Boston Dynamics Inspired Mechanical Quadruped Kinetic Model

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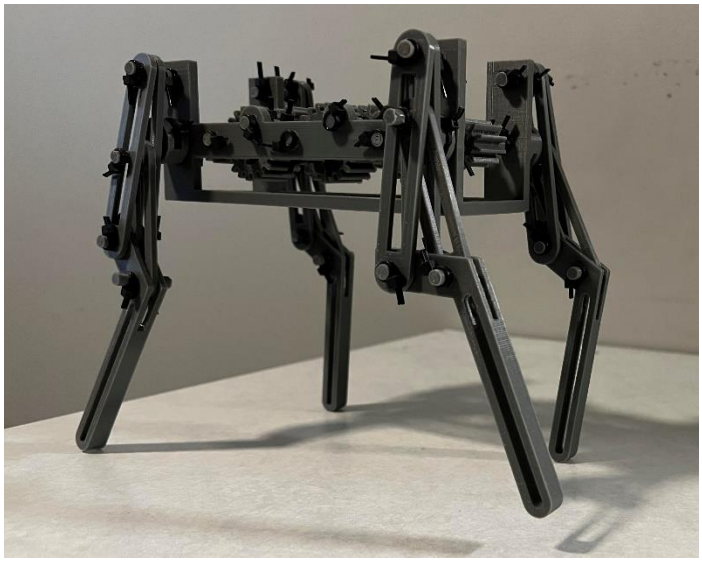
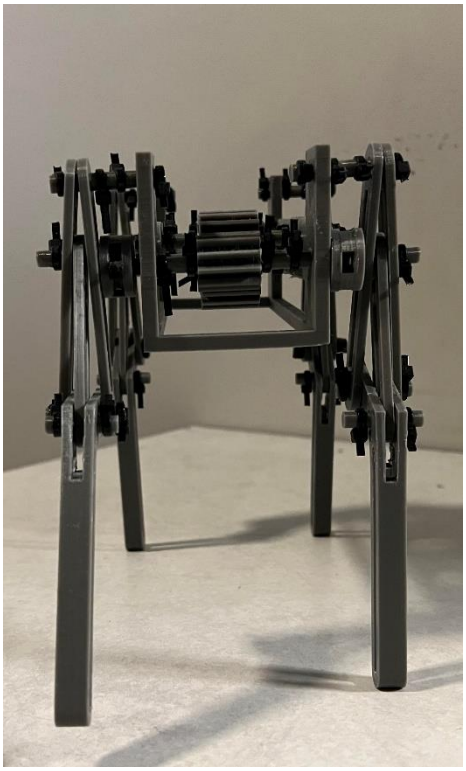
Description

6" Tall kinetic model inspired by Boston Dynamics' Spot robot. The model is powered by a hand crank and can move its legs in sequence when turned. The project is a 97 part assembly with 10 unique parts all modeled in PTC Creo 7.0. The project took 14 hours to model, 3 hours to assemble, and is entirely 3d-printable except the zip-ties. This is currently the version one minimum viable product prototype; it has issues with friction in the leg mechanisms and is bulkier than intended. Version two will have a simplified gear train that can be turned from the top, an overhauled leg mechanism, and a smaller, refined frame.

