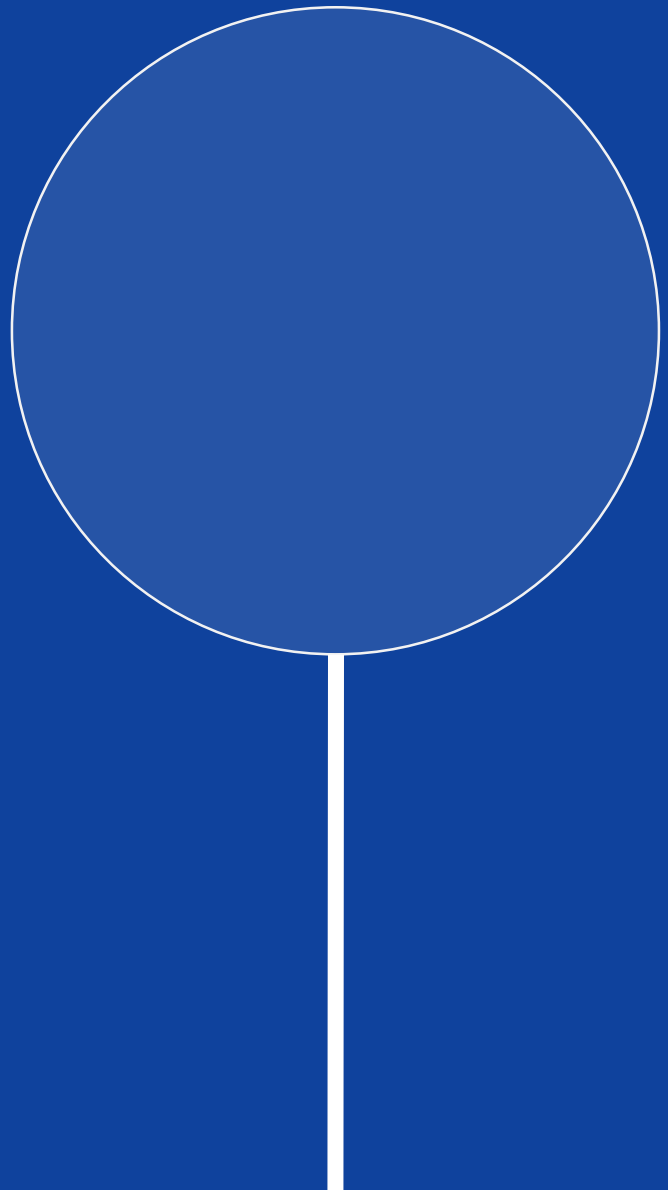

Team 3

Coil Seeker

Changhee
Jiheon
Sungwon
Jinseok

Demonstration – Coil Seeker

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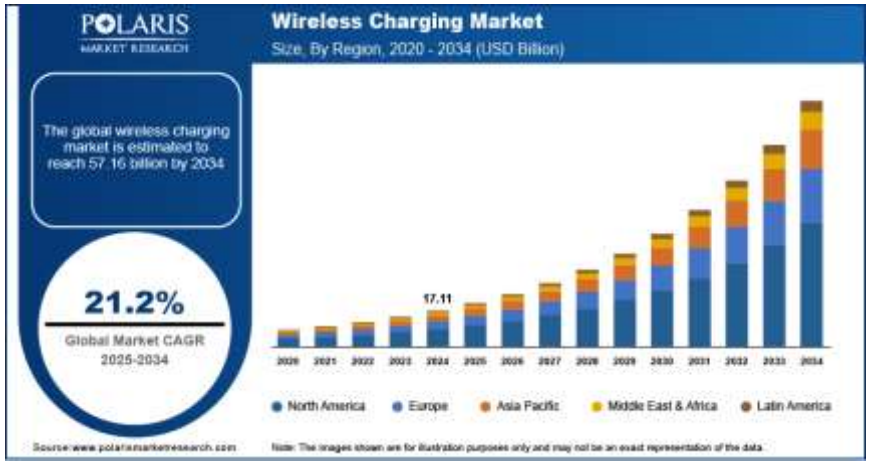
1

Introduction : Wireless Charger

Part 1 >> **Introduction**

Part 1 >> Introduction

“The wireless charging market size was valued at USD 8.41 billion in 2024.”



