

Vehicle Control using Video Surveillance

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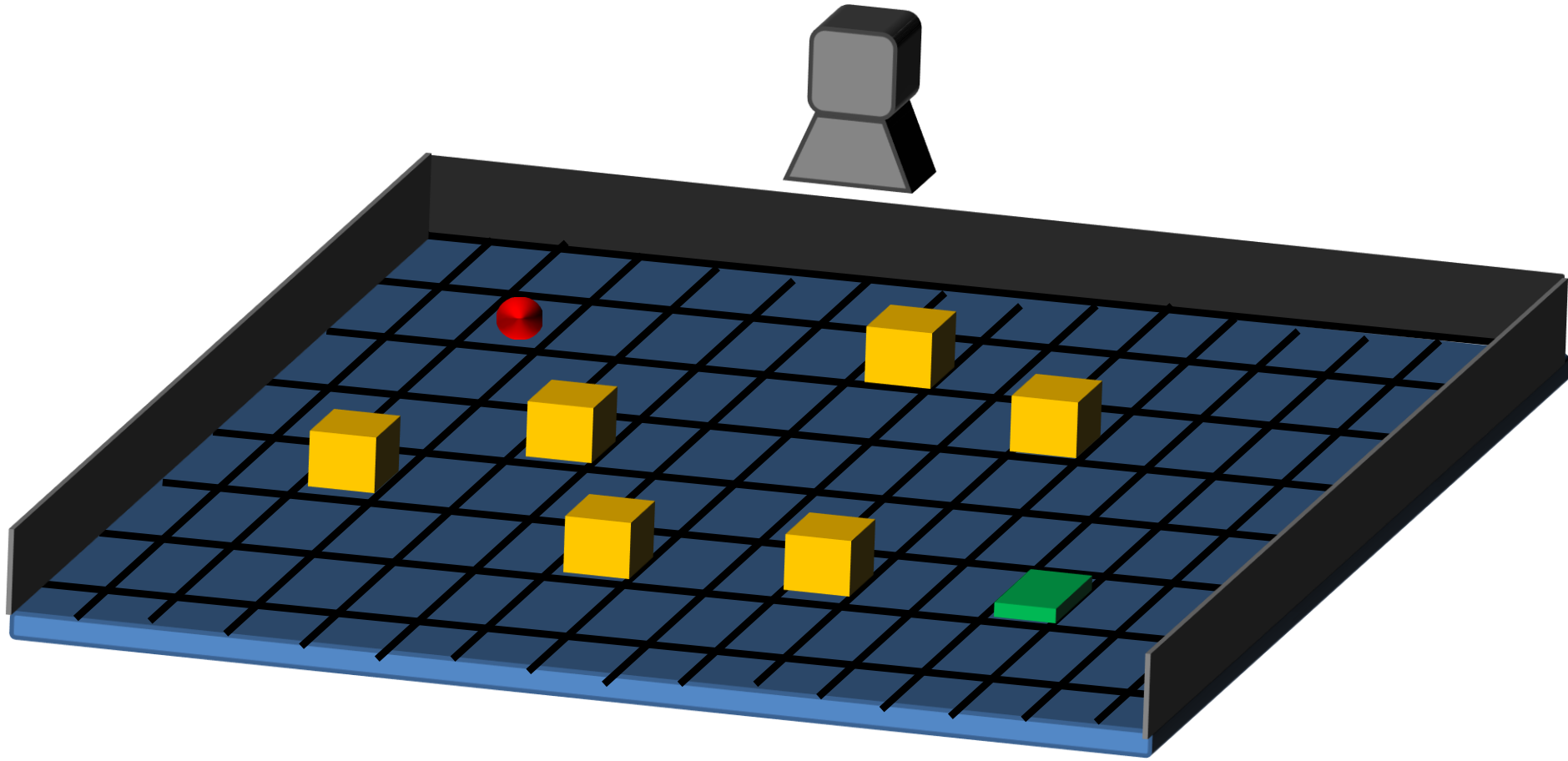
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Overview

