



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



EIE Robotic Challenge Junior 2018: Flying Robot EIE 機械人中小學生挑戰賽 2018：理電飛天

Dr. Lawrence Cheung
張子聰博士

March 2018
2018年3月

Objective 比賽目的

- Through this competition, we would like to arouse students' creativity and enhance their problem solving skills.
- Through the whole process, we would like to arouse students' interest in Electronic Engineering.
- 透過構建機械人參加這次比賽，激發學生創意和解難能力，從過程中引起學生對電子工程的興趣。

Organizers 主辦機構

- Organizers 主辦機構



- Co-Organizers 協辦機構

DNT FPV Drone Hong Kong Association
香港FPV無人機協會



EGG
Technology
Ltd.



Features 特點

- You can create a flying robot from scratch!
- 學生可以由零開始創造自己的飛天機械人！
- You can compete with other robots!
- 你可以跟其它機械人一起比賽！
- EIE provides workshops for you!
- 香港理工大學電子及資訊工程學系提供工作坊，學生可以體驗大學的教育和學習生活！

Features 特點

- EIE and sponsors will give financial supports to build robots!
- 香港理工大學電子及資訊工程學系和贊助機構會補貼大部分製造機械人的費用！
- You may represent Hong Kong to join the RCJ2018 international!
- 你可能獲邀請代表香港參加「理電飛天」國際邀請賽！

Schedule 流程

- Registration (Deadline: 5 pm, 13 Apr)
- 報名（截止日期：4月13日下午5點）
- Workshops
 - 19 and 20 June (full day)
- 工作坊
 - 6月19日和20日（全日）

Schedule 流程

- Complete guideline and material delivery (June)
- 完全指南和材料交付（六月）
- Robot making and trail run (June and July)
- 機械人製作和試用比賽場地（六月和七月）
- Laboratories will be opened on June and July.
The schedule will be confirmed later.
- 實驗室將於六月和七月開放。時間表將在稍後確認。

Schedule 流程

- Dates

- Qualifying stage: 6 July (Friday)
- Initial stage: 12 July (Thursday)
- Final stage: 12 July (Thursday)
- 日期
- 資格賽：7月6日（星期五）
- 初賽：7月12日（星期四）
- 決賽：7月12日（星期四）

Workshops 工作坊

- Overview 概述
- Introduction to Servo Motor and Microcontroller 伺服馬達和微控制器簡介
- Programming for Robots 機械人編程
- 3D Printing 3D打印外殼
- Drone control and training 無人機控制和培訓

Robot Making 機械人製作

- Complete guideline 完全指南
- Provide Android app to control a robot through Bluetooth and mobile phones
- 提供Android app通過手機和藍牙控制機械人

Types of Competition 比賽類型

- At most four students form one team.
- 最多四名學生組成一隊。
- Each team has a corresponding teacher and student (leader) for communication.
- 每隊都要有相關的老師和學生（隊長）。
- We will contact a team through the teacher and the student (leader).
- 我們將通過老師和學生（隊長）聯絡。

Types of Competition 比賽類型

- Beginner Level 初級組
 - Participants: P. 6 students 參賽者：小六學生
 - Components: robot with wheels + drone (the head of the robot will be attached to the drone)
 - 組件：簡單機械人（使用輪子）+ 無人機（機械人頭部將連接到無人機）
 - We borrow drones to them. 借用無人機
 - Difficulty level: Low 難度級別：低

Types of Competition 比賽類型

- Intermediate Level 中級組
 - Participants: secondary school students (junior, F.3 or below) 參賽者：中三或以下學生
 - Components: robot + drone (the head of the robot will be attached to the drone)
 - 組件：機械人 + 無人機（機械人頭部將連接到無人機）
 - We borrow drones to them. 借用無人機
 - Difficulty level: Medium 難度級別：中

Types of Competition 比賽類型

- Advanced Level 高級組
 - Participants: secondary school students (senior, F.6 or below) 參賽者：中六或以下學生
 - Components: robot + drone (the head of the robot will be attached to the drone)
 - 組件：機械人 + 無人機（機械人頭部將連接到無人機）
 - We borrow drones to them. 借用無人機
 - Difficulty level: High 難度級別：高

