

Big Brother

High Level Design

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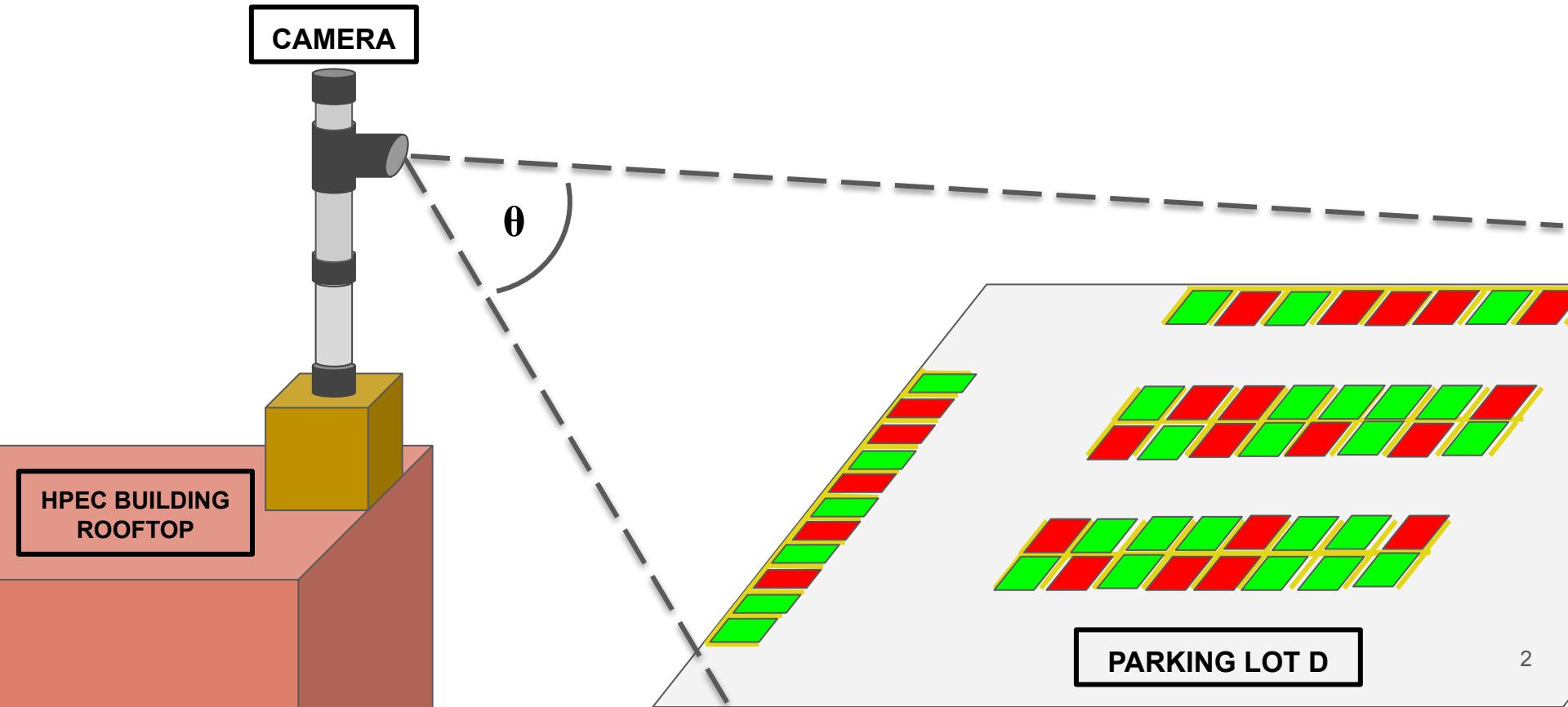
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Project Advisor - Professor Miller

Concept

LEGEND:
Vacant Spot =
Occupied Spot =



HPEC BUILDING
ROOFTOP

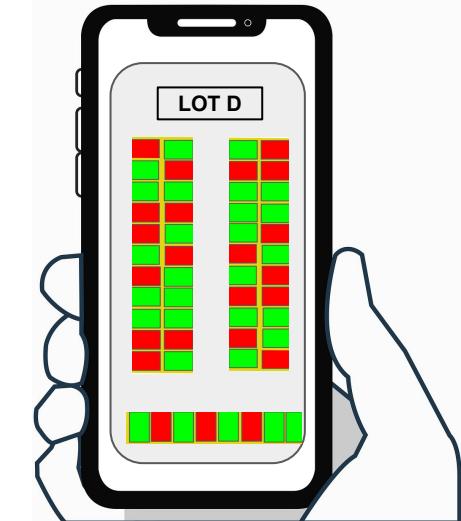
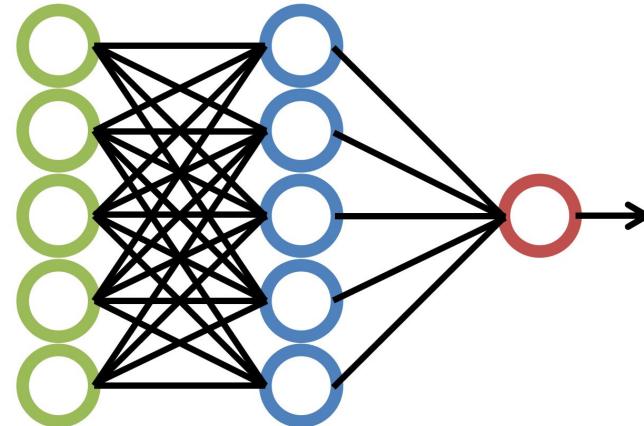
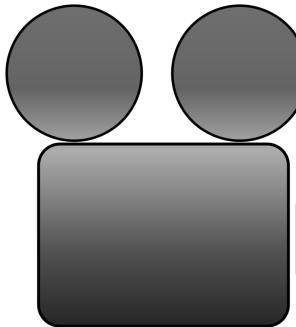
PARKING LOT D