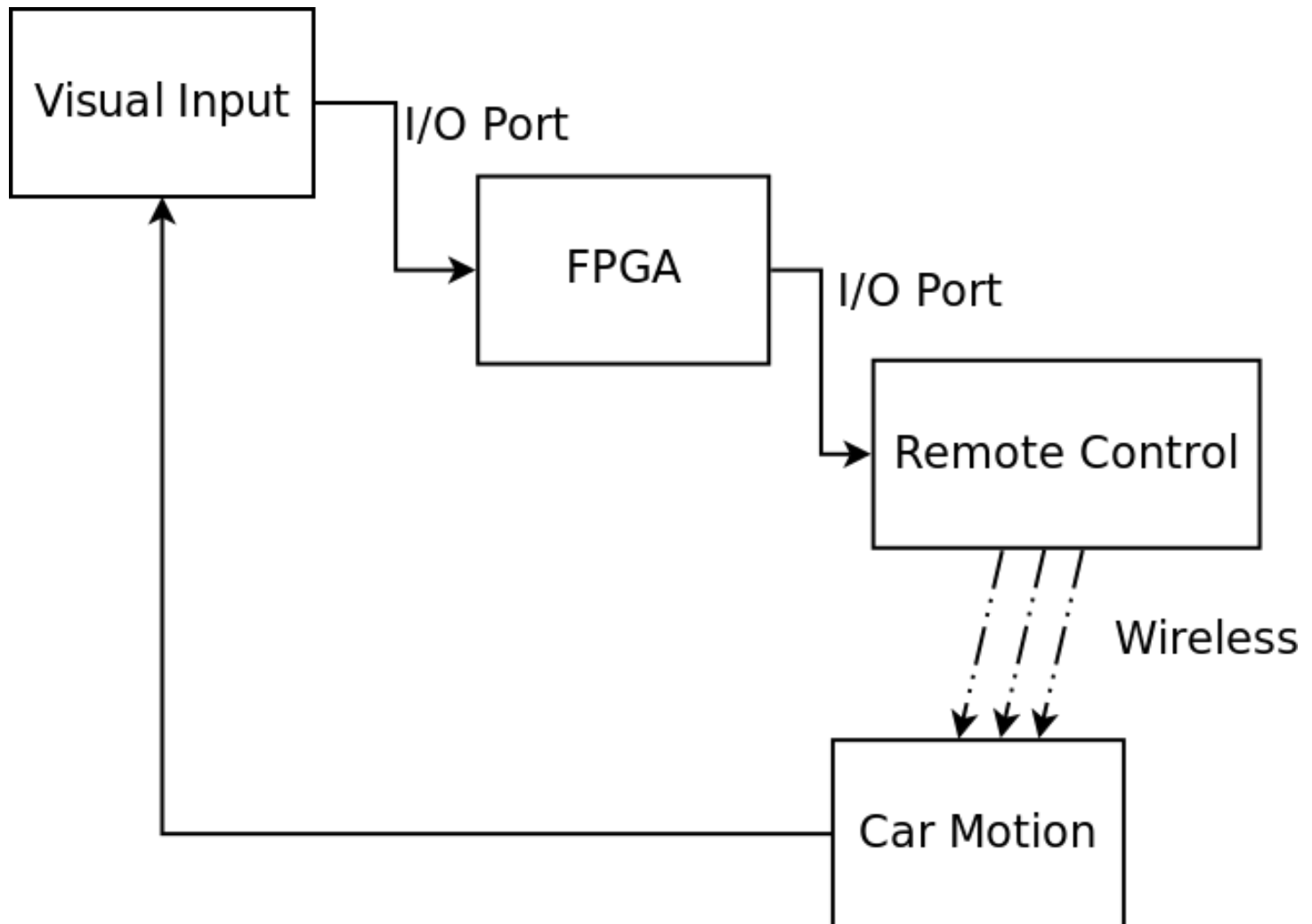
- **Objective:** Autonomous vehicle control using video as feedback
 - Interface control of RC car (Krishna)
 - User interface and camera decoding (Jorge)
 - Video filtering and positioning of vehicle (Kevin)
- **Motivation:**
 - Indoor positioning using video surveillance
 - Autonomous vehicle control with obstacles
 - Video processing in hardware is faster

