-health (SOH) readings and compared between multiple models.		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	Start thinking about how to build a circuit to collect the data.		N	
2	Begin brainstorming and researching different sensor types and circuit configurations that would be suitable for collecting the data needed for your project. Consider factors such as the type of data you want to collect like voltage, current, temperature, the sensors required, the interface with the microcontroller or data acquisition system, power supply requirements, and any signal conditioning or processing needed.		N	
3	Create a visual representation (sketch or schematic diagram) of the circuit you plan to build. Include all components such as sensors, microcontrollers, power sources, and any other relevant hardware. Label the components and connections clearly to ensure understanding and ease of implementation when it comes time to build the actual circuit. Use software tools like Fritzing, Eagle, or any other circuit design software to create the schematic.		N	
4	Once you have the circuit designed and assembled, start collecting actual data readings using the sensors and hardware setup. Set up the necessary data logging or acquisition system to capture the data from the sensors at regular intervals or in response to specific events. Verify that the data collection process is functioning correctly and that you are obtaining meaningful and accurate readings from the sensors.		N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		14/2/2024
2	Manaf Abduljabbar		14/2/2024
3	Obada Alhomsi		14/2/2024
4	Ezeddin Ezeddin		14/2/2024
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			14/2/2024

Meeting No.: 5		**Date: 21/2/2024**
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	Yes
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	yes

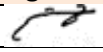
Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
1,2	We designed and built a functional circuit capable of interfacing with an 18650 lithium-ion battery, integrating sensors (MAX741 current and voltage, DS18B20 temperature), a battery management system (BMS - TP4056), a 2-channel relay, a load, and a potential power source (e.g., power bank). The circuit automated charging/discharging, collected data for testing and potential model training, managed voltage/current levels, and ensured stable power for sensors.		F	3
3	We programmed the microcontroller to read sensor outputs. And we began collecting real data using the sensors and hardware setup. We are still in the process of establishing a data logging system to capture sensor data regularly or in response to events, ensuring accurate and meaningful readings. And we are trying to collect the data now into a CSV file.		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	Write code to store the sensor data in a structured format, such as a CSV file, a database, or a simple text file. The data should be organized for easy use in further analysis to determine the battery's State of Health (SOH).		N	
2	Try to reduce the charge and discharge time. The charge/discharge cycle took 13 hours.		N	
3	Track the charge/discharge cycles of the battery and the real-time output of the battery. However, without knowing the		N	

	number of charge/discharge cycles, it may be difficult to accurately determine the SOH.			
4	Add a power supply circuit to the system that can safely charge the lithium-ion battery. Use a power bank circuit to store and supply power to the system.		N	
5	We will test the model on the newly acquired data and determine whether we need to retrain the model or tune some parameters. We will also calculate the error rate to evaluate the model's performance.		N	
6	We will compare the model outcome with preexisting solutions, such as the LTC3337 chip, to assess accuracy, efficiency, and feasibility, identifying areas for potential improvement or optimization.		N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		**21/2/2024**
2	Manaf Abduljabbar		**21/2/2024**
3	Obada Alhomsi		**21/2/2024**
4	Ezeddin Ezeddin		**21/2/2024**
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			**21/2/2024**

Meeting No.: 6		**Date: 28/2/2024**
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	Yes
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	yes

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
1	We conducted some calibration for accurate sensor readings and developed code to store sensor data in a structured format (CSV, database, text file) for analysis related to the battery's State of Health (SOH). Sensor readings of the battery voltage, current, and temperature are currently being stored in two separate files on a PC for testing, one for charging and the other for discharging.		F	3
2	We looked into how to reduce the charge and discharge time. The charge/discharge cycle took 13 hours. One way to reduce the time is to implement a current sink, which could reduce the time to 3 hours. This requires using a transistor (MOSFET) and a ceramic load in the circuit design.		F	3
3	We tracked the cycles and included it into the CSV file Track the charge/discharge cycles of the battery and the real-time output of the battery.		F	3
4	We still didn't add a power supply circuit.		C	3
5	We tested the model. There was a decrease in the performance or accuracy of the system around 0.5%, possibly due to the inaccuracy of the sensor readings, parameter tuning in the original model but not in the data that is being tested, or rounding errors from the data types used in the code or model. Floating point numbers can represent a wider range of values than fixed point numbers, but they can also introduce rounding errors.		F	3
6	We have put this task on hold as it is not needed anymore, which is comparing the model outcome with preexisting solutions, such as the LTC3337 chip, to assess accuracy, efficiency, and feasibility, identifying areas for potential improvement or optimization.		F	3

