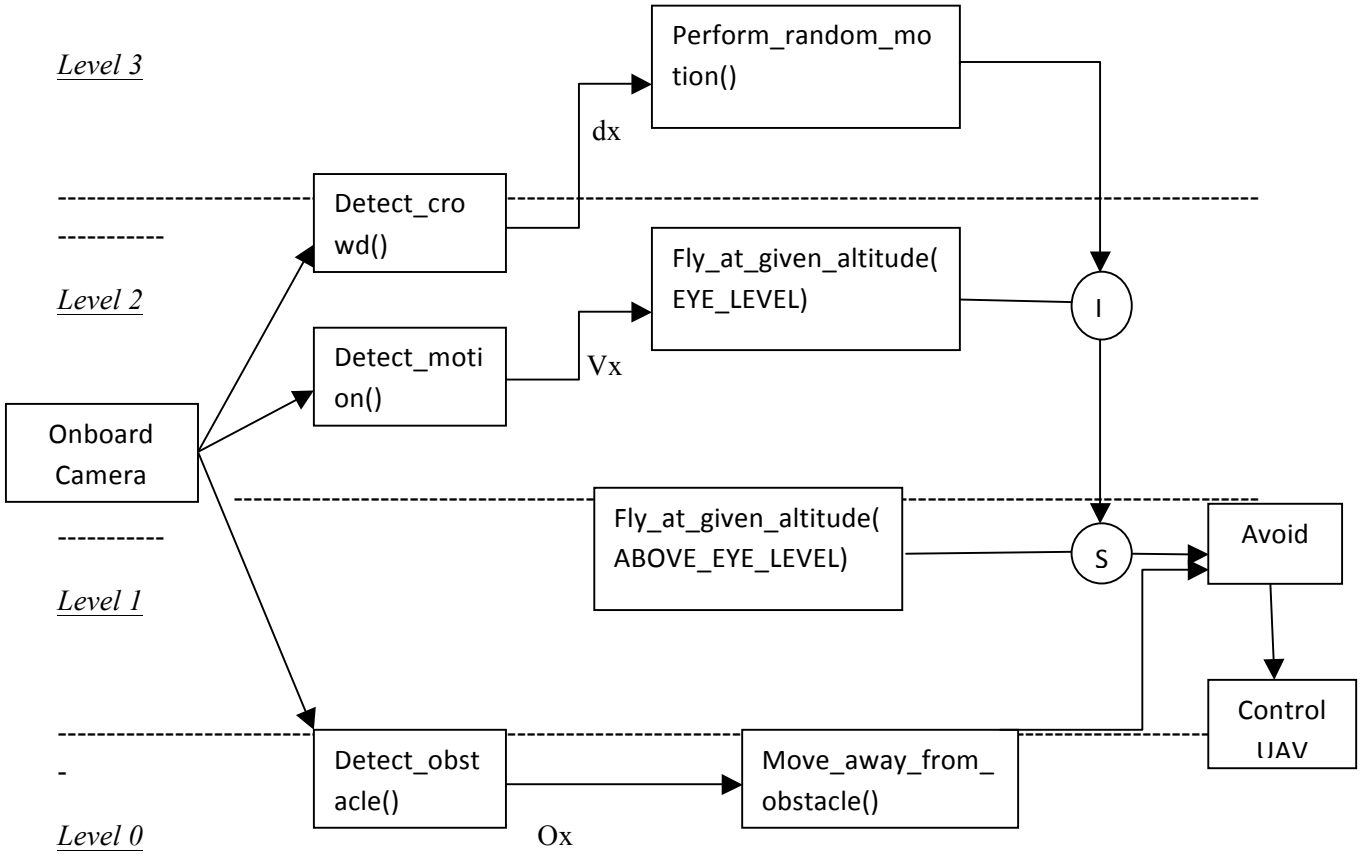
Design Specifications

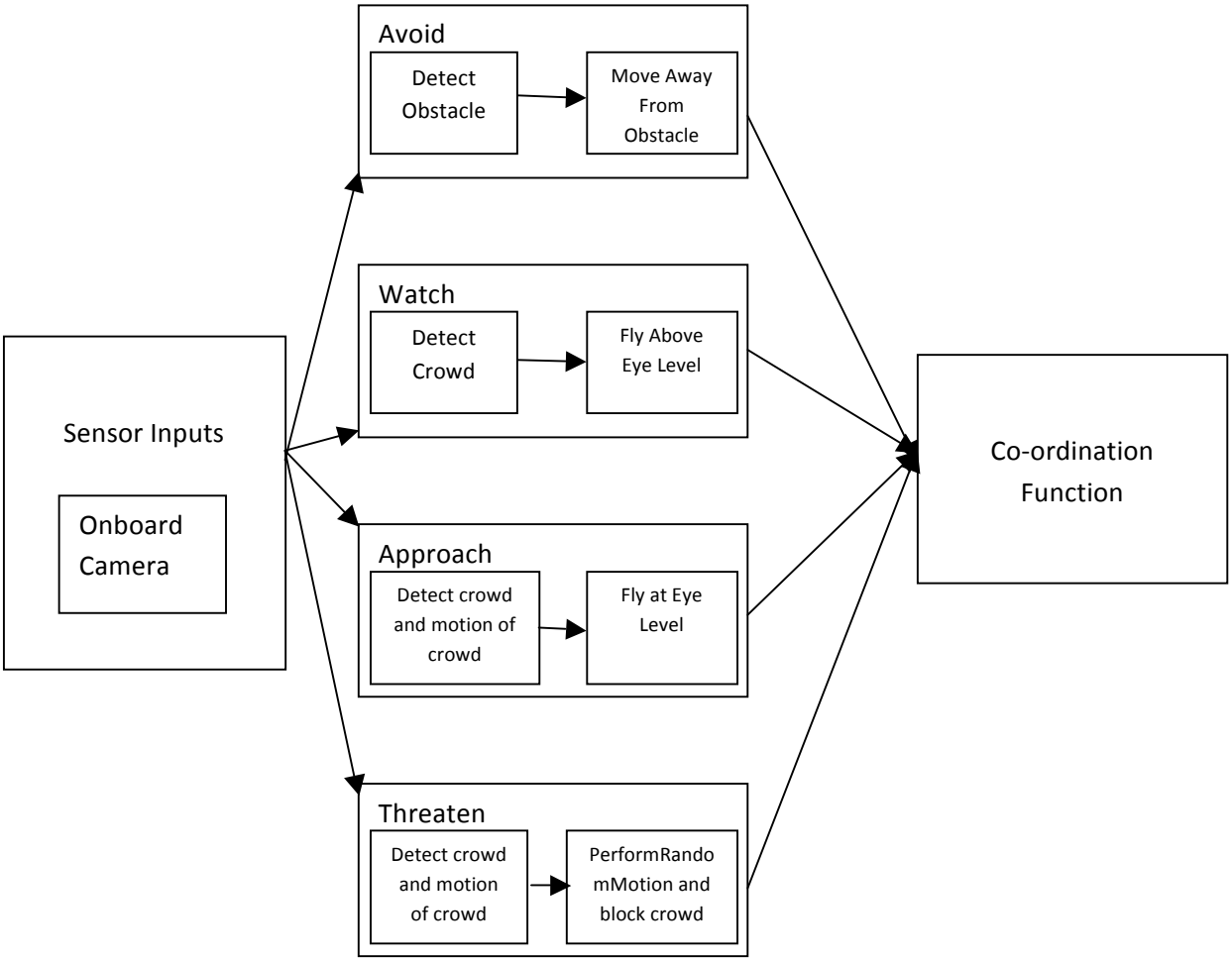
This document enlists the design specifications for the software which simulates the blocking behaviour of a UAV. The design strategy focuses on subsumption style architecture and schema theory in AI Robotics. It transforms the architecture further into object oriented design.

1. Subsumption architecture –



Behaviour	Releaser	Perceptual Schema	Percept	Motor Schema
Avoid (Level 0)	Always on	Detect Obstacle()	Distance from wall	Move away from obstacle()
Watch(Level 1)	Always on	-	-	FlyAt(ABOVE_EYE_LEVEL)
Approach(Level 2)	APPROACHING == TRUE	Detect crowd() Detect motion()	Positive vertical component of movement	FlyAt(EYE_LEVEL)
Threaten(Level 3)	TOO_CLOSE == TRUE	Detect crowd()	Distance of nearest person from UAV	Perform random motion()