Overview II

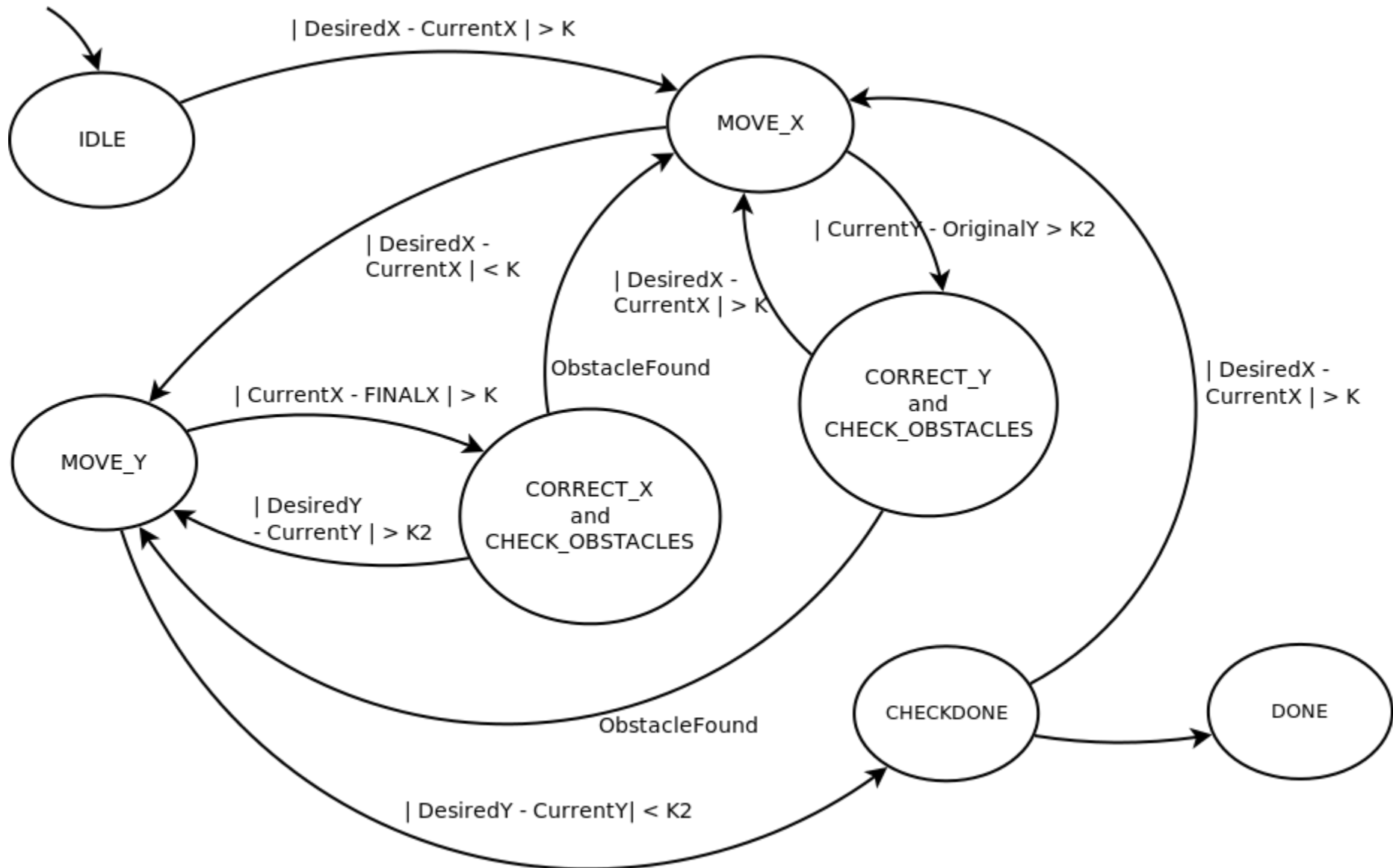
1. 6ft by 6ft arena created and divided into 16x16 grid pattern
2. Remote control car and obstacles placed on field
3. Position determined by camera
4. Destination inputted by User
5. Car moves to position and avoids obstacles



