國立臺東大學 理工學院
NATIONAL TAITUNG UNIVERSITY COLLEGE of SCIENCE and ENGINEERING

教師指導學生專題製作與論文競賽補助 成果報告

一、 申請補助計畫基本資料

申請教師	劉恩睿	核定經費	8000
單位系所	綠能與資訊科技學系	經費執行情況	■已請購核銷完畢 □尚未請購核銷 □經費餘款_____
計畫執行年度/學期	113 年度第二學期	參賽期程	2025 年 4 月 25 日~ 2025 年 4 月 27 日
參加競賽/學術活動名稱	IEEE ICEIB 2025	作品名稱	Combining FFRLS and DAEKF Techniques for Dynamic Estimation of Lithium Battery State of Charge
指導參賽學生姓名	丁彩淳、徐唯瑄、洪偉華	班級	綠能三
競賽性質	☑國際性 □校際 □校內(院級以上)	參賽地點	淡江大學
系所主管簽章		日期	
學院院長簽章		日期	

二、 參賽作品：(論文摘要或作品說明)

Abstract—As electric vehicles gain traction globally, lithium-ion batteries serve as the primary energy storage units, crucially affect the vehicles' performance, safety and lifespan. Accurate state of charge (SOC) estimation emerges as a pivotal component of the battery management system (BMS), essential for enhancing the predictability of the vehicle's range and averting thermal runaway due to improper charging practices. This paper introduces an adaptive SOC estimation methodology, beginning with parameter identification through forgetting factor recursive least squares (FFRLS). These parameters are then incorporated into dual adaptive extended Kalman filter (DAEKF) to facilitate SOC estimation under varying load conditions. The study reveals that the DAEKF dynamically adjusts the covariance matrices for process and measurement noises, significantly enhancing the filter's adaptability and precision. The integration of FFRLS and DAEKF provides a robust state estimation in vehicular models, featuring rapid computation speeds, high accuracy, and excellent adaptability, positioning it as an ideal candidate for future enhancements in BMS technology.

三、 參加之競賽活動：(請依據參加活動次數，附上相關活動簡章或海報、議程與參加證明等佐證資料)

ICEIB 2025 Conference Agenda

Conference schedules are listed in Taiwan Local Standard Time (GMT+8:00, Taipei)

Venue: Tamkang University, New Taipei, Taiwan — Language: English

Main Conference		
Friday, April 25, 2025		
09:00	09:30	Welcoming Reception & Registration
09:30	10:00	Opening Ceremony
10:00	10:20	Coffee Break
10:20	11:10	Keynote Speech
11:10	12:00	Keynote Speech
12:00-13:00 LUNCH BREAK		
13:00	17:00	Oral Paper Sessions & Poster Paper Sessions
14:50	15:10	Coffee Break
13:00	17:00	(Remote) Oral Paper Sessions & Poster Paper Sessions
18:00	20:00	Conference Banquet & Best Paper Award
Main Conference		
Saturday, April 26, 2025		
09:00	17:00	Poster Paper Sessions & (Remote) Poster Paper Sessions
Main Conference		
Sunday, April 27, 2025		
08:30	17:30	Technical Visit & Communication

四、 參賽準備與活動記錄

※請附文字說明與 4-6 張活動照片（無照片則免附）

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圖說明：其他組的成果海報</td>
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五、參加競賽成果 (參賽證明、得獎證明或學生心得)

學生心得:

這次參加國際研討會對我們來說是一個很棒的學習經驗,透過這次機會我們不僅能將我們的研究成果跟大家分享,同時去看看其他團隊的研究,讓我們拓展了視野、啟發了新的思考方向。此外,這次活動也是我們練習英文表達的好機會。當天在現場我們遇到了一位外國教授向我們提問,但由於她語速較快,加上我們平時較少使用英文進行聽說交流,導致當下沒能完整理解問題的內容。這次的經驗讓我們深刻意識到,除了專業知識外,英文能力也是與國際接軌的重要關鍵,未來我們會更加努力提升這方面的能力,以便更自信地參與國際交流。

圖：研討會與會證明。


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Combining FFRLS and DAEKF Techniques for Dynamic Estimation of Lithium Battery State of Charge
Cai-Chun Ting; Wei-Hsuan Hsu; Pei-Zhang Chen; Wei-Hua Hong; Hung-Chih Ku; En-Jui Liu

New Taipei, Taiwan, April 25-27, 2025

Teen-Hang Meen
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The President of International Institute of Knowledge Innovation and Invention

Prof. Tzung-Kang Lee, Ph. D.
Dean, College of Engineering, Tamkang University, Taiwan
Conference Chairman of ICEIB 2025

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圖二：最佳研討會論文獎。