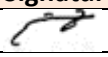
Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)	**BY ADVISOR**

Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	Assess the model performance before and after compression using TensorFlow. Compare the performance of the TensorFlow Lite model when it is compressed to 16 bits versus 32 bits. This can affect the model's accuracy and size. Check the online resources and documentation for implementing TensorFlow Lite and the resources sent by the advisor. Coordinate with the other team that is working on implementation of TensorFlow Lite to gain some knowledge and speed up the work.		N	
2	The next step is to research the connection of the circuit to the Raspberry Pi and to program the Arduino to communicate with the Raspberry Pi and start reading data in real time from the Arduino to the Raspberry Pi using one of the following methods: serial communication, USART, I2C, or Wi-Fi.		N	
3	Discuss the innovative aspects of the project and examine how other devices are able to calculate the state of health or if no one has implemented it and what limitations these devices might have.		N	
4	Sensor readings of the battery voltage, current, and temperature are currently being stored in two separate files on a PC for testing, one for charging and the other for discharging. The next step is to program the Arduino to communicate with the Raspberry Pi and start reading data in real time from the Arduino to the Raspberry Pi using serial communication, USART, or Wi-Fi.		N	
5	Try again to integrate a power supply circuit to the system that can safely charge the lithium-ion battery using a power bank.		C	
6	Start writing the report or documentation for the project.		N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		**28/2/2024**
2	Manaf Abduljabbar		**28/2/2024**
3	Obada Alhomsi		**28/2/2024**
4	Ezeddin Ezeddin		**28/2/2024**

Advisor Name	Signature	Date
Mohamed Al-Meer		**28/2/2024**

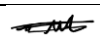
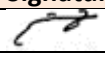
Meeting No.: 7		**Date: 6/3/2024**
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	no
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	no

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
1	We successfully compared the performance of the TensorFlow model and TensorFlow Lite model. The original model size was around 4MB, the TensorFlow Lite model was 1.4MB, and after compression to float16, it became 750KB. The accuracy of the original model (98.5%) remained unchanged after transforming it into a TensorFlow . after compression to lite (both 32-bit and 16-bit achieved 95%). The runtime was approximately 3 seconds. We will gather additional parameters like error rates, RMSE, MAE, and R-squared in the coming weeks after finishing the circuit and the implementation.		F	3
2	We decided to go with USB serial communication due to its convenience, reliability, and simplisity. We remain open to exploring other alternatives if we found a better protocol that we could use.		F	3
3	The load was replaced with a 5-15 ohm ceramic resistor, improving reliability and reducing discharge time to 4 hours. The code was modified to automate charging, discharging, and data collection via the serial monitor. We encountered an error where the code created new headers within the data file during collection. We are re-collecting data and currently storing it only for potential model retraining in case of performance issues. The cycle count for discharge cycles was added to the code.		F	3
4	The power supply circuit integration is still pending. We are currently utilizing the lab power supply but plan to implement the circuit next week.		C	3
5	Report writing will commence upon completion of the circuit and implementation.		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	Finish the data collection and test the model on real collected data		N	
2	Deploy the model on raspi. Currently, all testing occurs on the PC. This week, we will deploy the model onto the Raspberry Pi for a more realistic testing environment.		C	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		**6/3/2024**
2	Manaf Abduljabbar		**6/3/2024**
3	Obada Alhomsi		**6/3/2024**
4	Ezeddin Ezeddin		**6/3/2024**
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			**6/3/2024**