Concept

Input Parking Lot Images

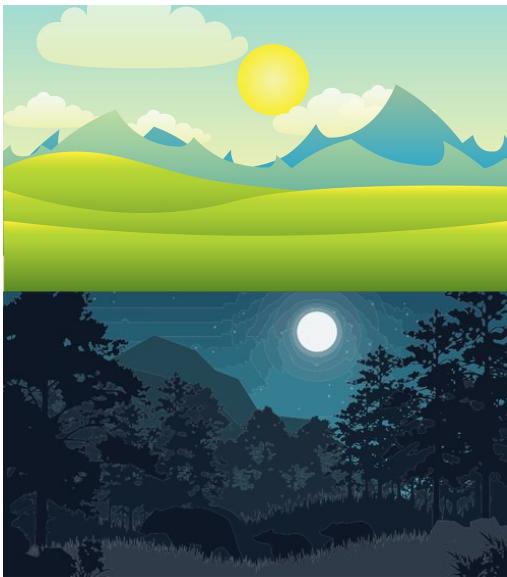
Convolutional Neural Network

Parking Spot Availability App



Constraints

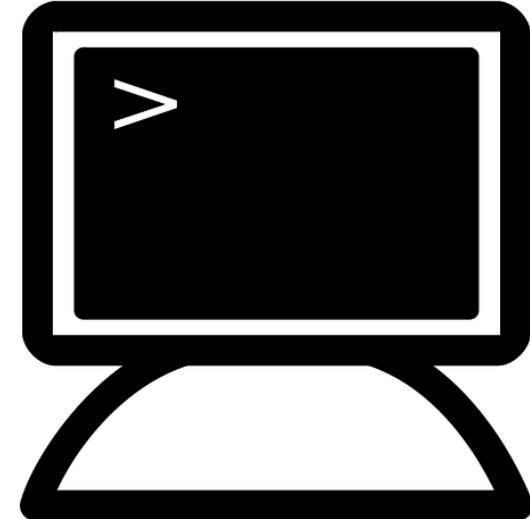
Lighting & Visibility



