

Project requirements

In this project you are required to:

- *Implement a GUI application in Python 3*
 - *The GUI app interfaces the user to an underlying data store.*
- *The project should be completed using the agile principles articulated in Pilone & Miles.*

Make sure to meet with your instructor as regularly as you require to ensure that the project is scoped appropriately – neither too narrowly nor too widely.

Beyond those requirements, you and your team are free to choose your own domains to create a solution project for.

Instructions - Run Program

Prerequisites:

- Python3
- Connection with Tello drone
- Packages (if Anaconda is not installed):
 - threading
 - socket
 - sys
 - time
 - datetime

Instructions:

1. Download "Drone_Control.py"
2. Open command line (e.g. Windows, Windows key+R, type "cmd", enter)
3. Change current directory to the location of the "Drone_Control.py" file
 - a. E.g. cd Desktop (if the file is in your Desktop folder)
4. If running Python, please enter "python Drone_Control.py" to run the program
 - a. If running ipython, please enter "ipython" to begin using ipython and enter "run Drone_Control.py" to run the program
5. Follow instructions from the command line:
 - a. Enter your name
 - b. The below will not be available if you are not connected to the Tello drone:
 - i. Enter the Help command by typing "help command"
 - ii. Enter command mode by typing "command"
 - iii. Enter instructions (e.g. takeoff)

- iv. Once complete with flight, enter “end” to exit the program

Instructions - Run Tests

Prerequisites:

- Python3
- Packages:
 - Install Pytest

Instructions:

1. Open command line (e.g. Windows, Windows key+R, type “cmd”, enter)
2. Change current directory to the location of the “Drone_Control.py” file
3. Type “pytest -v Drone_Control.py”
4. View the results of the five tests
 - a. You will see three “PASSED” and two “XFAILED” results

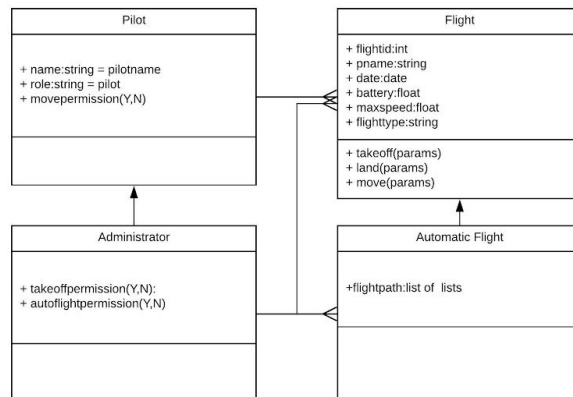
Concept

Control the Tello drone with a GUI to take off, fly, and land.

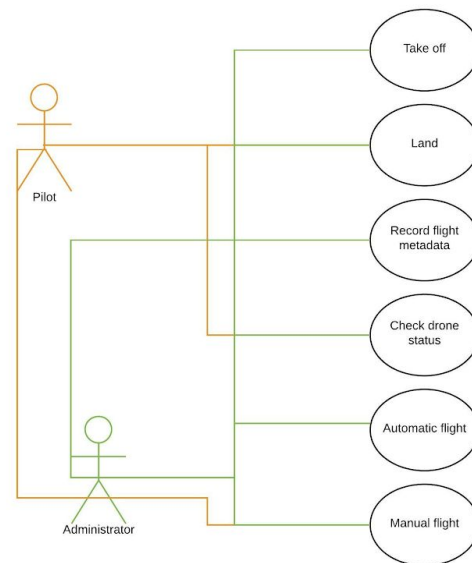
Use Cases and Class Relationships

Python Pilots
IST 303
20181011

Class diagrams



Use cases



Requirements - User stories and Tasks

1. Title: Take off
 - a. Description: As a user, I should be able to launch the drone from the ground into the air, so that I can begin a flight route.
 - b. Completion time: One week
 - c. Priority: 10
 - d. Tasks:
 - i. Create a command to connect with the drone (7 hours)
 - ii. Create a Flight class (12 hours)
 - iii. Create a Flight object in the datastore (12 hours)
2. Title: Land drone
 - a. Description: As a user, I should be able to land the drone safely on the ground so that I can complete the flight.
 - b. Completion time: One week
 - c. Priority: 10