Types of Competition 比賽類型

- Expert Level 專家組
 - Participants: secondary school students (F.6 or below) 參賽者：中六或以下學生
 - Components: robot + drone (self-design, the robot will be combined with the drone)
 - 組件：機械人+無人機（自行設計，機器人將與無人機結合）
 - They buy their own drones. 購買自己的無人機
 - Limited number of teams 參賽者的數量有上限

Admission Fee 參賽費

- Package A: HKD 500 (Beginner, Intermediate and Advanced Levels)
- 套餐A：\$500（初級組，中級組和高級組）
 - Provide electronic components.
 - 提供電子零件。
 - Provide workshops for building robots and controlling drones.
 - 提供製作機械人和控制無人機的工作坊。

Admission Fee 參賽費

- Do NOT provide 3D printing for building robots.
- 不為製作機械人提供3D打印。
- Provide the drone training and testing in PolyU.
- 在理大提供無人機培訓和測試。
- Provide complete guideline with videos and programs to build robots and control drones.
- 提供有關製作機械人和控制無人機的完整指南（包括視頻和電腦程式）。

Admission Fee 參賽費

- Provide technical support from PolyU and DNT FPV Drone Hong Kong Association.
- 提供理大及香港FPV無人機協會的技術支援。
- Borrow a drone in the competition.
- 在比賽中借用無人機。

Admission Fee 參賽費

- Package B: HKD 900 (Beginner, Intermediate and Advanced Levels)
- 套餐B：\$900（初級組，中級組和高級組）
 - Package A + 3D printing for building robots
 - 套餐A + 為製作機械人提供3D打印

Admission Fee 參賽費

- Package C: HKD 1950 (Expert Level)
- 套餐C：\$1950（專家組）
 - Package B + drone
 - 套餐B + 無人機
- Package D: HKD 1550 (Expert Level)
- 套餐D：\$1550（專家組）
 - Package A + drone
 - 套餐A + 無人機

Admission Fee 參賽費

- Package E: HKD 300 (Beginner, Intermediate and Advanced Levels)
- 套餐E：\$300（初級組，中級組和高級組）
 - Package A + attach a logo of a sponsor to the robot body
 - 套餐A + 將贊助商的標誌附加到機械人身上

Admission Fee 參賽費

- Package F: HKD 600 (Beginner, Intermediate and Advanced Levels)
- 套餐F：\$600（初級組，中級組和高級組）
 - Package B + attach a logo of a sponsor to the robot body
 - 套餐B + 將贊助商的標誌附加到機械人身上

Regulations 條例

- Subject to approval if the hardware configuration of the robot and the drone is different to what we specify.
- 如果機械人和無人機的硬件配置與我們指定的不同，需經批准。

Qualifying Stage 資格賽

- Participants are qualified if they can successfully complete the following tasks:
- 參賽者需要成功完成以下任務：
 - The robot can finish specified dancing motions.
 - 機械人可以完成指定的舞蹈動作。

