**Project name:** Project [RL-ANN] - Port a ANN for RL to Crazyflie

**Goal:** The goal is to take a implement inside CF a ANN trained in RL to solve a hovering task.

**Technology Roadmap:**

1. Analysis of existing implementation:
   1. Analyze existing ANN implementations for hovering tasks;
   2. Determine how to integrate it into the flight controller or AI deck;
2. Status information acquisition:
   1. Integrate with Optiflow deck or other external positioning systems (like Inertial Measurement Unit, IMU etc.) to obtain status information;
3. Implementation and testing:
   1. Test your implementation on an actual Crazyflie drone or in a simulated environment.

**Technical Implementation:**

1. Technology stack:
   1. Programming language: C, Python;
   2. Operating system: FreeRTOS;
   3. Technical field: Artificial Neural Network reasoning (ANN), Reinforcement Learning (RL) basics.
2. Implementation steps:
   1. Obtain and analyze existing ANN implementation code;
   2. Modify the code to fit the Crazyflie hardware and software environment;
   3. Integrate status information acquisition modules (such as Optiflow deck);
   4. Perform preliminary testing in a simulated environment to ensure proper functionality;
   5. Tested and debugged on an actual Crazyflie drone.

**Recommended reference books:**

1. 《Reinforcement Learning: An Introduction》 by Richard Sutton and Andrew Barto
2. 《Deep Reinforcement Learning Hands-On》 by Maxim Lapan
3. 《Reinforcement Learning and Optimal Control》 by Dimitri Bertsekas
4. 《Algorithms for Reinforcement Learning》 by Csaba Szepesvári