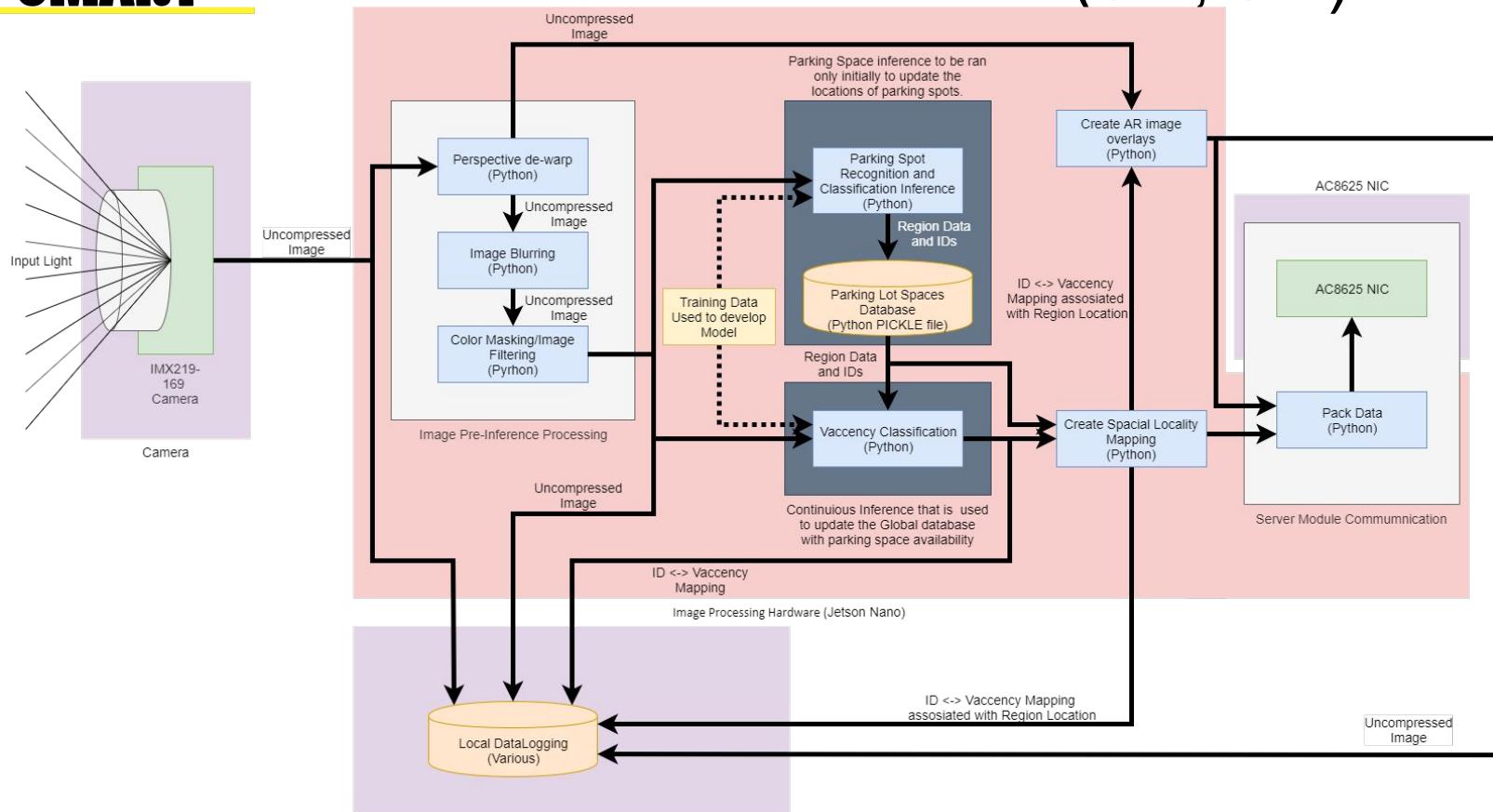
Power Management



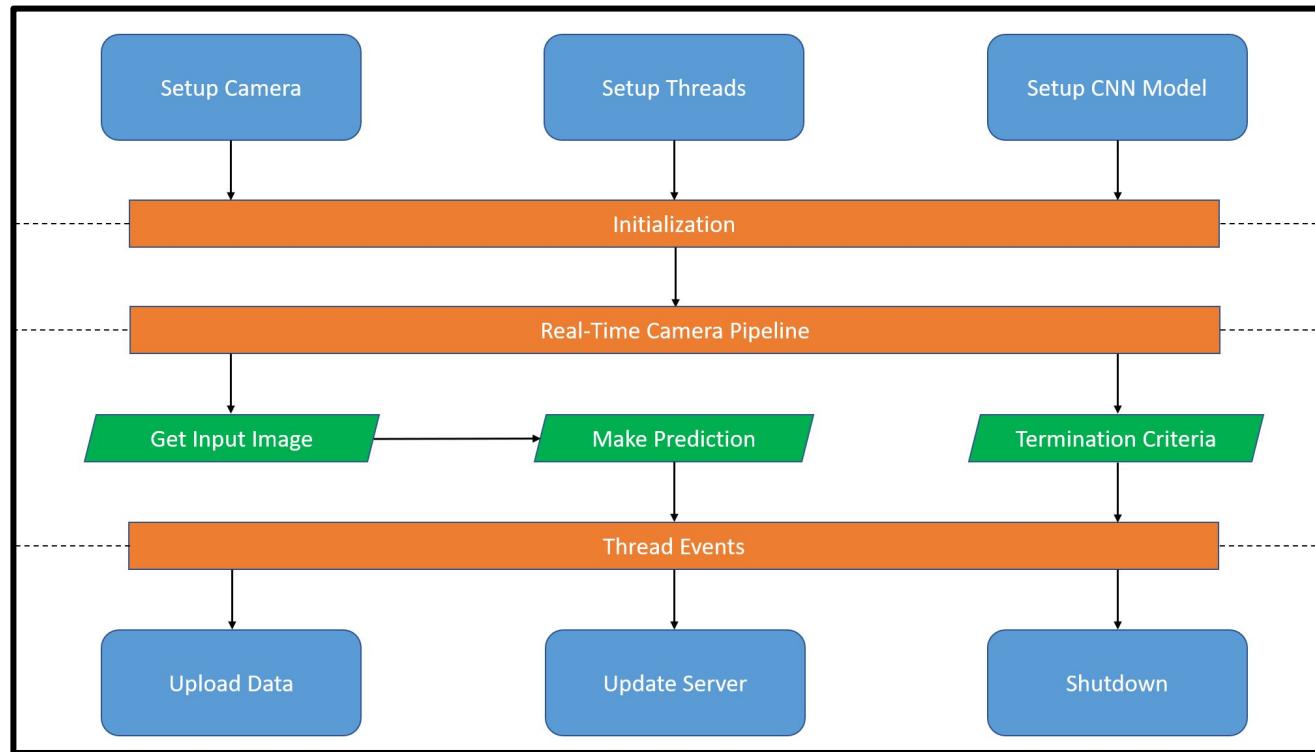
Accessibility



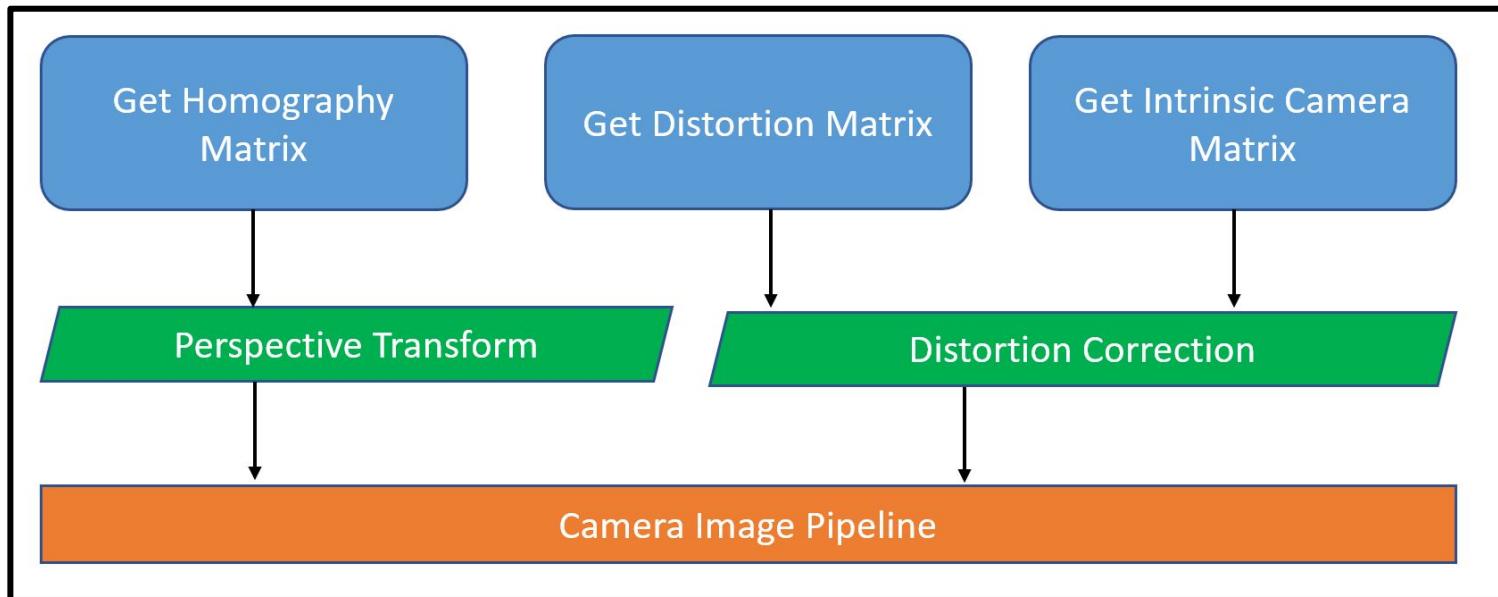
Modules: Camera Module (3.1, 3.4)



