

Regulated Research Institutional/Industrial Setting Form (1C)

This form must be completed **AFTER** experimentation by the adult supervising the student research either virtually or on site, conducted in a regulated research institution, industrial setting or any work site other than home, school or field.

Student's Name(s) Liu Zihao, Ng Jean Tzi Edric

Title of Project Data-Driven Method for Li-Ion Battery Health Monitoring

To be completed by the Supervising Adult in the Setting (NOT the Student(s)) after experimentation:

(Responses must be on the form as it is required to be displayed at student's project booth; please do not print double-sided.)

Research was supported at my work site:

1. Did you or your proxy (e.g. graduate student, postdoc, employee) mentor or provide substantial guidance to the student researcher?

☒ Yes

☐ No

a. If yes, complete questions 2–5

- b. If no, describe your and/or your institution's role with the student researcher and his/her project (e.g. supervised use of equipment on site without ongoing mentorship and sign below).

NA

2. Is the student's research project a subset of your ongoing research or work?

☐ Yes

☒ No

Use questions 3, 4 and 5 to detail how the student's project was similar and/or different from ongoing research or work at your site. If this project is under a grant and needs to be acknowledged, please list the grant statement here.

The students are doing research in developing the machine learning model to predict the state-of-health (SOH) of the battery, different from my ongoing work, which is to estimate SOH of the battery from the health indicator (HI) extracted.

3. Describe the independence and creativity with which the student:

a. developed the hypotheses or engineering goals for the research project

The students was proactive in clarifying queries with regards to results from past work. They were then able to understand this project and develop an end goal for their experiments.

b. designed the methodology for his/her research project

The students asked for relevant literature papers for their project. They then conduct subsequent experiments independently after reading the literatures and understanding the project. They clarified their questions about the research with me, and were provided with the datasets for training. Then they were able to develop a correct methods to create the model framework and then adapted suitable tools to build and train the model.

c. analyzed and interpreted data

They independently trained and evaluated the model with the dataset given. They adapted the correct methods to evaluate the results and calculate the errors. After checking with relevant research, they were able to show the good correlation and make predictions.

(Continued on next page)

Regulated Research Institutional/Industrial Setting Form (1C) Continued

Student's Name(s) Liu Zihao, Ng Jean Tzi Edric

4. Detail the student's role in conducting the research (e.g. data collection, specific procedures performed). Differentiate what the student observed and what the student actually did.

Zihao and Edric conducted the literature research on background knowledge required for this project. They meet with me to clarify some questions. During the planning process, they were able to process the pre-collected dataset and understand the meaning of the data. After discussing with each other, they were able to create a specific model and present their framework in a clear and systematic way using the flow diagram. They then learnt the relevant programming libraries to build the model and then trained it with correct methods, evaluating their results with correct parameters. At the end of the project, Zihao and Edric split the work and finished the project report together.

5. Did the student(s) work on the project as part of a group?

☐ Yes

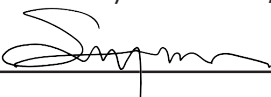
☐ No

If yes, how many individuals were in the group and who were they (e.g. high school students, graduate students, faculty, professional researchers)?

No. The two students work independently.

I attest that the student has conducted the work as indicated above and that any required review and approval by institutional regulatory board (IRB/IACUC/IBC) has been obtained. Copies are attached if applicable. I further acknowledge that the student will be presenting this work publicly in competition and I have communicated with the student research regarding any requirements for my review and/or restrictions of what is publicized.

Xu Yan
Supervising Adult's Printed Name


Signature

Associate professor
Title

School of Electrical and Electronic Engineering, NTU
Institution

01/09/23
Date Signed (must be after experimental)
(mm/dd/yy)

50 Nanyang Avenue, Singapore, 639798
Address

xuyan@ntu.edu.sg
Email/Phone