Qualifying Stage 資格賽

- The robot can walk to push a ball crossing a line.
- 機械人可以推動足球穿越一條線。

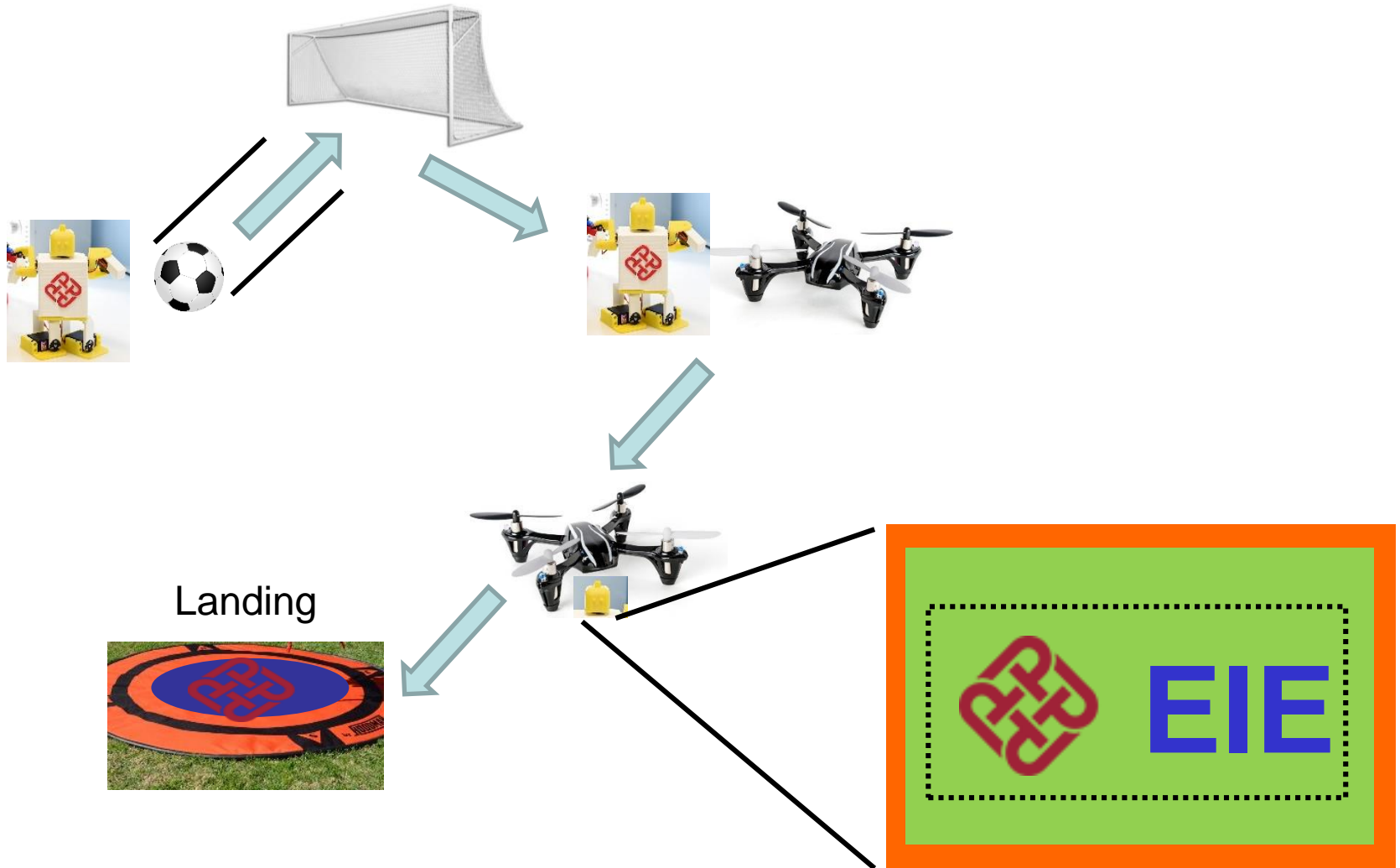


Qualifying Stage 資格賽

- A team can control a drone to take a photo with PolyU and EIE Logos.
- 參賽者可以控制無人機給理大和EIE標誌拍照。



Initial Stage 初賽



Initial Stage 初賽

- Requirements: 要求：
 - The ball is kicked inside the net. 球踢入網內。
 - A photo is taken with PolyU and EIE logos (no orange colors can be found in the photo). 給理大和EIE標誌拍照（照片中不能找到橙色）。
 - The drone is landed inside the circle. 無人機降落在圓圈內。

