STEM Gait Analysis

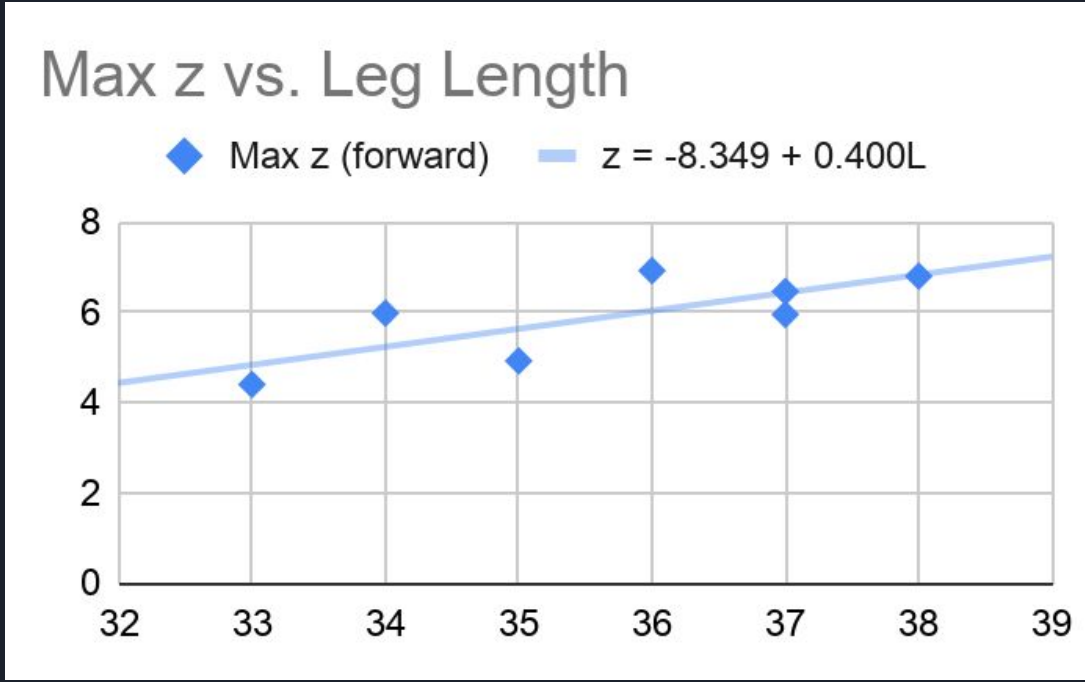
By These Humans Inc.

Method

- General Subject Information
- Tested 3-axis acceleration using phone accelerometer
- 6 meter walk

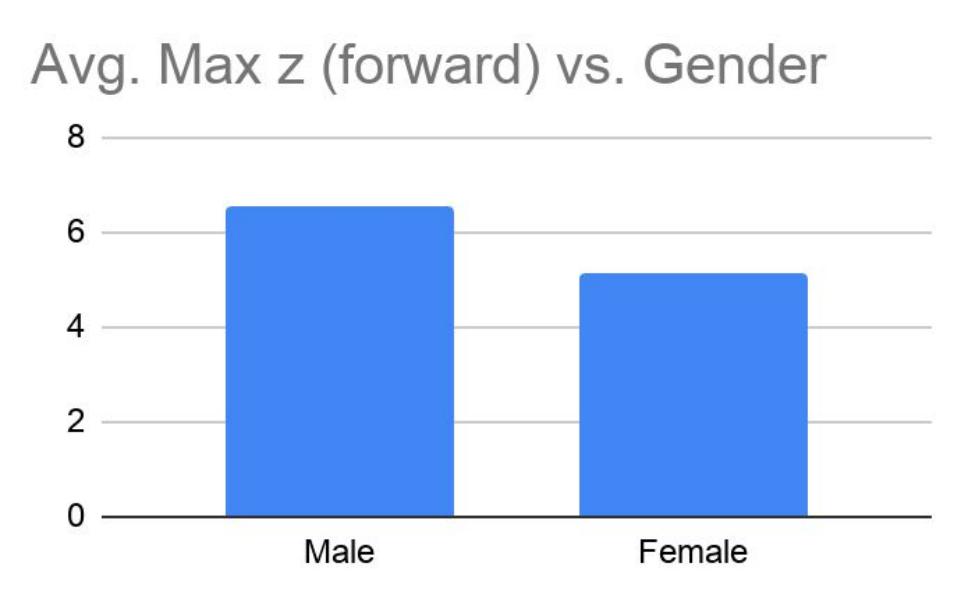
Leg Length (inches)	Height(in)	Weight (lbs)	Gender(binary)	Eye Color(approx.)	Dogs/ Cats	Age(years)	# of Steps	Stride length (cm)	Max x (upward)	Max |y|	Max z (forward)
37	66	110	Male	Brown	No	17	10	60	7.91	5.74	5.96
37	71	150	Male	Blue	Yes	18	8	75	8.91	8.61	6.47
36	70	120	Male	Hazel	Dogs	17	8	75	14.61	9.82	6.93
33	61	2?	Female	Brown	Yes	16	9	67	6.75	4.44	4.41
34	65	115	Female	Hazel	Dogs	17	8	75	8.14	4.90	5.99
38	70	130	Male	Brown	Dogs	17	10	60	8.03	3.35	6.81
35	67	2?	Female	Brown	Cats	17	10	60	9.42	5.10	4.93