IKEA’s powered furniture line gives mobile users a charge

Author
Michael Barris

IKEA is bringing out a line of furniture with built-in wireless chargers to increase convenience for connected consumers who weary of looking for a charger and the attendant charging-cable mess.

Part 1 >> **Introduction**

Part 1 >> **Introduction**

Heat

박*호
★☆☆☆☆ 2024.03.14
판매자: 쿠팡(주)

발열 심하고 충전이 제대로 안됩니다.

갤럭시 S23 울트라 모델 (잔여 배터리 30%).
제품에 연결한 충전기 삼성 정품 C타입 충전기.

Low charge rate

김*홍
★☆☆☆☆ 2023.05.25
판매자: 쿠팡(주)

——충전 10번 올리면 1번 될까 말까 함

뭐지 기존 무선충전쓰다가 바꿔서 쓸려고 꺼냈는데 충전기에 스마트폰 올리다 부셔버리고 싶어졌음.
10번 올리면 1번 돌까 말까 함 안되는 경우가 허다 함
기존 충전기랑 모양이 비슷하고 고속충전이라고해서 샀는데 무선 충전이 이모양이면 어케씀 ——
짜증 지대로 남

Noise

로고골골골
★☆☆☆☆ 2021.06.09
판매자: 쿠팡(주)

충전할때 소리남 ㅠ 귀아픔

충전기는 주로 침대맡에 두게 되죠 아님 책상위나.