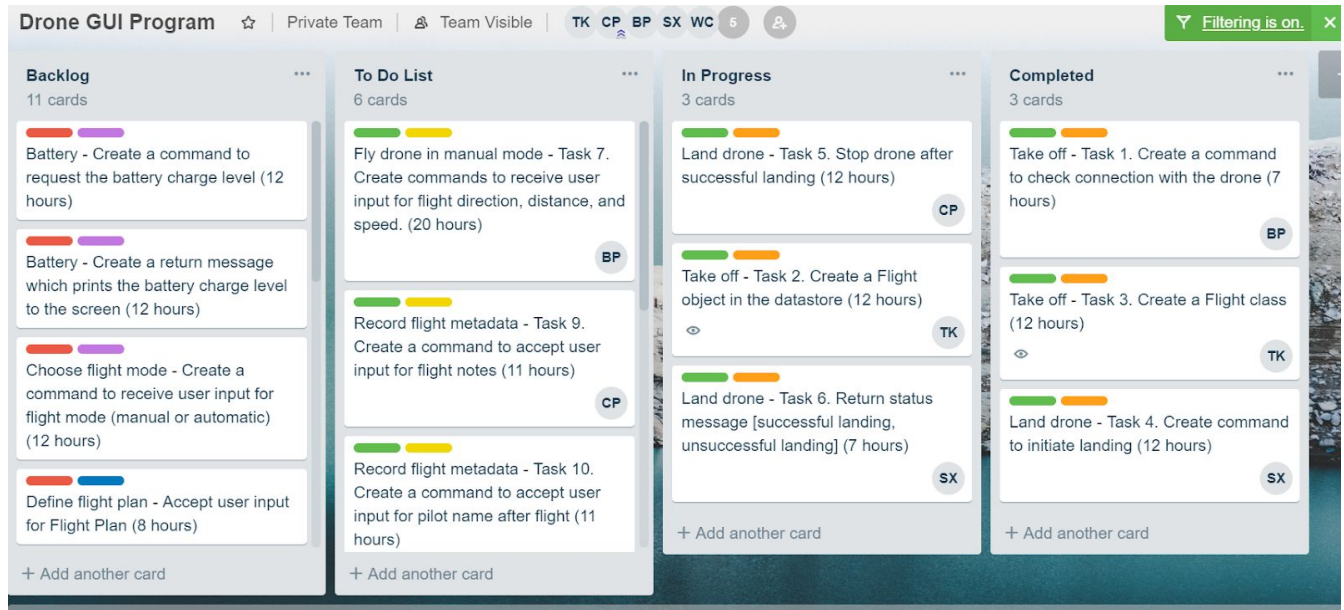
- d. Tasks:
 - i. Program the code for landing (31 hours)
 - 1. Create a command to initiate landing (12 hours)
 - 2. Stop drone after successful landing (12 hours)
 - ii. Return status message [successful landing, unsuccessful landing] (7 hours)
- 3. Title: Choose flight mode
 - a. Description: As a user, I should be able to choose the flight mode (manual control or flight plan) so that I can fly the drone in two different ways.
 - b. Completion time: One week
 - c. Priority: 20
 - d. Tasks:
 - i. Create a command to receive user input for flight mode (manual or automatic) (12 hours)
- 4. Title: Fly drone in manual mode
 - a. Description: As a user, I should be able to control the drone's movement in real time so that I can improvise the flight path.
 - b. Completion time: Two weeks
 - c. Priority: 10
 - d. Tasks:
 - i. Create commands to receive user input for flight direction, distance, and speed. (20 hours)
 - ii. Create commands to send user input to drone for execution (20 hours)
- 5. Title: Display the remaining charge of the battery.
 - a. Description: As a user, I should be able to see the remaining battery charge in the GUI.
 - b. Completion time: One week
 - c. Priority: 30
 - d. Tasks:
 - i. Create a command to request the battery charge level (12 hours)
 - ii. Create a return message which prints the battery charge level to the screen (12 hours)
- 6. Title: Display the drone's status
 - a. Description: As a user, I should be able to see the connection status of the drone. For example, if the drone is either connected or disconnected from the computer.
 - b. Completion time: One week
 - c. Priority: 30
 - d. Tasks:
 - i. Create a command to request the drone's status. (6 hours)
 - ii. Create a return message which prints the connection status (drone is connected or disconnected). (18 hours)
- 7. Title: Define flight plan