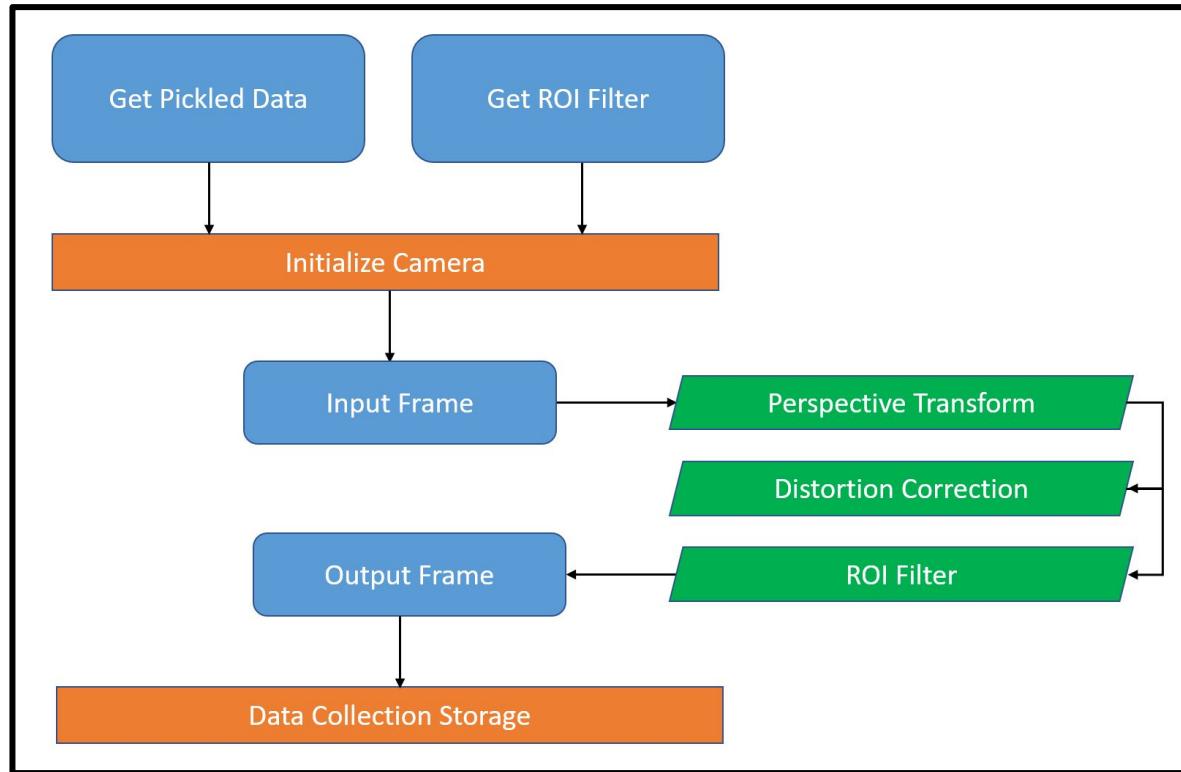
Cam. Module: CNN System Overview



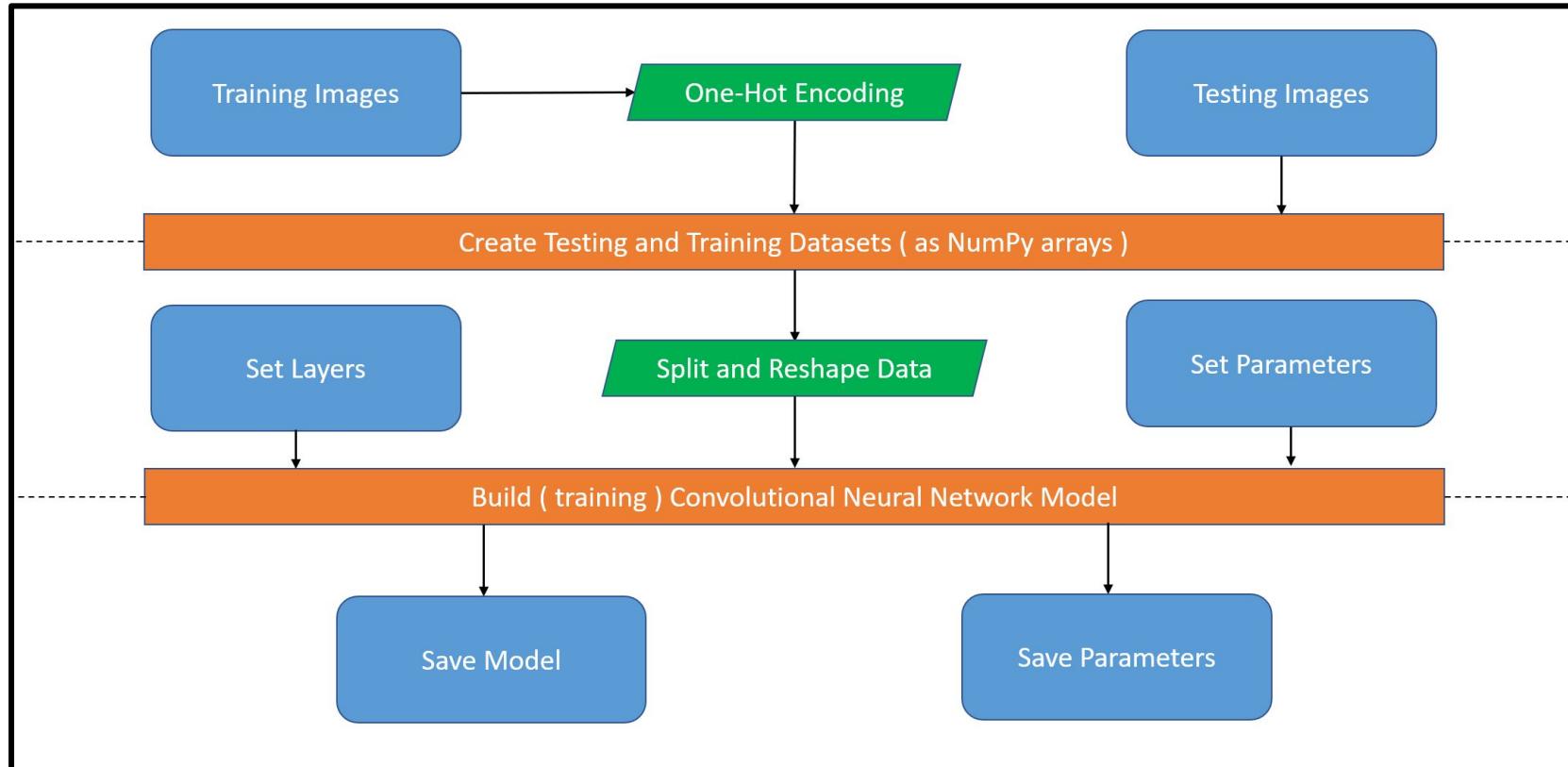