Forward Acceleration vs. Leg Length



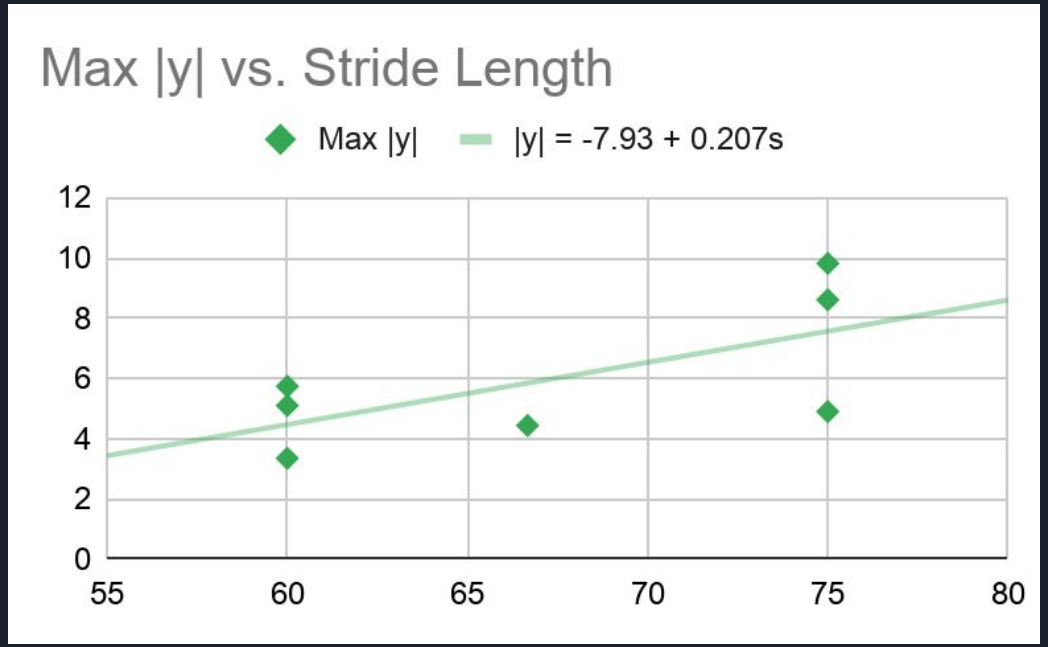
- $R^2 = 0.577$
- Over half of the variability in maximum forward acceleration can be explained by an individual's leg length.
- Every extra inch of leg length increases the maximum forward acceleration by 0.400m/s2.

Forward Acceleration vs. Gender



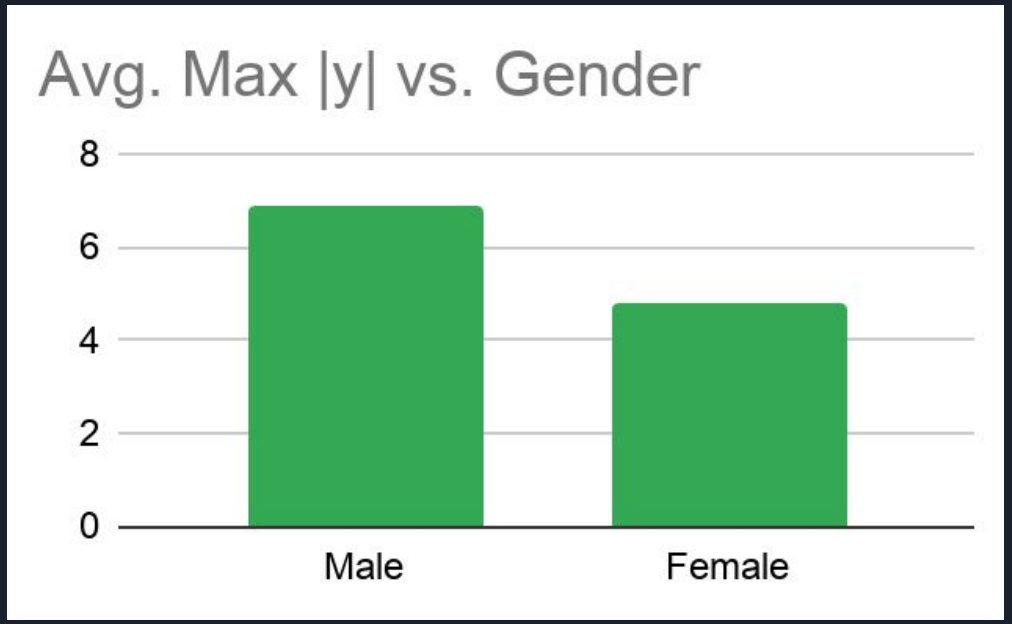
- On average, males' maximum forward acceleration is about 1.4m/s^2 higher than that of females
- Difference is likely caused by females generally having shorter legs than males. (Males Average = 37in) (Female Average =34in)