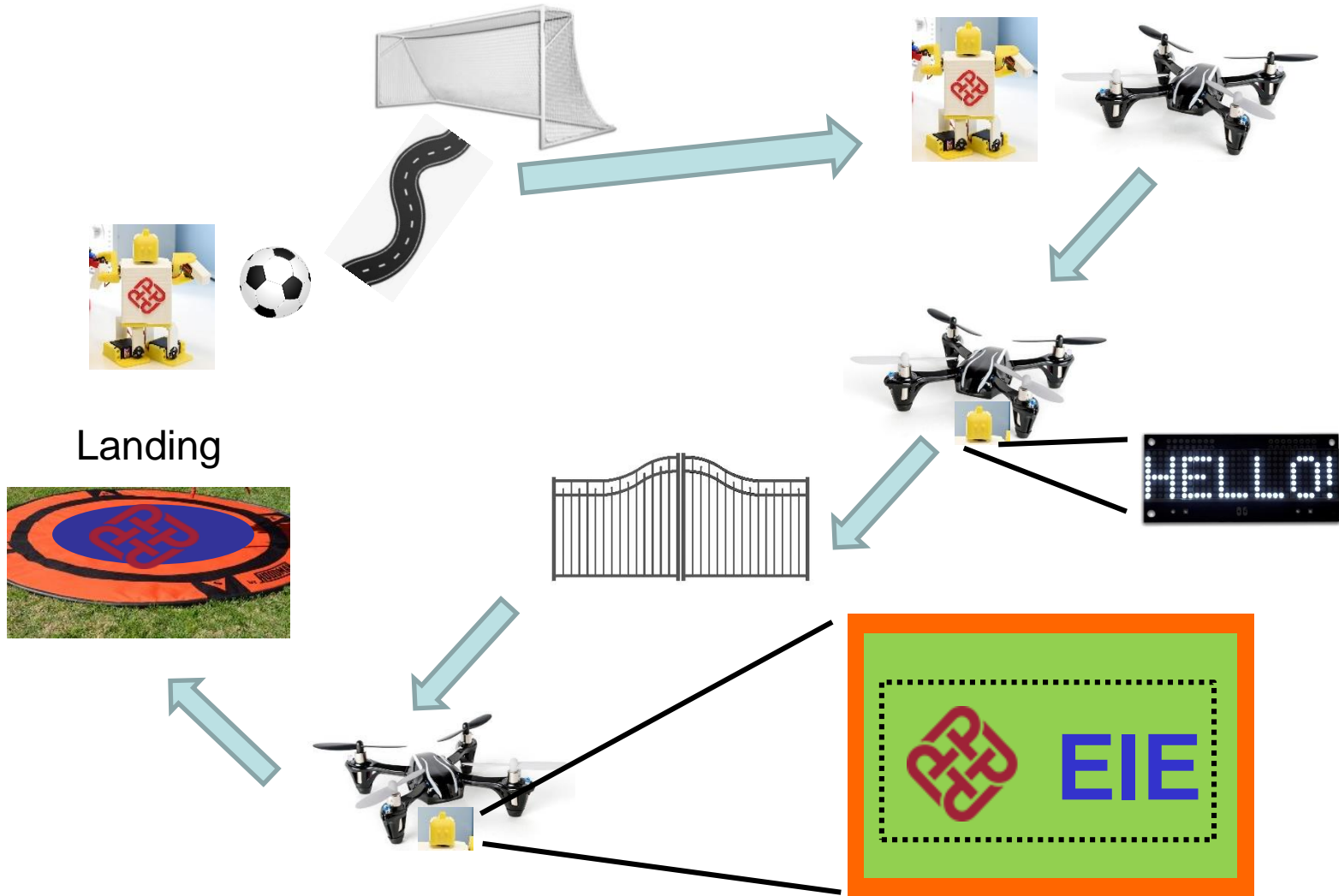
Initial Stage 初賽

- Remarks: 備註：
 - The head of the robot is captured by the drone.
 - 無人機抓住機械人的頭部。
 - The head of the robot can take a photo and send it back to a mobile app.
 - 機械人的頭部可以拍攝照片並將其發送回手機應用程式。

Initial Stage 初賽

- Safety procedures will be applied into the drone (e.g., altitude limitation, speed limitation, the field is covered by nets).
- 無人機內設有安全措施（例如，高度限制，速度限制，場地有安全網）。
- The eight team with the shortest time to finish the whole journey will go to the Final Stage.
- 最短時間完成整個路程的八隊將進入最後階段。

Final Stage 決賽



Landing



Final Stage 決賽

- Requirements: 要求：
 - The ball is kicked inside the net. 球踢入網內。
 - A photo is taken with PolyU and EIE logos (no orange colors can be found in the photo). 給理大和EIE標誌拍照（照片中不能找到橙色）。
 - The drone is landed inside the circle. 無人機降落在圓圈內。

