CSE 321

Project 1: Drone control and deployment (DECOY) for social good

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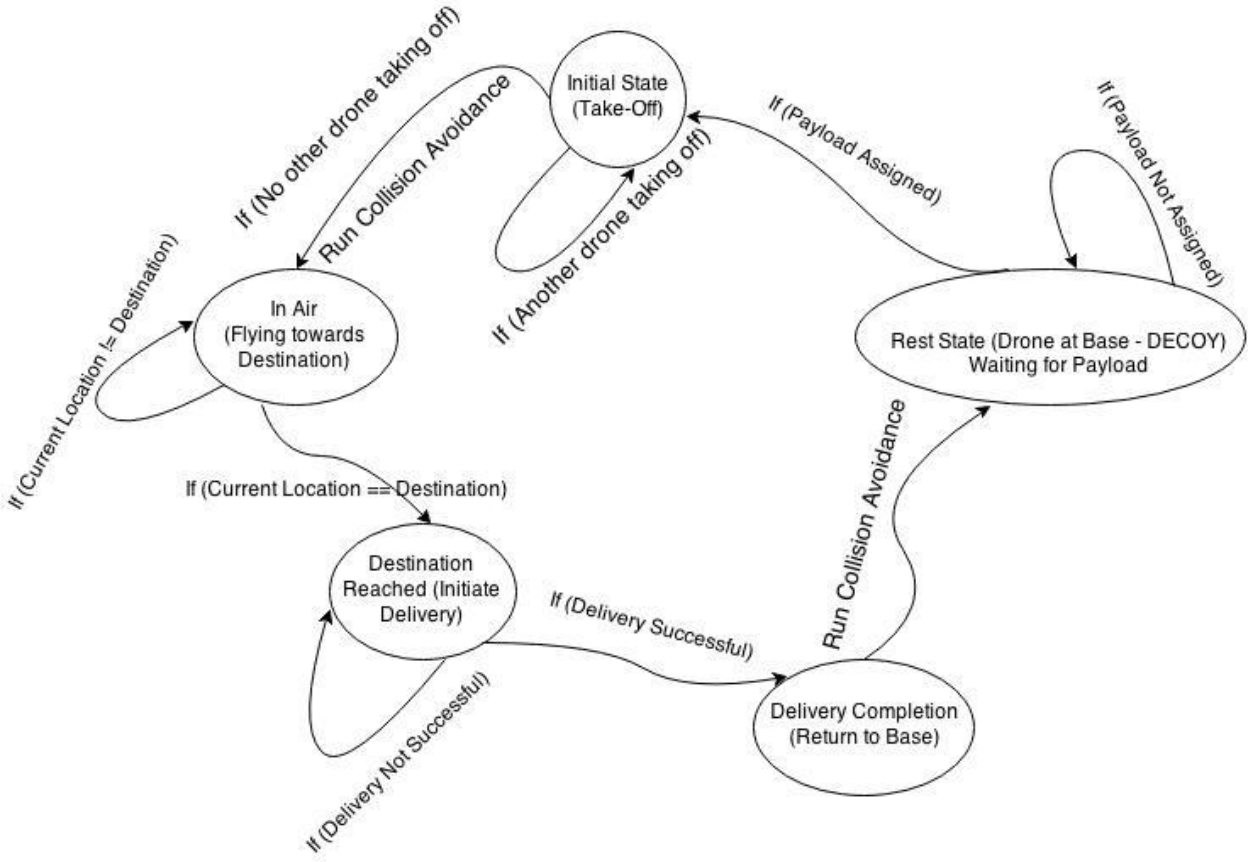
Objective: Design, Implement and Test a program which simulates a general structure of drone management in a DECOY drone control center (Drone Control and Deployment for social good)

Design: We are using pthreads and locking different thread instances to certain states implemented in C. The following state diagram shows all the possible basic states a set of Drones may have to face. It assumes we are using a built in Collision Avoidance system, base is at coordinates (1, 1), we have a single target to deliver payload to and a single DECOY drone base to return to:



Example Output:

Using 5 drones as an example. The program can handle any integer amount of drones, but the runtime may be exponential depending on the inputs.
How to run:

Untar
Type make command: *gcc -o dronesimulator -lm -pthread dronesim.c ;*
Run output file: *./dronesimulator;*
Select number of drones to be simulated.

```
timberlake {~} > cd 321Proj1
timberlake {~/321Proj1} > ./dronesimulator
> Enter number of drones (threads) for the DECOY simulation: 5
> Since multiple drones are delivering in the air simultaneously, the order of d
elivery may appear to be arbitrary.
>
> Initializing delivery sequence for Drone 1 from DECOY 1. Current location of t
he drone (1,1)
> Initializing delivery sequence for Drone 2 from DECOY 1. Current location of t
he drone (1,1)
> A drone from DECOY 1 is taking off for its destination address.
> Drone from DECOY 1 is on route to its designated delivery address. Collision D
etection - ON.
> Drone from DECOY 1 has reached his destination coordinates(83, 86). Delivering
 payload now...
> Drone from DECOY 1 delivered payload, returning back to base.
> Initializing delivery sequence for Drone 3 from DECOY 1. Current location of t
he drone (1,1)
> A drone from DECOY 1 is taking off for its destination address.
> Drone from DECOY 1 is on route to its designated delivery address. Collision D
etection - ON.
> Drone from DECOY 1 has reached his destination coordinates(77, 15). Delivering
 payload now...
> Drone from DECOY 1 delivered payload, returning back to base.
> Initializing delivery sequence for Drone 4 from DECOY 1. Current location of t
he drone (1,1)
> A drone from DECOY 1 is taking off for its destination address.
> Drone from DECOY 1 is on route to its designated delivery address. Collision D
etection - ON.
> Drone from DECOY 1 has reached his destination coordinates(93, 35). Delivering
 payload now...
> Drone from DECOY 1 delivered payload, returning back to base.
> Initializing delivery sequence for Drone 5 from DECOY 1. Current location of t
he drone (1,1)
> A drone from DECOY 1 is taking off for its destination address.
> Drone from DECOY 1 is on route to its designated delivery address. Collision Detection - ON.
> Drone from DECOY 1 has reached his destination coordinates(86, 92). Delivering payload now...
> Drone from DECOY 1 delivered payload, returning back to base.
> Drone 1 returned to DECOY 1. Ready for next assignment.
> Drone 2 returned to DECOY 1. Ready for next assignment.
> Drone 3 returned to DECOY 1. Ready for next assignment.
> Drone 4 returned to DECOY 1. Ready for next assignment.
> A drone from DECOY 1 is taking off for its destination address.
> Drone from DECOY 1 is on route to its designated delivery address. Collision Detection - ON.
> Drone from DECOY 1 has reached his destination coordinates(49, 21). Delivering payload now...
> Drone from DECOY 1 delivered payload, returning back to base.
> Drone 5 returned to DECOY 1. Ready for next assignment.
> All payload deliveries have been completed by the drone for DECOY 1. Location: Base - (1,1)
timberlake {~/321Proj1} >
```