침대 옆 서랍장 위에 두었는데
전기 지나가는 소린가요?
여튼 엄청 고~음이
계속 ㅠㅠ
나요

귀가 찢어질것 같아서
이리저리 움직이면 괜찮기에 손을 떼면 다시 소리나고

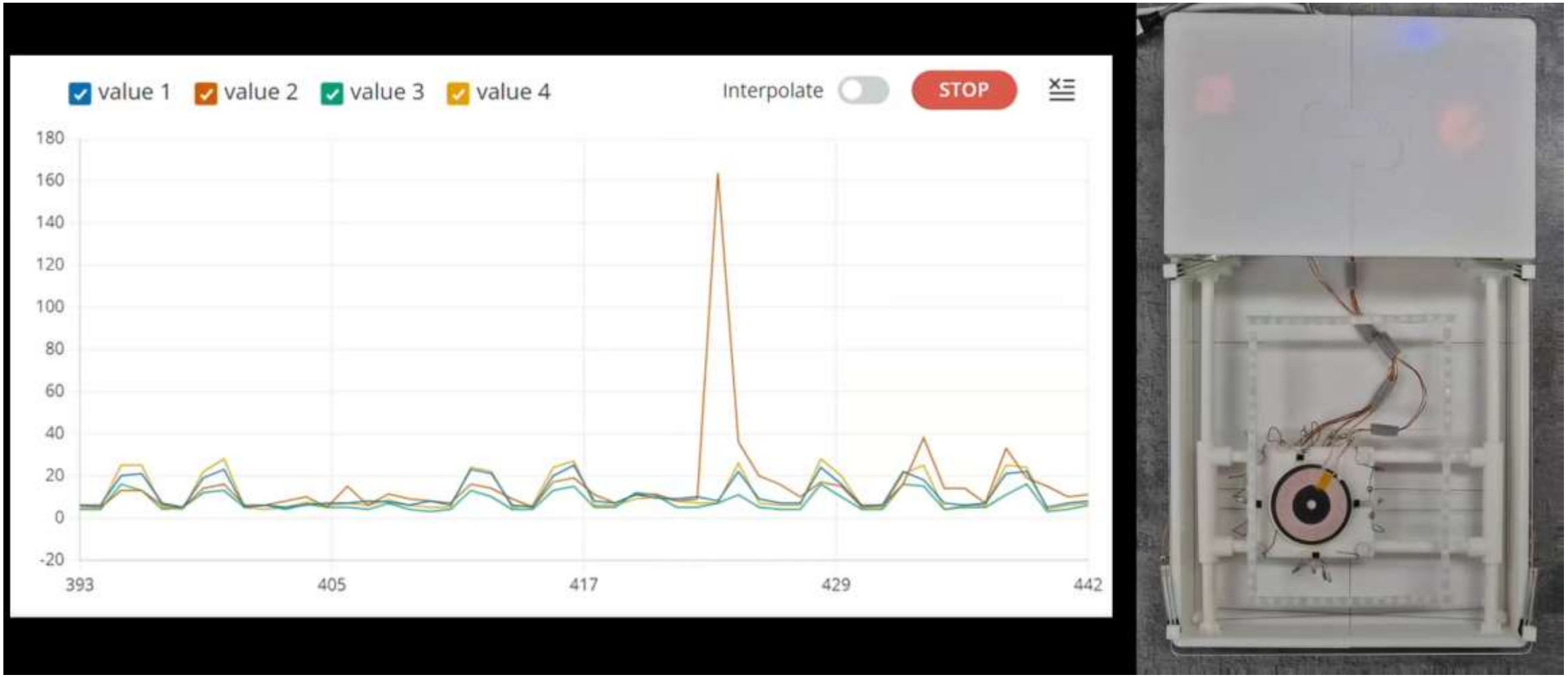
아주 가끔은 소리 안나고 ㅠㅠ

이거 어쩔 ㅠ

2

Product Mechanism

Part 2 >> **Product Concept**



Part 2 >> **Product Concept**

<Hardware>

2 motors

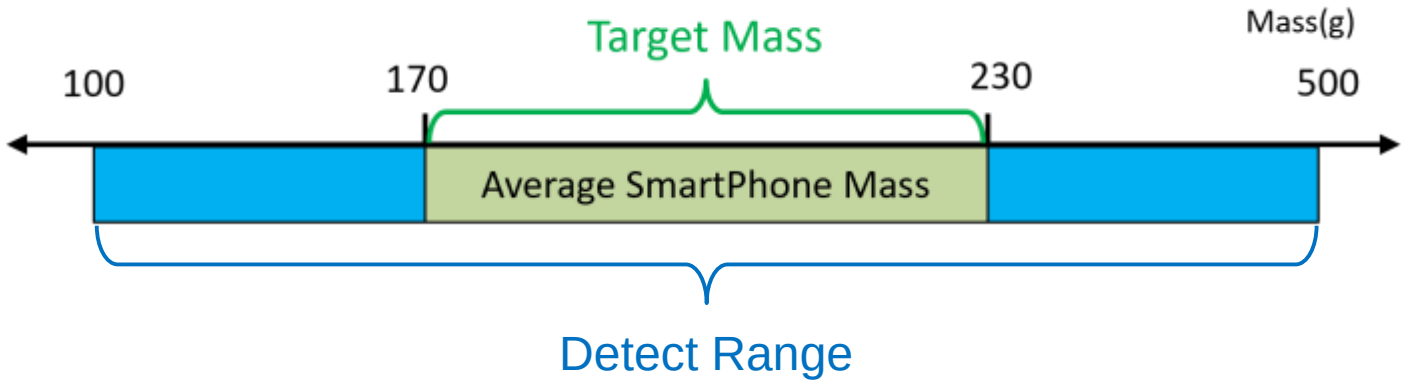
Wireless Charger Coil

4 Hall Sensors

4 Pressure Sensors

Part 2 >> **Product Mechanism**