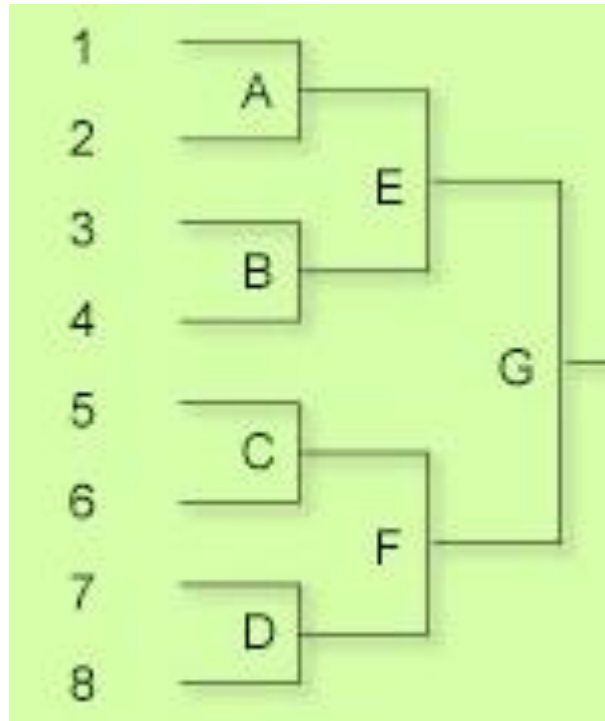
Final Stage 決賽

- Remarks: 備註：
 - The drone gets the password from the LED screen.
 - 無人機從LED屏幕獲取密碼。
 - Only the drone can see.
 - 只有無人機可以看到。
 - Key in the password to open the gate.
 - 輸入密碼打開大門。

Final Stage 決賽

- Remarks: 備註：
 - The green zone is smaller.
 - 綠色區域較小。
 - 1 vs 1 in knock-off stage (two fields for two teams to play in parallel, the winner is the first one to complete all tasks)
 - 在淘汰賽階段 1對1（兩隊並行比賽，勝者是首先完成所有任務的隊員）

Final Stage 決賽



Penalty Kick Competition 十二碼比賽



Penalty Kick Competition 十二碼比賽

- Special rule: Both robots can use HANDS!
- 特殊規則：兩個機械人都可以用手！



報名方法

- Students or teachers can visit the following website to register:
- 參賽者可瀏覽以下網址報名：
<http://www.eie.polyu.edu.hk/rcj2018>
- Deadline: 5 pm, 13 Apr 2018
- 截止日期：2018年4月13日下午5點

比賽獎項

- Trophy and certificate
 - Champion, first runner-up, second runner-up, first prize, second prize, Facebook choice award and best outlook award
- 獎盃一座及證書一張
 - 冠軍，亞軍，季軍，一等獎，二等獎，Facebook人氣獎及最佳外觀獎

比賽獎項

- Each participant will have a certificate.
- 各出席參與學校均附有參與狀。
- Champion, first runner-up and second runner-ups may join “EIE Robotic Challenge Junior International 2018: Flying Robot”!
- 冠軍，亞軍，季軍可能獲邀請代表香港參加「理電飛天」國際邀請賽！

Declaration 聲明

- The organizer reserves the right to change the terms and conditions of the conference.
- In case of any dispute, the organizer reserves the right of final decision.
- Submission of the application means that the participants comply with and accept the terms and conditions of participation introduced by all the organizers here and thereafter.
- Organizers and their agents have the right to use any photo, video and event record of any event for any legal purpose, including promotional activities.

Declaration 聲明

- 主辦單位保留更改大會條款及細則之權利。
- 如有任何爭議，主辦單位保留最終決定權。
- 遞交報名後，即表示參加者遵守及接受在此及其後所有主辦單位所引入之參賽條款及細則。
- 主辦機構及其代理商有權使用任何有關活動之相片、錄像及賽事紀錄作任何合法用途，包括活動宣傳之用。

End

完