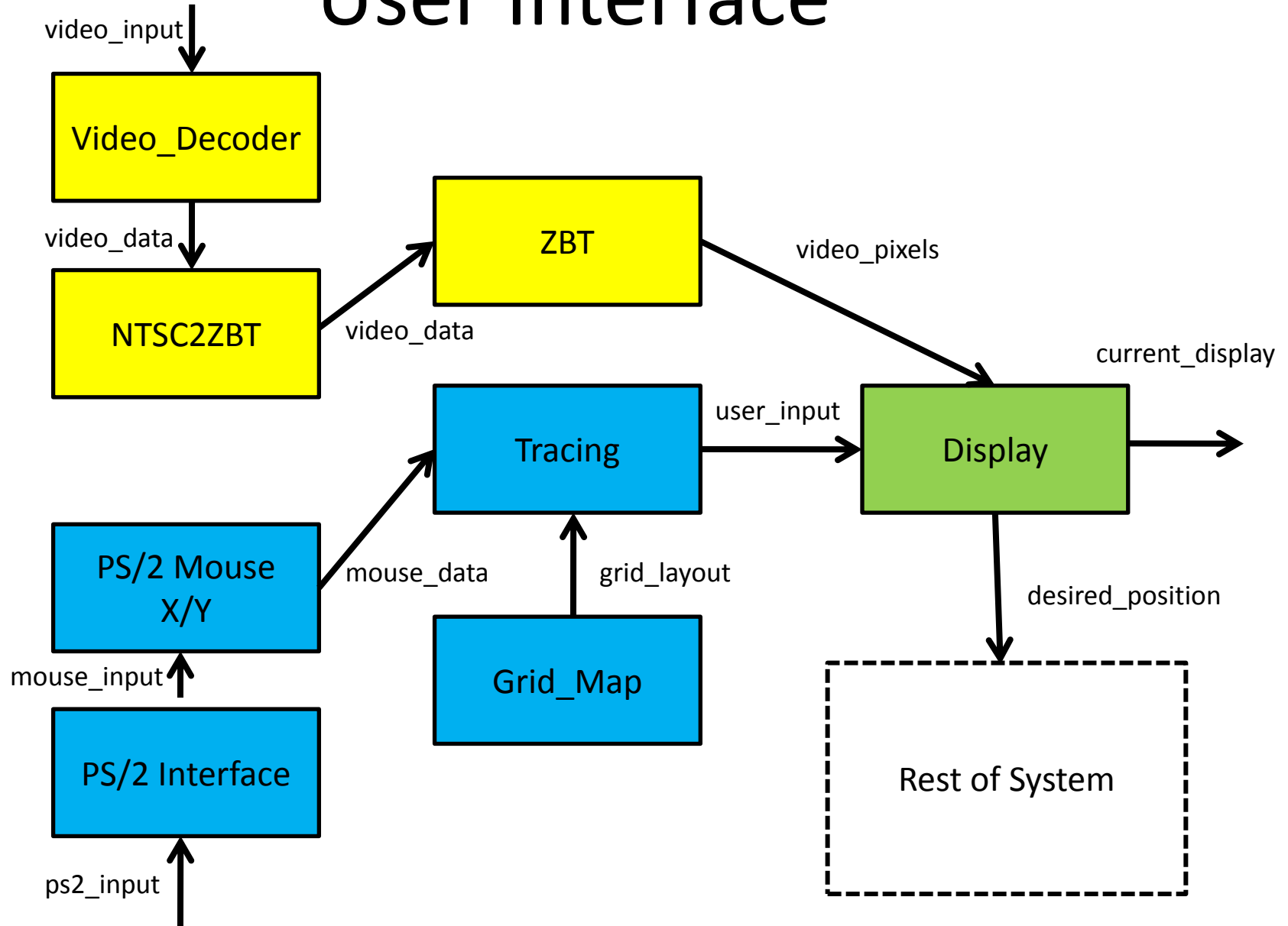
Interface & Control of vehicle: System Layout