Horizontal Acceleration vs. Stride Length



- $R^2 = 0.438$
- Stride length explains only part of the variability in maximum horizontal acceleration.
- For every centimeter of stride length, an individual's maximum horizontal acceleration will increase by 0.207m/s2.

Horizontal Acceleration vs. Gender

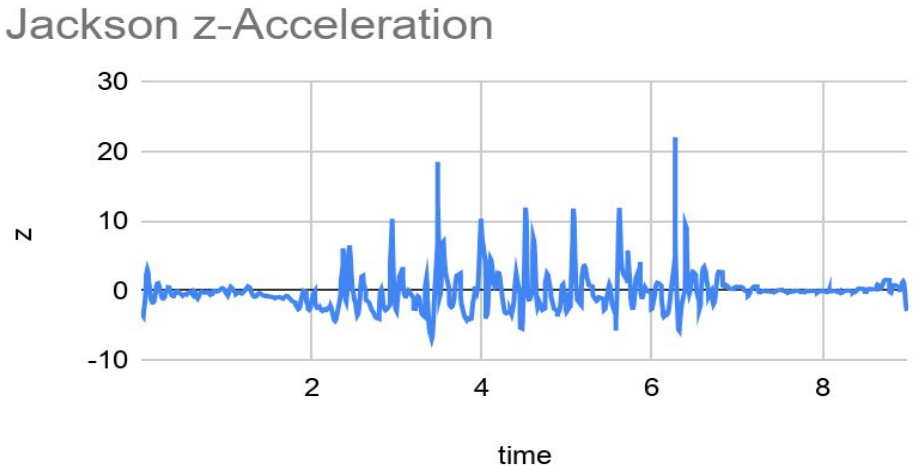


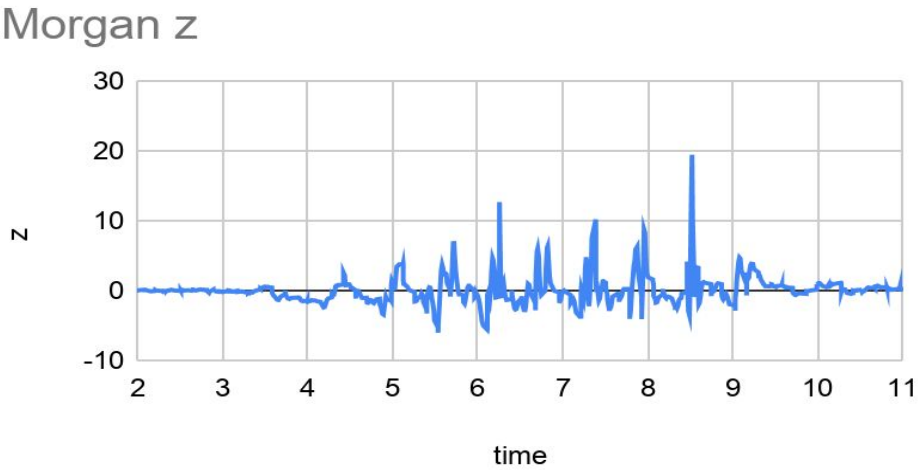
- On average males have a maximum horizontal acceleration about 2m/s^2 higher than females.
- Gender is likely the cause of this correlation, as none of the other variables we measured explain this difference.

Model Effectiveness

- Relatively ineffective
  - Juan appears to be a girl
  - Morgan appears to be a boy
- $R^2 = 0.577$
- $R^2 = 0.438$

Correlation: Hazel Eyes and a_z peaks





Two spikes in forward acceleration at approximately the same relative times during the test.

We are done