(1) Detect the weight of the phone

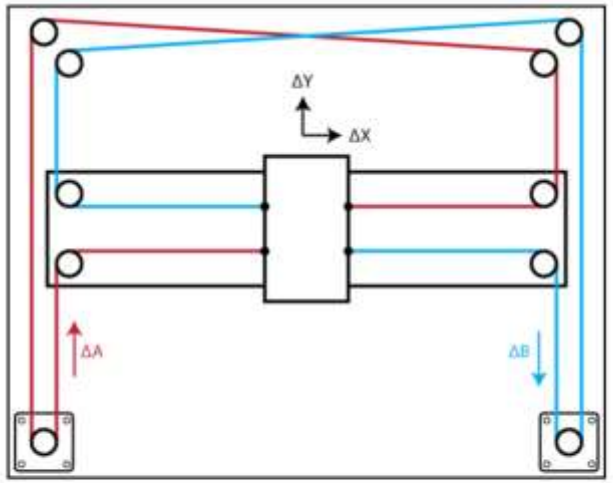


1 Pressure Sensor on Each Corner

Part 2 >> **Product Mechanism**

(2) Move charger coil until it finds a mobile device

Core XY Mechanism

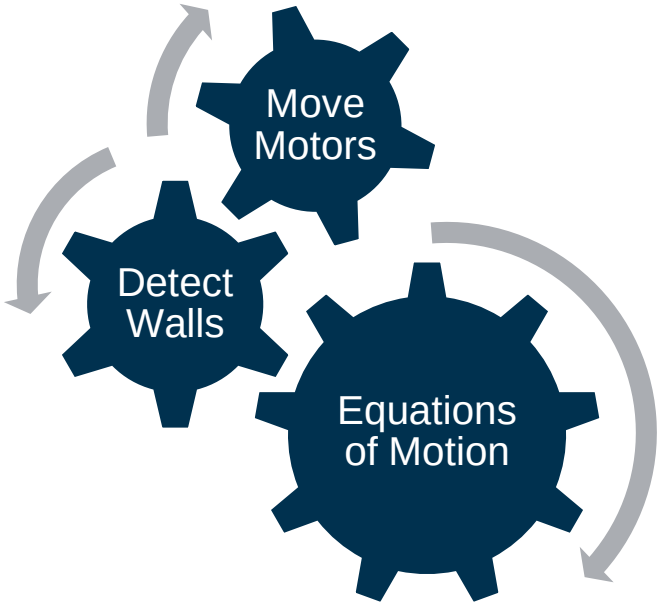


Equations of Motion:

$\Delta X = \frac{1}{2}(\Delta A + \Delta B)$, $\Delta Y = \frac{1}{2}(\Delta A - \Delta B)$