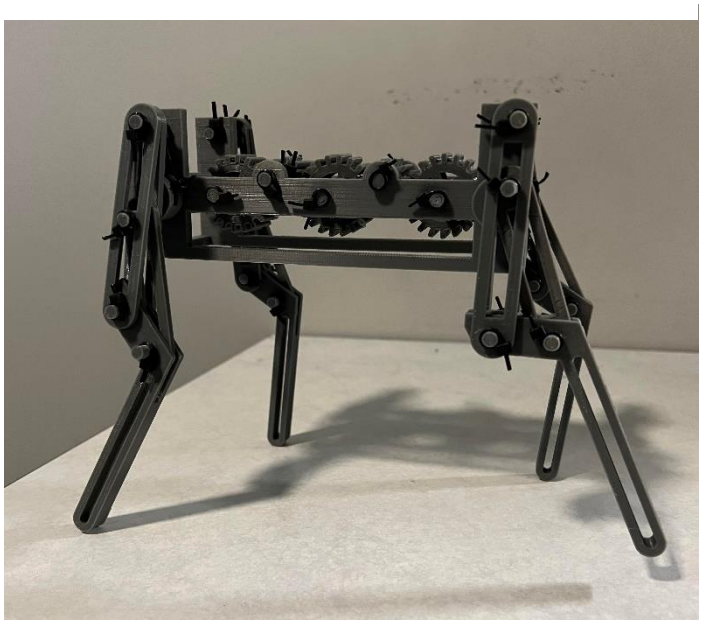
Isometric View



Front View

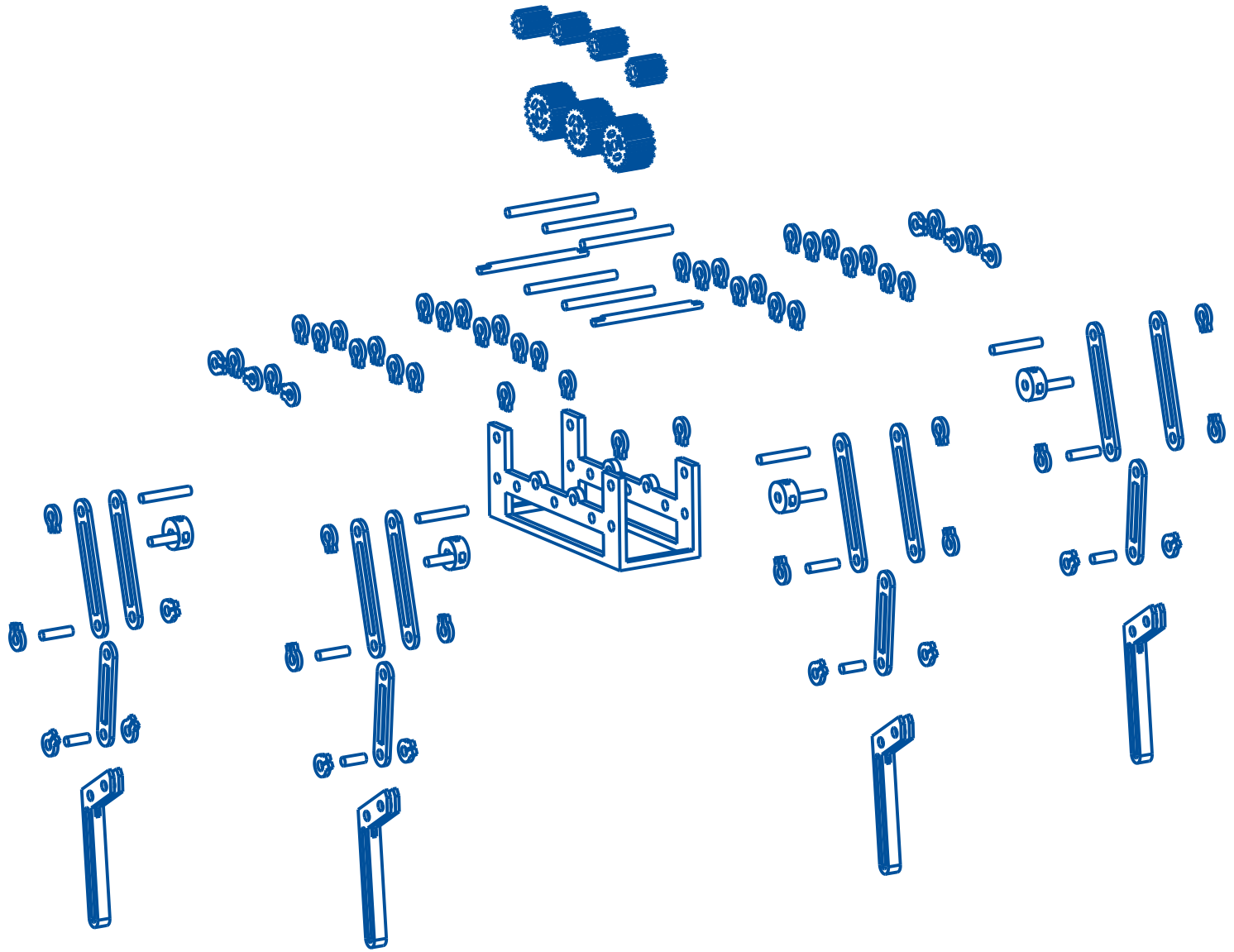


Side View

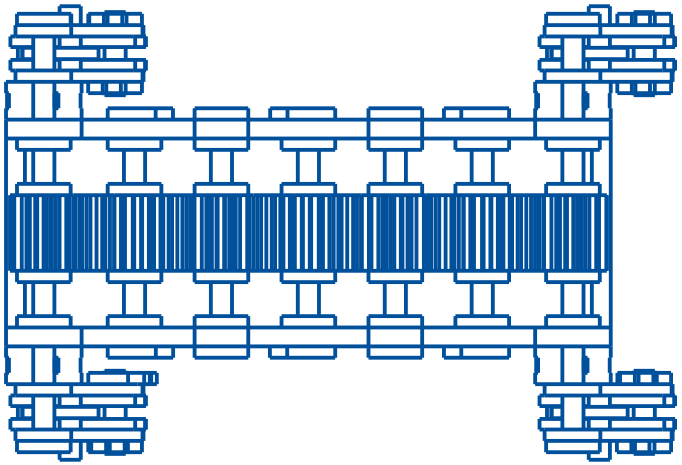


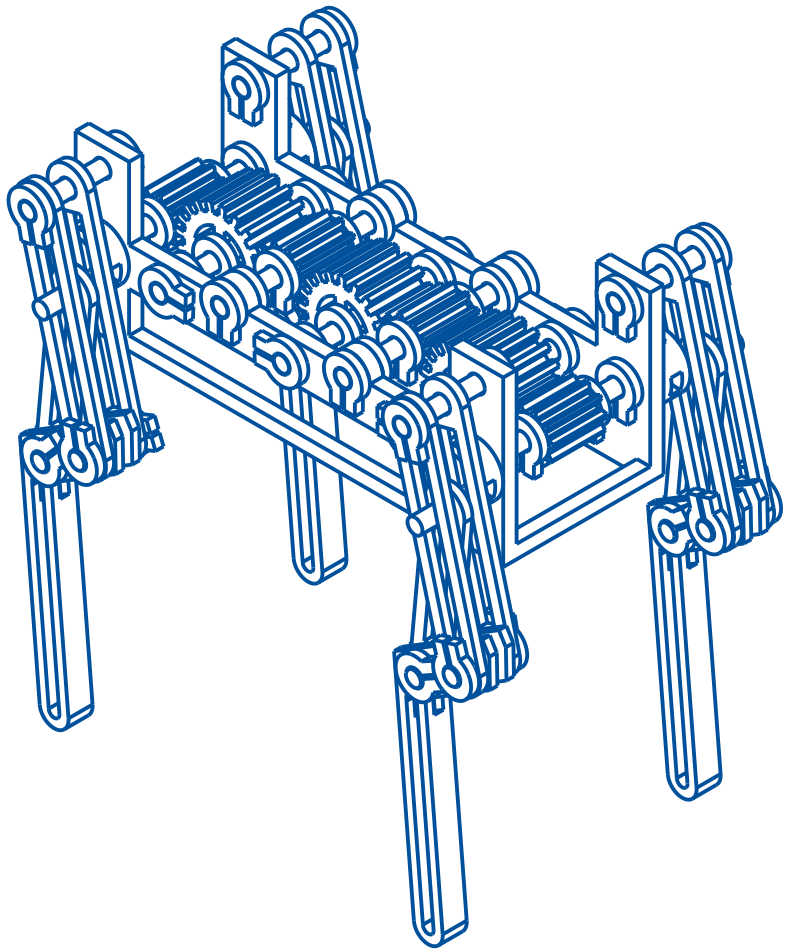
Results and Improvements

The model holds little traction with the ground due to both material selection and shape of legs. The legs were designed for printability not to stand; the next design will either incorporate rocker feet or have high friction leg attachments such as silicon or rubber. Further the legs would often become out of sequence due to slipping and falling over; however, my modifying the gearing train to split into individual legs off the main drive would resolve this issue and most likely provide more stability as well. The turning was also hard to access and redundant due to having to hold the machine to turn it. This design was a proof-of-concept prototype. The next design will move the crank to the top of the robot as well as incorporate a spring to store mechanical energy to independently walk. The body was also bulky and gears quite wide, causing a lot of empty space. To improve this, the next body will be sleek and use thin gears and have more support for the axles to use less collars.