Cam. Module: Camera Calibration



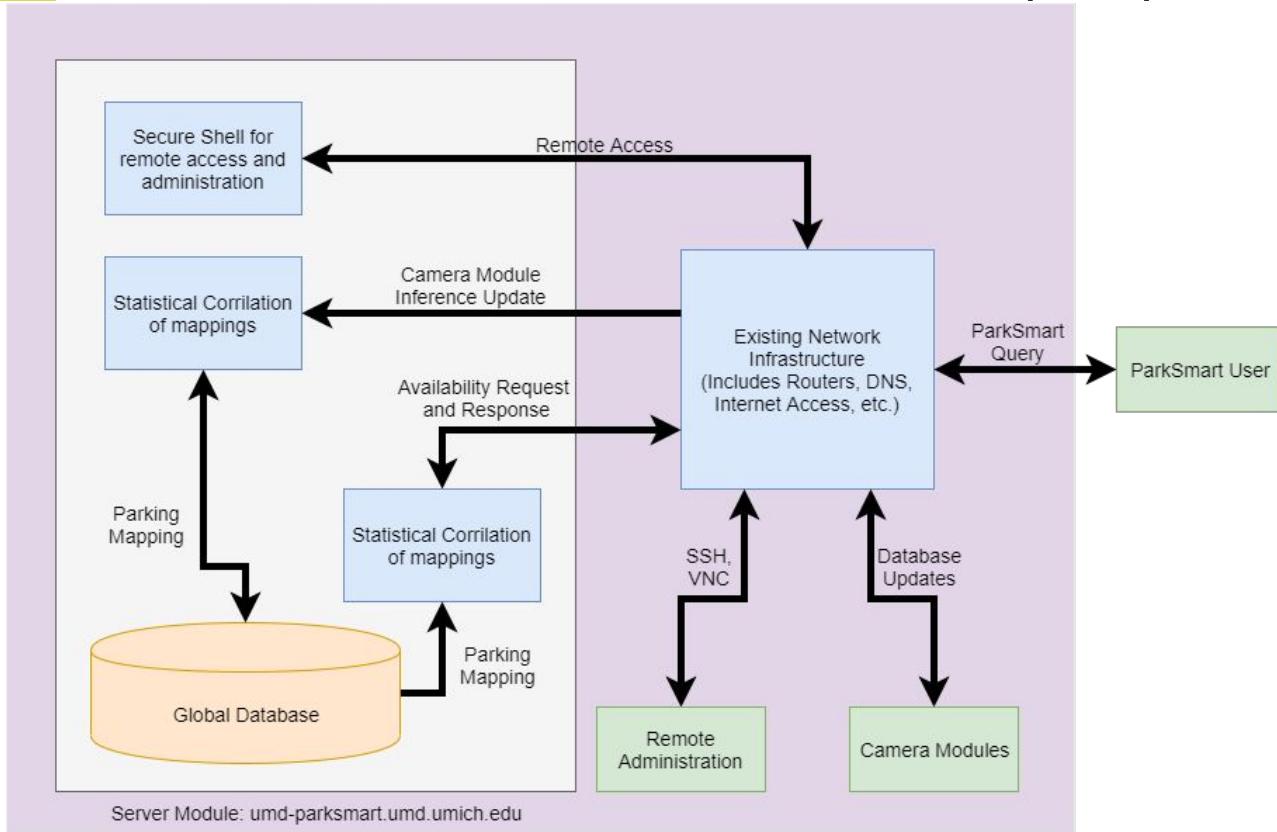
Cam. Module: Data Collection



Cam. Module: CNN Build