- a. Description: As a user, I should be able to design a flight plan in the GUI and have the drone execute the flight plan so that I can fly the drone automatically.
 - b. Completion time: 2 weeks
 - c. Priority: 20
 - d. Tasks:
 - i. Create a Flight Plan class (8 hours)
 - ii. Accept user input for Flight Plan (8 hours)
 - iii. Create Flight Plan object (8 hours)
 - iv. Execute Flight Plan object (16 hours)
 - v. Convert user input into executable instructions (16 hours)
 - vi. Example test case: Execute and test a flight plan in a square (8 hours)
8. Title: Record flight metadata
- a. Description: As a user, I should be able to write flight notes after a flight so that I can have a record for flights for reference (e.g. debugging)
 - b. Completion time: 1 week
 - c. Priority: 30
 - d. Tasks:
 - i. Create a command to accept user input for flight notes (11 hours)
 - ii. Create a command to accept user input for temperature during flight (11 hours)
 - iii. Create a command to accept user input for pilot name after flight (11 hours)
 - iv. Save flight notes, temperature, and pilot name as a part of the Flight object (17 hours)
9. Archives (User stories on hold or eliminated)
- a. Title: Fly in a circle
 - i. Description: As a user, I should be able to fly the drone in a circle.
 - ii. Completion time: Two weeks
 - iii. Priority: 30
 - iv. Notes: This user story is accounted for in the "Define flight plan" user story.
 - b. Title: Take Photo
 - i. Description: As a user, I should be able to take a photo, in order to see what the drone saw during flight.
 - ii. Completion time: 3 weeks
 - iii. Priority: 30
 - iv. Notes: The drone manufacturer does not support taking photos through the interface and the customer agreed to remove this from scope.
 - c. Title: Register user
 - i. Description: As a user, I should be able to create an account to be recognized in the system as a unique user.
 - ii. Completion time: 2 weeks
 - iii. Priority: 10

- iv. Tasks:
 - 1. Create an Account class (3 days)
 - 2. Create user interface to enter data to create an account (5 days)
 - 3. Create an Account object with the user-entered data (3 days)
- d. Title: Login/out
 - i. Description: As a user, I should be able to log in to be able to access the system.
 - ii. Completion time: 2 weeks
 - iii. Priority: 10
 - iv. Tasks:
 - 1. Allow user to start a session by entering a valid Username and Password (1 week)
 - 2. Check user-entered data against the Account data store (3 days)
 - 3. Create a return message for valid and invalid user credentials (3 days)
 - 4. Allow user to end the session (3 days)
- e. Title: Forgot password
 - i. Description: As a user, I should be able to reset my password in case I forget it, in order to access the system.
 - ii. Completion time: 2 weeks
 - iii. Priority: 20
 - iv. Tasks:
 - 1. Create a command to send users message to confirm identity (2 days)
 - 2. Create a command for users to reset their password. (4 days)
 - 3. Test the code (2 days)

Allocation

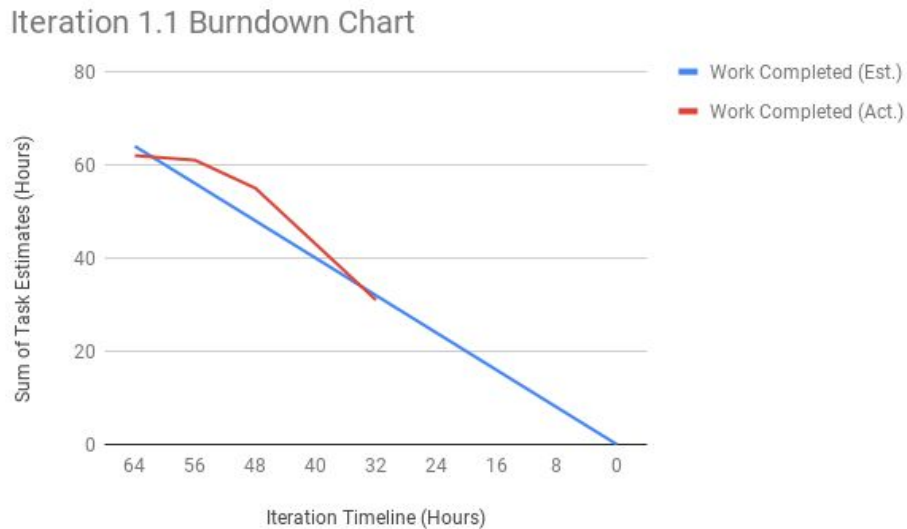
Please check our trello website (<https://trello.com/b/BYz9KJnR/drone-gui-program>)