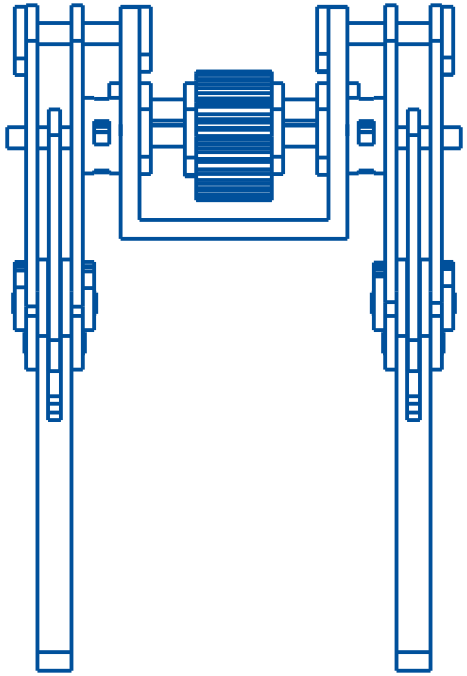


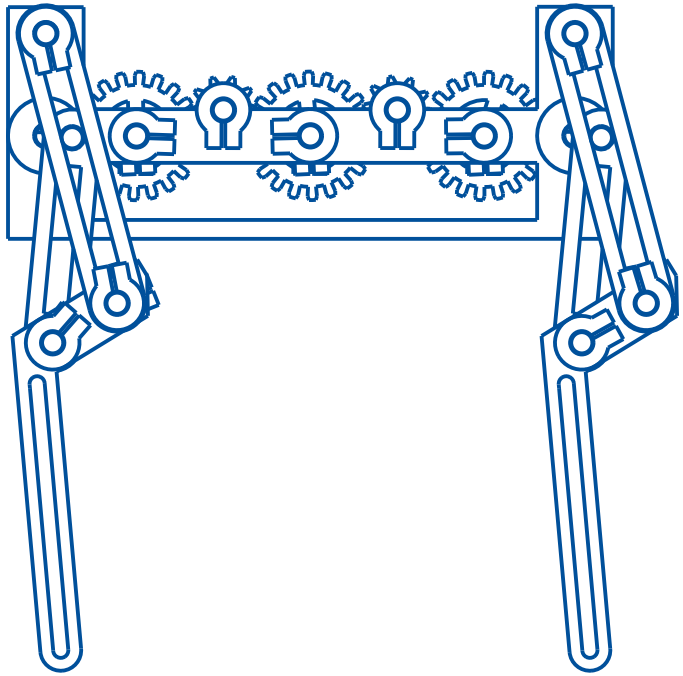
UNLESS OTHERWISE SPECIFIED: .X = ± .1 .XX = ± .01 .XXX = ± .005 ∠ = ± 1°	NAME: Tristan Linn	DATE: Jan 23
	DRAWING NAME: Kinetic Dog Model V1	SCALE: 0.25
	Exploded View	UNITS:mm
	Independent Project	





UNLESS OTHERWISE SPECIFIED: .X = ± .1 .XX = ± .01 .XXX = ± .005 ∠ = ± 1°	NAME: Tristan Linn	DATE: Jan 23
	DRAWING NAME: Kinetic Dog Model V1	SCALE: 0.5
	Top and Isometric Views	UNITS:mm
	Independent Project	





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	DRAWING NAME: Kinetic Dog Model V1	SCALE: 0.5
	Front and Side Views	UNITS:mm
	Independent Project	