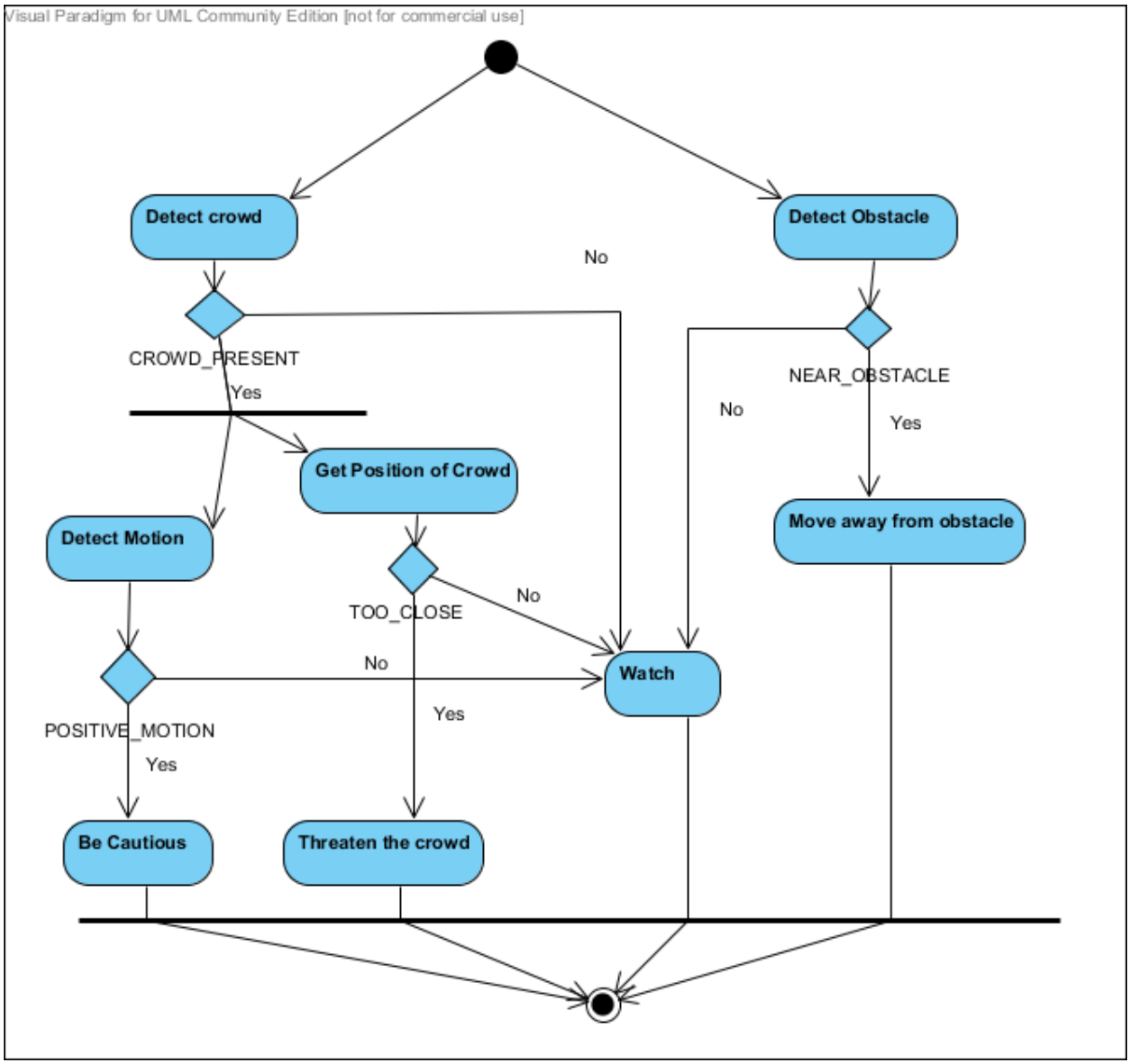
2. Schema Diagram – Schema Theory represents each behaviour as a schema. A behaviour consists of a perceptual schema and a motor schema. Perceptual Schema receives input from the sensor and provides percept. According to the percept motor schema takes an action, thus simulating the behaviour.



Description of the schema diagram –

1. Sensor input is the output of the onboard camera.
2. Behaviours –
    i. Avoid
    ii. Watch
    iii. Approach
    iv. Threaten
3. Perceptual Schemas –
    i. Detect Obstacle
    ii. Detect Crowd
    iii. Detect Motion of Crowd
4. Motor Schemas –
    i. Move away from obstacle
    ii. Fly at given altitude (EYE_LEVEL / ABOVE_EYE_LEVEL)
    iii. Perform random motion

3. UML Activity Diagram –



Activity	Behaviour
Move away from obstacle	Avoid
Watch	Watching
Be Cautious	Approaching
Threaten the crowd	Threatening