$\Delta A = \Delta X + \Delta Y$, $\Delta B = \Delta X - \Delta Y$

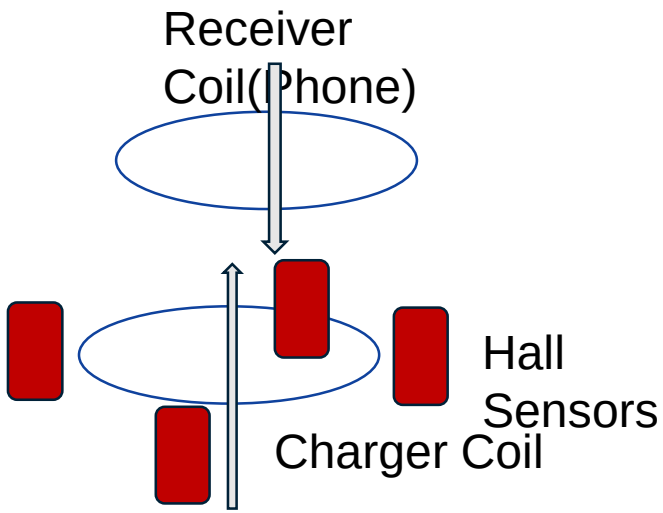
Control Diagram



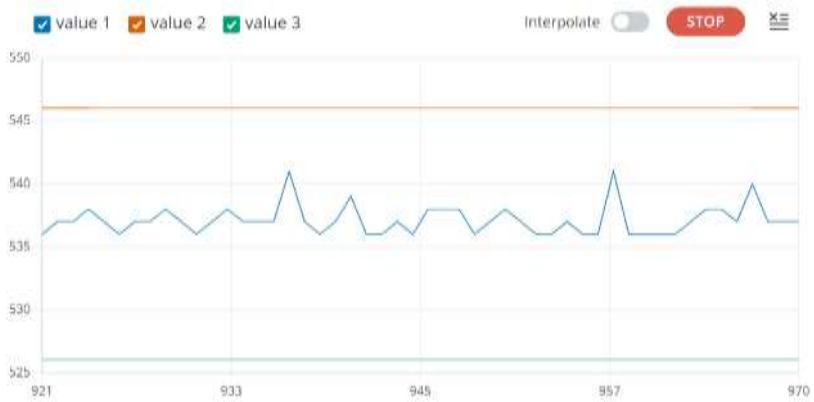
Pulley-String System

Part 2 >> **Product Mechanism**

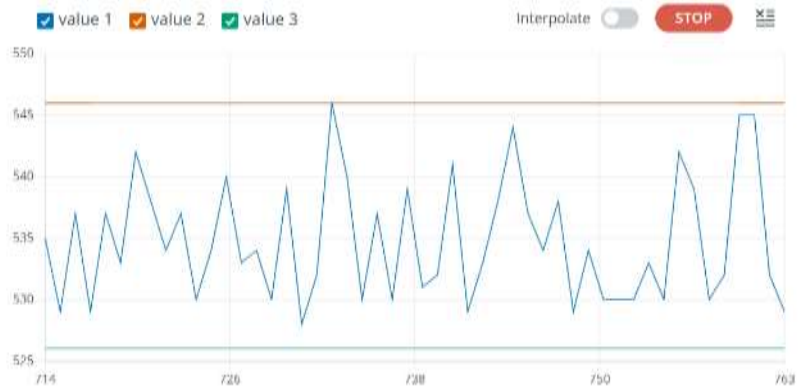
(3) Check if charging started



Hall Sensors
Measure the magnetic field



When not Charging



When Charging