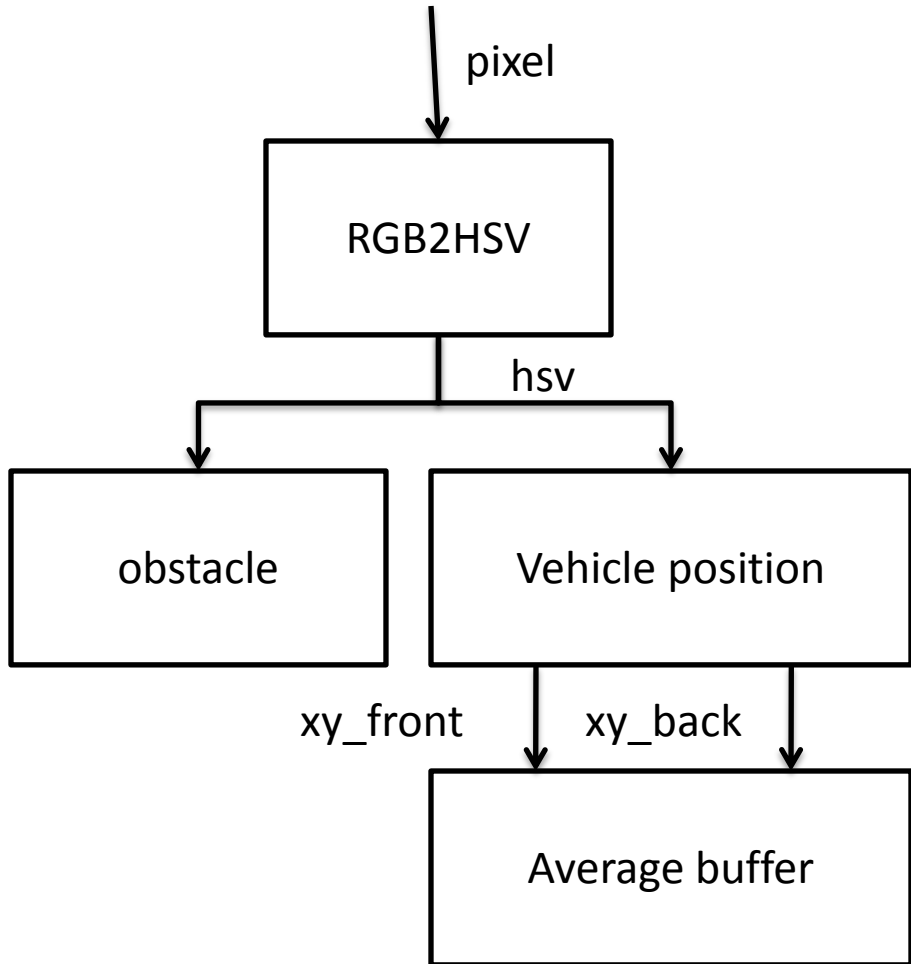
Position Control FSM



User Interface

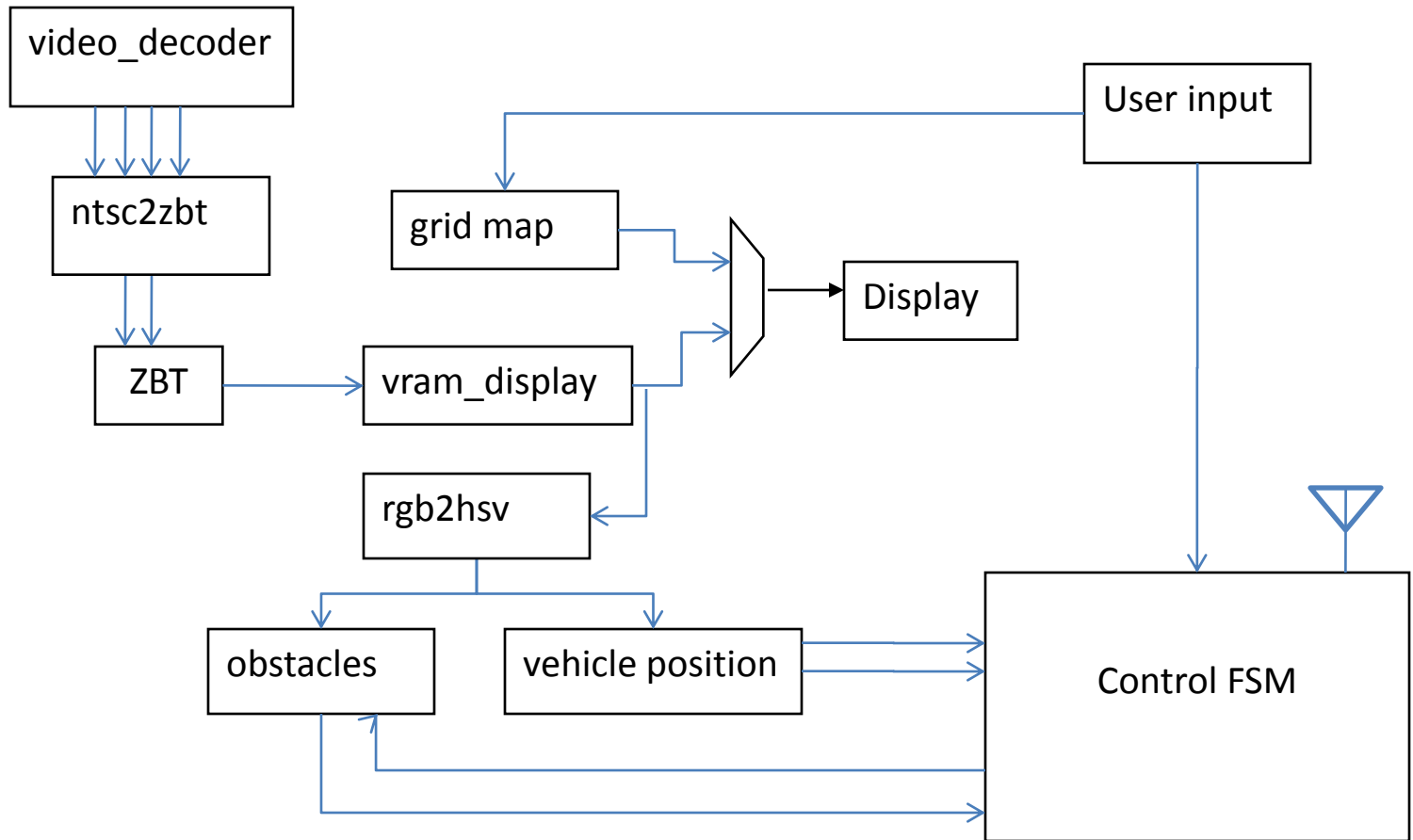


Video Processing



- **RGB2HSV:** convert rgb pixel to hsv
- **Obstacle:** stores obstacle information on map
- **Vehicle position:** finds locations of the front and back markers on the vehicle
- **Average buffer:** use circular buffer to average the positions of the last 8 frames

System block diagram



Challenges

- Filtering and precision in vehicle positioning
- Interface with RC vehicle
- Interface between video processing and vehicle control for obstacles (specifically obstacle locations and updates)
- Vehicle control algorithm
- Obstacle avoidance

Timeline