Meeting No.: 8		**Date: 27/3/2024**
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	Yes
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	yes

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
2	We successfully deployed a 16-bit model using TensorFlow Lite on the Raspberry Pi. This deployment involved configuring the Raspberry Pi to run TensorFlow Lite and integrating the model into its environment for inference.		F	3
1	We demonstrated the process of reading and collecting data using Arduino. Once some data has been collected the data was sent by Arduino to the Raspberry Pi using serial communication USB for further processing and storage. The data was formatted in a way that could be easily handled by the TensorFlow lite model by storing it into csv format.		F	3
	We tested the model using real collected data.		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
1	Perform evaluation testing on the collected results to assess their accuracy and reliability.		N	
2	Develop a GUI in Python for the Raspberry Pi to display real-time State of Health (SOH) readings.		N	
3	Finalize the report by consolidating all activities and progress made throughout the semester.		N	
4	Create new milestones and revise the time plan to accommodate any adjustments or additions.		N	
5	Begin working on the presentation, research poster, and pitch video to communicate project findings and progress effectively.		N	

Other matters if any (BY STUDENTS/ADVISOR)
By Students: By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	Student Name	Signature	Date
1	Mahmoud Barodi		**27/3/2024**
2	Manaf Abduljabbar		**27/3/2024**
3	Obada Alhomsi		**27/3/2024**
4	Ezeddin Ezeddin		**27/3/2024**
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			**27/3/2024**

Meeting No.: 9		**Date: 24/4/2024**
No.	Member's name/QUID **(BY STUDENTS)** *keep the same order in all logbooks.*	Attended/Absent **(BY ADVISOR)**
1	Mahmoud Barodi	Yes
2	Manaf Abduljabbar	Yes
3	Obada Alhomsi	Yes
4	Ezeddin Ezeddin	yes

Tasks from last meeting (BY STUDENTS)		**BY ADVISOR**		
Task No	Progress, problems, related issues, …	Assigned to **Member's No/All**	**F**inished/ **C**ontinued/ **F**inished **D**elayed **F/C/FD**	Unsatisfactory (**1**) Marginal (**2**) Satisfactory (**3**) **1/2/3**
	We engaged in a thorough review session with the doctor, where we discussed and received valuable feedback on how to enhance the content and formatting of the report. This feedback included suggestions for improving clarity, structure, and overall presentation to ensure the report effectively communicates our work.		F	3
	We showcased the Graphical User Interface (GUI) we developed and conducted a demonstration of the complete circuits associated with our project. During this presentation, we received feedback on ways to further refine and optimize the organization of our work. This feedback focused on streamlining the presentation of the GUI and enhancing the clarity of our circuit demonstration.		F	3
	In addition to the report and GUI demonstration, we submitted other project-related files, such as the presentation slides and research poster, for feedback and comments. This proactive approach allowed us to gather input on various aspects of our project, including visual design, content coherence, and overall effectiveness in conveying key messages.		F	3

Tasks from this meeting (BY STUDENTS BASED ON ADVISOR)		**BY ADVISOR**		
Task No	Description	Assigned to **Member's No/All**	**N**ew/ **C**ontinued **N/C**	Duration in days
	We received feedback on improving the report's content, formatting, and circuit organization.			
	No further revisions or notes are expected.			

Other matters if any (BY STUDENTS/ADVISOR)

By Students:
By Advisor:

Evaluation: unsatisfactory (1), marginal (2), satisfactory (3) (BY ADVISOR) 1/2/3			
Member No.	Quality of the work	Contribution in discussions	Communication skills and team playing
1	3	3	3
2	3	3	3
3	3	3	3
4	3	3	3

Student No	**Student Name**	**Signature**	**Date**
1	Mahmoud Barodi		**24/4/2024**
2	Manaf Abduljabbar		**24/4/2024**
3	Obada Alhomsi		**24/4/2024**
4	Ezeddin Ezeddin		**24/4/2024**
Advisor Name		**Signature**	**Date**
Mohamed Al-Meer			**24/4/2024**