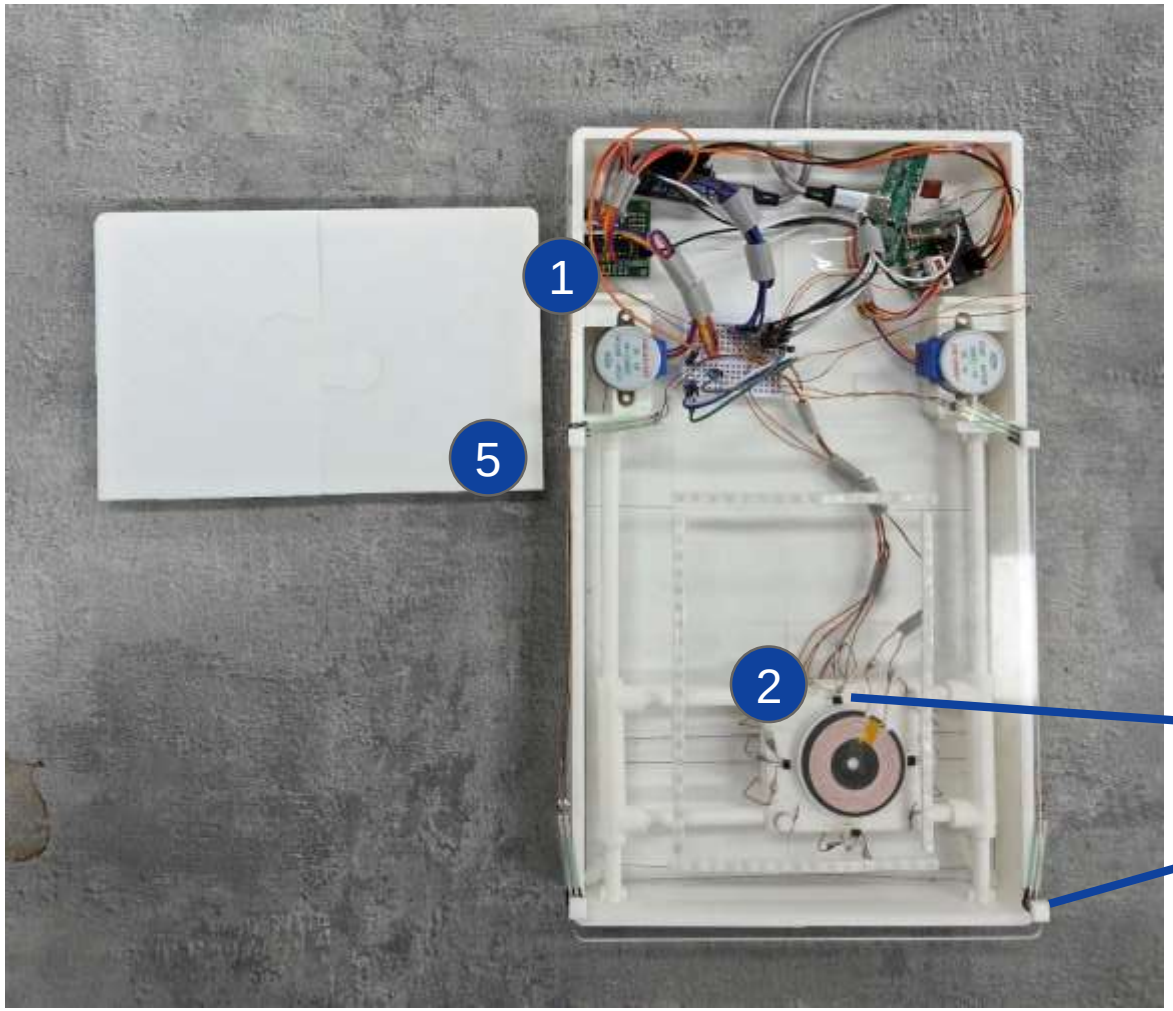
Significant Change in Amplitude

Part 2 >> **Product Mechanism**

(4) Stop at highest efficiency

Compare Amplitudes to Set Direction

Part 2 >> **BOM (Build of Material)**



No.	Component	Qty.	Total Price(KRW)
1	Step Motor	2	3960
2	Wireless Charger	1	4000
3	Hall Sensor	4	2816
4	Pressure Sensor	4	14400
5	3D printed container	453g	13150
	Total Cost		39000 (＜$30)