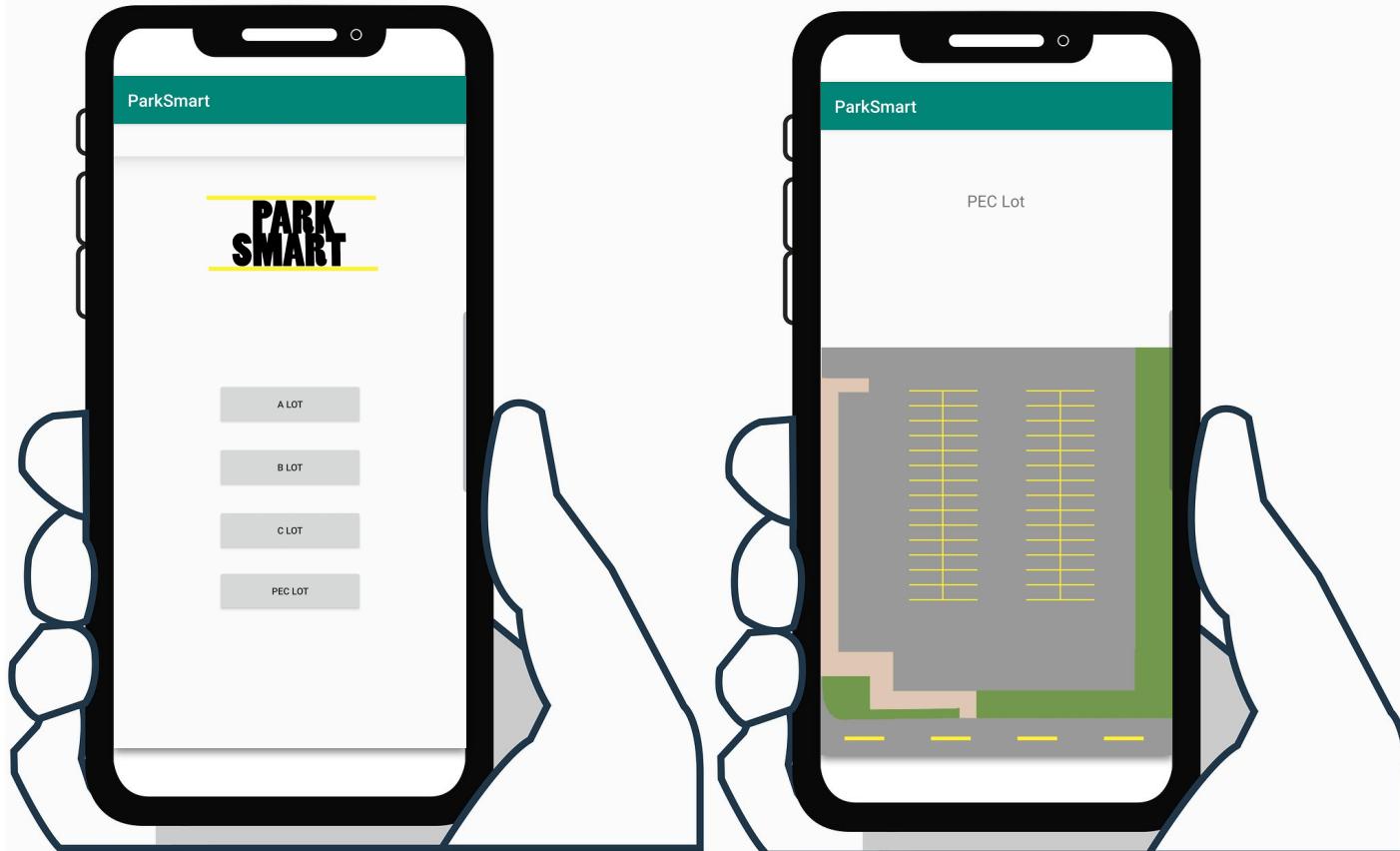


Modules: Network Module (3.3)





Network Module - App Interface



Module: Enclosure (3.2)



