WII Solutions

Crutch Converted to Angled Seat

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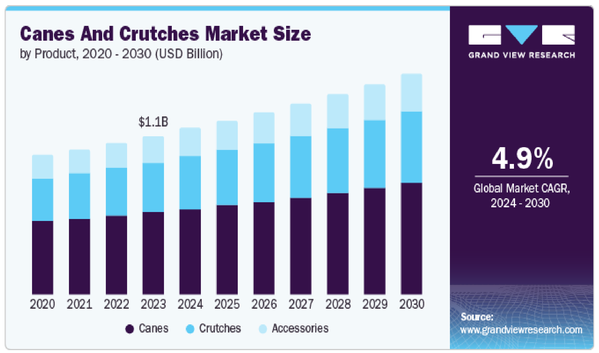
11:30-1:30pm ME 263
Section 111

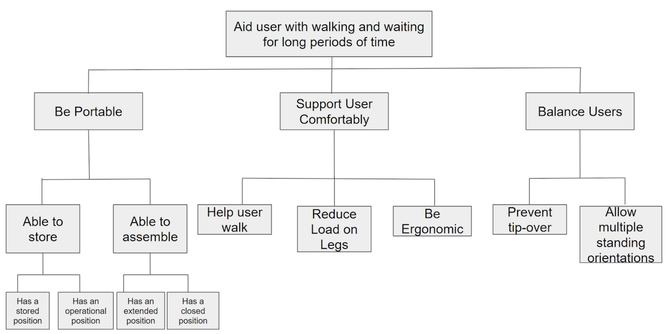
Problem Statement

Many people with disabilities or injuries face trouble standing for long periods of time and require assistance; e.g. when in lines, on public transport, or during daily tasks.



Canes and Crutches Market Projected to Grow for the Next Decade

FUNCTIONAL DECOMPOSITION



Our primary function was 'aid user with walking and standing for long periods of time' as this was the main reason why we were developing our product. We want to create a walking aid that resolves the issue of people not being able to stand for long periods of time with their current walking aids. We then created sub functions and further derivative functions as required. Functions of note include the three subfunctions from the main problem, that being: "be portable", "support user comfortably", and "balance users". From these, a third tier of functions are displayed.

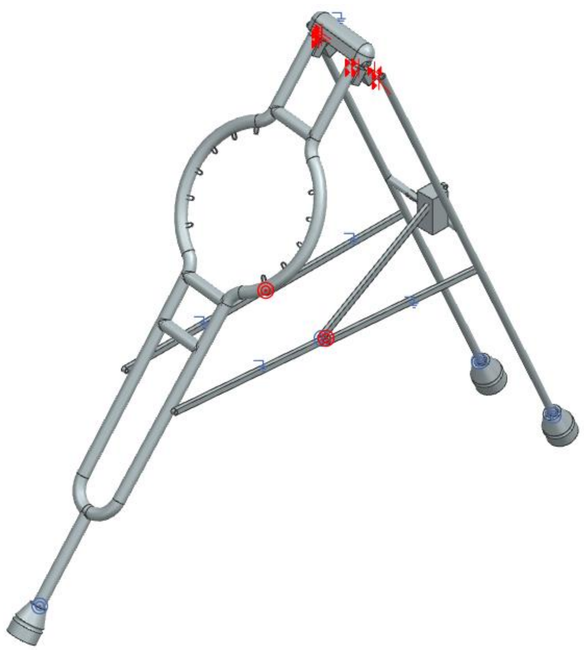
Primary Concept Description

Our device is an aluminum crutch with a curved center containing a net seat in the center of its body consisting of aluminum rods. The user uses it as a traditional crutch when walking, however when having to conduct a standing task or wait in line for prolonged periods of time the user can switch to its extended position. Its extended position consists of the crutch rotated 30 degrees anticlockwise (if the users facing toward the right) supported by two stands that rotate through the mechanism of a button system. These stands then lock using a cross member and locking mechanism. The rubber tips at the end of the legs are able to bend while still having the bottom face completely touching the ground.

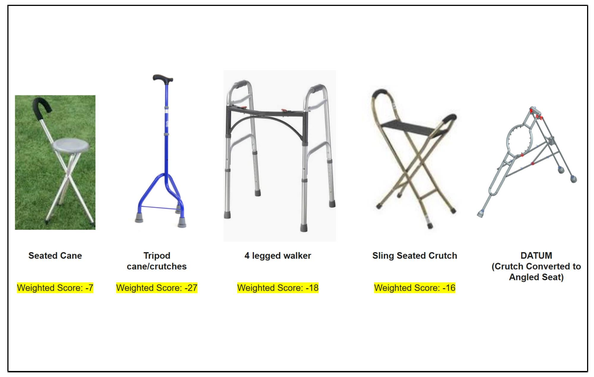
OPERATIONAL DESCRIPTION

1.Walk as you would with a traditional crutch
2.Stop, balance using one leg/crutch and use free hand to open legs – legs will lock once in open position
3.Pivot on good leg and sit into mesh seat
4.Once done resting, stand using good leg, release crutch leg lock, and resume traditional crutch operation

Qualitative Requirements		
Adjustable		Comfortable
Quantitative Requirements		
Longest width 40.64 cm	$100 to purchase	Collapsed width 12.7cm
Collapsing time 5 seconds	Structual material compressive strength at least 6000 psi	Has 3 legs
Maximum load 158.76 kg	Total weight 1.82 kg	1 collapse fold



Comparison to Benchmarks



Comparing WII Solution's Prototype to Current Market Products Using a Decision Matrix

Engineering Modeling

Requirement	Meets? (Y/N)	Details
Adjustable	Y	Seating angle adjustable. Opened and closed positions with increments of angle between.
Device has 3 legs	Y	Two fixed length and one telescoping leg.
Longest width of 40.64 cm	Y	Largest width of 16 in = 40.64 cm for the seat width
Material compressive strength of 6,000 psi	Y	Aluminum tubing compressive strength of 6,000 psi met.

How our prototype design meets key engineering requirements

"Canes and Crutches Market Size and Share Report, 2030." Canes And Crutches Market Size And Share Report, 2030, Grandview Research, 2023 www.grandviewresearch.com/industry-analysis/canes-crutches-market-report