3

4

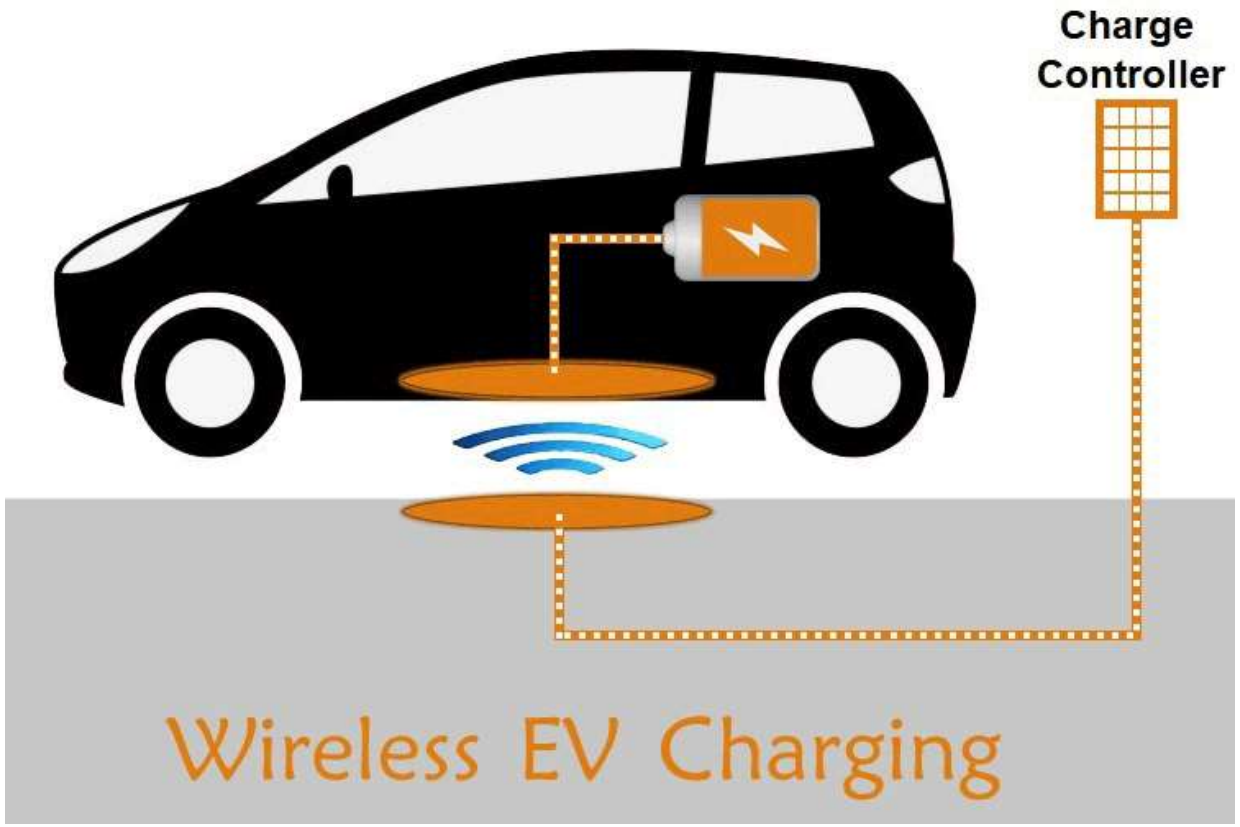
3

Market Comparison

	Cable Charger (C2C)	Typical Wireless Charger	MagSafe	TESLA	Coil Seeker (Our Product)
					
Comfortable?	X	O	O	O	O
Charging speed?	O	X	O	O	O
Affordable?	O (₩25,000)	O (₩40,000)	△ (₩65,000)	X (₩390,000)	O (₩39,000)
For every device?	O	O	X	O	O

Part 3 >> **Market Comparison**

Part 3 >> **Market Comparison**



Part 3 >> Conclusion

Q&A

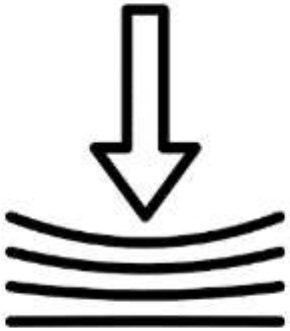
Q&A >> Existing Mechanism / Our Mechanism

- Detect distance using light (cameras)

Optical Sensor

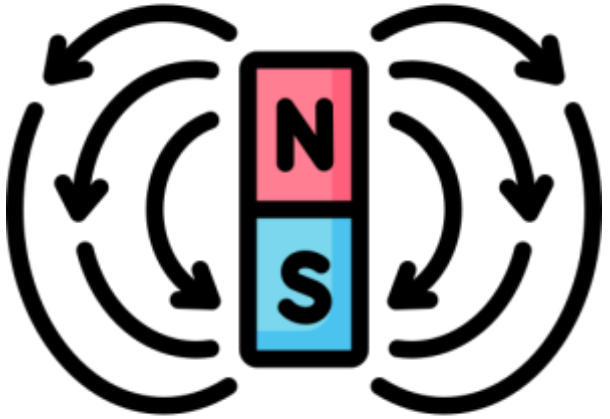
- Capacitance changes when a device touches / comes near the surface

Capacitive sensors



- Force sensing resistor
- Location approximation with the pressure data

Resistive Sensor



- Detects magnetic field
- Continuous real-time position feedback
- Simple data processing

Hall Sensor

Suitable for detecting the perfect alignment between coils for maximum charging efficiency!