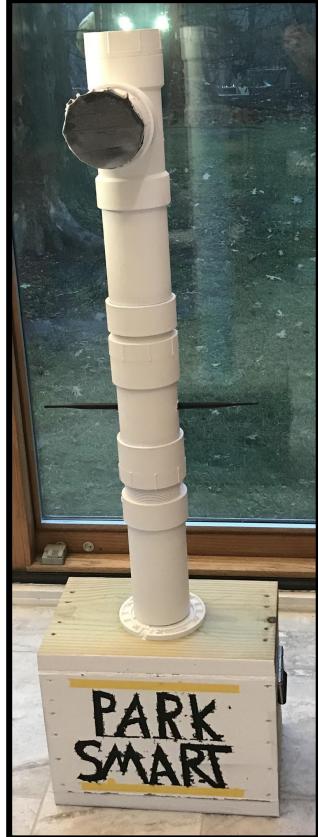
Bottom



Top



Full Structure



Interface Description

adsroot.itcs.umich.edu

UMD-Secure

Web Server



umd-parksmart.umd.umich.edu

To Internet

12V	—
5V	—
CSI	—
M.2	—
IEEE 802.11ac	—

Weather-Sealed Containment

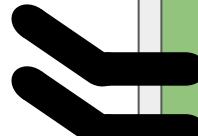
Jetson Nano

Camera

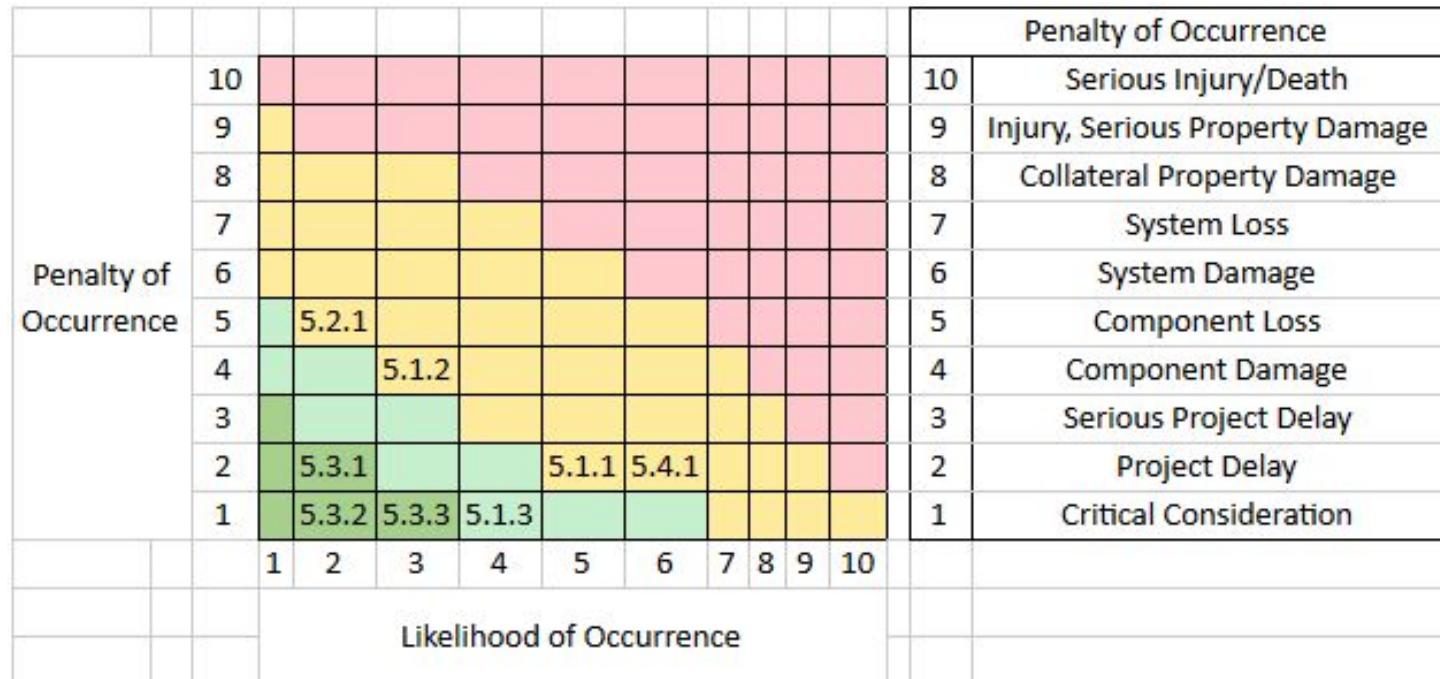
Wireless NIC

Regulator

Battery



Risk Assessment & Mitigation



Excursions

~~5.3.1.1 Wireless Excursion~~

5.3.1.2 Wireless Range Excursion

5.3.2 OpenCV Excursion

~~5.3.3.1 Web Server Hosting Excursion~~

5.3.3.2 App Development Excursion

5.3.3.3 ZQM and CurveZQM Evaluation Excursion

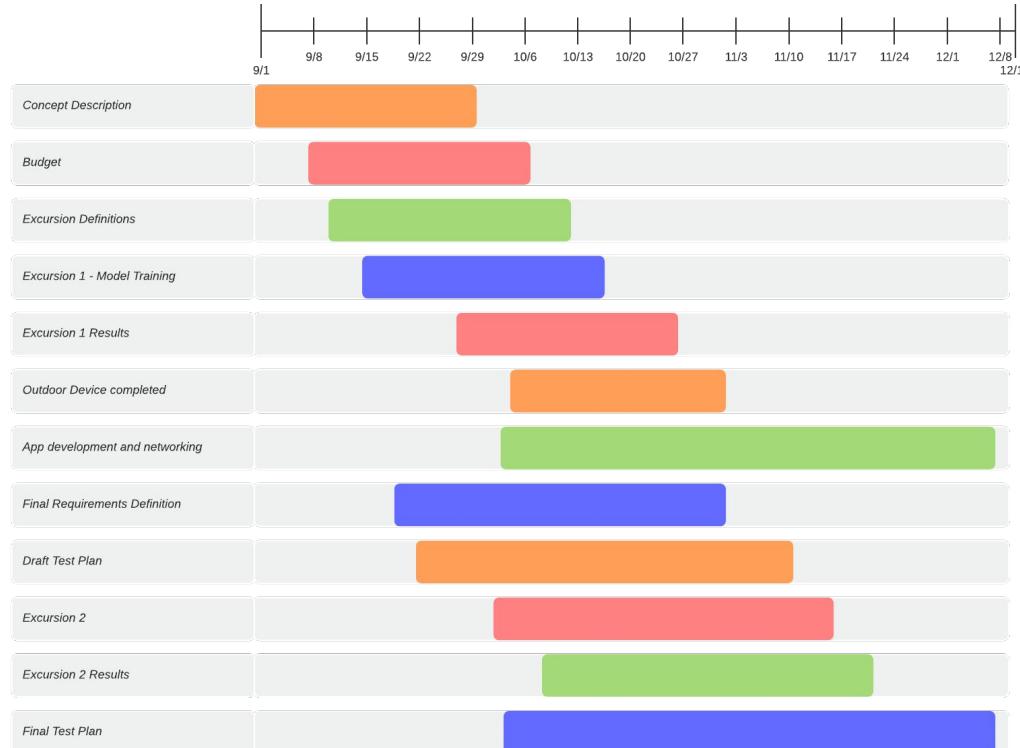
~~5.3.4.1 Campus Access to Information Gathering Location~~

5.3.4.2 Placement and Data Acquisition Excursion

Budget

module	no	Item	Vendor	Model/Part No.	Unti Cost	Qty	Sub Total Cost
Vision	1	wideangle camera	Waveshare	IMX219-160 Camera	30	1	30
Vision	2	mount			30	1	30
Vision	3	case & fan			22	1	22
Image Processing	4	microcomputer board	NVIDIA	Jetson Nano	100	1	100
Image Processing	4	256 GB MicroSD	Amazon	MB-ME256GA	40	1	40
Comm	6	jetson NIC	Waveshare	AC8625 NIC	25	1	25
Power Management	7	TBD				TBD	+
Total Cost Estimates							267+

Master Schedule



Master Schedule - Due Dates

OCTOBER							NOVEMBER							DECEMBER							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
			1	2	3	4	5					6	7	8	9					10	11
6	7	8	9	10	11	12	3	4	5	6	7	8	9	1	2	3	4	5	6	7	
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21	
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28	
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31					

Item #	Description
1	Concept Description
2	Budget
3	Excursion Definitions
4	Excursion 1
5	Excursion 1 Results
6	Final Requirements Definition
7	Draft Test Plan
8	Excursion 2
9	Excursion 2 Results
10	Final Test Plan