Burn-Down Chart

- Velocity:
 - Numerator: 8 hours/person/week (with 4 people, we estimate 32 hours of work per week)
 - Denominator: 3 days * 8 hours/day = 24 hours/person/week (Assumption: 3 possible working days per week, we estimate 3 days/week as the total number of days/week)
 - Estimated length of each iteration:
 - Iteration 1.1 (2 weeks) = 62 hours (Oct 7 - 21)
 - Iteration 1.2 (2.5 weeks) = 90 hours (Oct 22 - Nov 8)
 - Iteration 2.1 (2 weeks) = 60 hours (Nov 9 - Nov 22)
 - Iteration 2.2 (2 weeks) = 64 hours (Nov 23 - Dec 6)

- Velocity for the iteration 1.1 : (16 hours/person) / (48 hours/person) = $\frac{1}{3}$



Stakeholders

- Farmers - check crops
 - As a farmer, I want to plan a flight route, to check my crops.
- Landscape architects - help design
 - As a landscape, I want to take photos of the site, to help design the landscape.
- Mining planner - check progress of mining
 - As a mining planner, what I want is the geographical characteristics of particular areas like longitude and latitude.
- People in the travel industry or real estate - plan aerial shots of a location
 - As a travel blogger, I want to post aerial photographs of my travel locations to my website and social media platforms
- Toy store - let users use a simple UI to control the drone
 - As a player, I want fly drone in a circle because I think it's cool.
- Sell software to people that don't have a suitable phone to control it

Data elements (flight log)

- Flight ID
- Flight time
- Pilot ID
- Date
- Distance
- Source location
- Destination location
- Photo taken during flight

- Complete flight? [True/False]
- Reason for the failure, if applicable
- Temperature(?)
- # of charges
- Location of charge

GitHub

GitHub repository: https://github.com/thkim91/IST_303-GroupProject--Group2.git

Team members

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Team meetings

1. 9/26/201
 - a. Attendees: Taehoon, Charidy, Bill, & Siyu
 - b. Notes:
 - i. Discussed project concept and user stories
 - ii. Collaboratively created new user stores (e.g. flight plan)
 - iii. Scheduling time to meet with Prof. Chipidza on project scope
2. 09/27/2018
 - a. Attendees: Taehoon, Charidy, Bill, Siyu, & Prof. Chipidza
 - b. Notes:
 - i. Identify stakeholders
 - ii. Identify different kinds of users
 - iii. New user stories:
 1. Change the password, should be able to access.
 - iv. Determine reports
 - v. Consider the feasibility of the project
 - vi. You can change it to normal airline company if drone does not work

3. 10/07/2018

- a. Attendees: Taehoon, Bill, & Siyu
- b. Notes:
 - i. Added user stories
 - ii. Divide user stories into tasks
 - iii. Allocated the tasks
 - iv. Velocity Calculations & Burndown charts
 - v. Tried to send command to Drone

4. 10/11/2018

- a. Attendees: Taehoon, Charidy (remote), Bill, Siyu, & Prof. Chipidza
- b. Notes:
 - i. Discuss progress, velocity, datastore, grades for ReadMe
 - ii. Tools
 - 1. Database - SQLite
 - 2. GUI - Tkinter

5. 10/14/2018

- a. Attendees: Taehoon, Charidy (remote), Bill, Siyu
- b. Notes:
 - i. Code review and bug fixing
 - ii. Draft instructions for code and running tests (Pytest)
 - iii. Update burndown chart



c.

GUI Application in Python 3

Tkinter

References

- <https://www.ryzorobotics.com/tello>
- <https://dl-cdn.ryzorobotics.com/downloads/tello/0228/Tello+SDK+Readme.pdf>

Group Meetings:

Sat 10/6

Sun 10/7

Sat 10/13

Sun 10/14

Sat 10/20

Sun 10/21 - Iteration 1.1 Release

Thurs 10/25 Midterm

Sat 10/27

Sun 10/28

Sat 11/3

Sun 11/4

Thurs 11/8 Milestone 1 Presentation and Iteration 1.2 Release

Sat 11/10

Sun 11/11

Sat 11/17

Sun 11/18

Thurs 11/22 - Iteration 2.1 Release

Sat 11/24 Thanksgiving Break

Sun 11/25 Thanksgiving Break

Thurs 12/9 Charidy out of Town on business

Sat 12/1 Charidy out of town on business

Sun 12/2 Charidy out of town on business

Thurs 12/6 Iteration 2.2 Release

Sat 12/8

Sun 12/9

Thurs 12/13 Milestone 2 Presentation

*****Sundays will need to be after 2PM*****