3.1 Requirement Analysis

Table 3.2: Functional Engineering Requirements

	Functional Requirement	Reference
FER 1	Have BLE or ANT+ Connectivity	UR 1
FER 2	Accommodate Both 27.5' and 29' Wheel Diameters	UR 4
FER 3	Be Able to Determine Wheel Speed	UR 5

Table 3.3: Performance Engineering Requirements

	Performance Requirement	Target	Value	Unit	Reference
PER 1	Allowable Wheelbase	Range	900-1200	mm	UR 4
PER 2	Weight	Max	8	kg	UR 3
PER 3	Simulated Moving Speed	Max	60	$\mathrm{km\,h^{-1}}$	UR 2
PER 4	Wheel Speed (27.5')	Max	2900	rpm	UR 2
PER 5	Wheel Speed (29')	Max	3500	rpm	UR 2
PER 6	Torque Applied to Wheel	Min	12	N m	UR 2

PER 4 & 5:

The typical speed of a cyclist typically ranges from $10\,\mathrm{km\,h^{-1}}$ to $50\,\mathrm{km\,h^{-1}}$ when cycling on reasonably flat ground. For the design of the platform, a speed of maximum required speed of $60\,\mathrm{km\,h^{-1}}$ was assumed. Considering the two wheel sizes that were identified in Section 2.5, the expected wheel rotational speeds are determined by Equation 3.1.

$$\omega = \frac{2v}{D_{wheel}} \tag{3.1}$$