
HELPING PEOPLE WITH CIP
Congenital Insensitivity to Pain

Background Information

- Congenital Insensitivity to Pain (CIP)
- Rarer conditions
- Person cannot feel physical pain
- Able to feel difference between sharp and dull/ hot and cold
- Cannot sense it
- Common for people with condition to die in childhood due to injuries/ illnesses going unnoticed.
- Burn injuries among the more common injuries.

Exploring Data

Sometimes, CIP occurs starting from birth, it is in the genes of the people. Based on scientific resources, there is currently no cure for CIP. Many patients just have to be careful with everything they touch or wear gloves when going out.

Framing Our Problem

What day to day problems might they encounter?
A cut any time, and by not sensing the pain, the cut can get swollen. They also can't sense, heat, meaning they can get hurt burns. According to wikipedia, they get burns very often.

What precautions do they have to take?

1. Wearing gloves outside.
2. Having to be especially cautious of their surroundings.
3. Wearing longer pants to prevent accidental cuts.

How can we improve their quality of life?

What are the things around them that could cause burns or injuries?

What are they trying to prevent?
1.Infections
2.Burns
3.Cuts
4.Scrapes

Outside:
1.Cigarette buds
2.Sharp rocks
3.Metal drain covers

In kitchen:
1.Kettle
2.Sink
3.Stove

Problem Statement

How can we help people with CIP to avoid getting hurt from heat or sharp objects?

Generating Ideas

NO.	IDEA 1	IDEA 2	IDEA 3	IDEA 4	IDEA 5
DESCRIPTION	A wristband that can sense the temperature of the water and the sharpness of the objects.	A cup in which its colour changes according to the temperature of the water.	A pair of thin gloves that can sense the temperature of water and protect the hands from getting hurt.	An ankle band that senses possible obstacles in front of you, e.g. objects you might trip on/ hot objects.	Temperature sensor on the sink tap to alert the user when there is hot water coming of out the sink.
IMAGE					

Idea 1 Development

- Heat sensor
- Sense temperature of objects near it
- If it senses that the temperature is too high, it will produce a ‘beep’ sound.

- Ultrasonic sensor
- Sense presence of sharp object near the user.
- If it senses objects are too sharp/ can hurt user, it will produce a ‘ding’ sound.

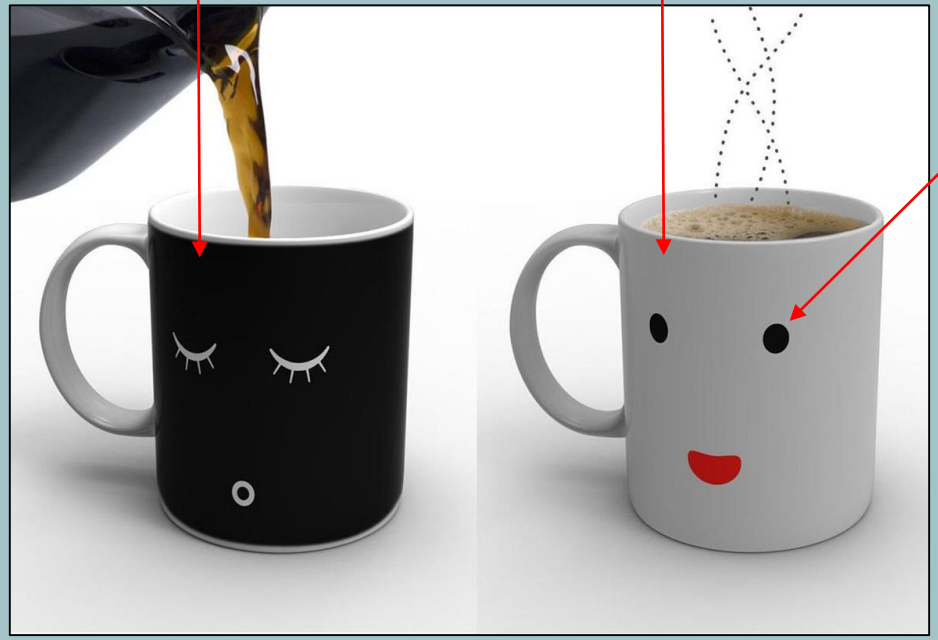
Pros and Cons 1

Pros	Cons
Light-weighted.	Users have to have the wristband on them all the time.
Small to keep.	Might not be waterproof.
Easy to handle.	Might not be attractive looking all the time.

Idea 2 Development

Temperature is appropriate for drinking, colour will turn blue/black.

Temperature too high for the user to drink, colour will turn red/white.



Designs around its body.
Design changes colour according to temperature of liquid.

This can be done using heat-sensitive paint.

Pros and Cons 2

Pros	**Cons**
Attractive and pleasing.	The paint can fall off.
Good in heat sensing.	It takes time to produce one cup.
Easy to handle.	Unable to help the users sense sharp objects.

Idea 3 Development

Wearing a pair of gloves prevents sustaining injuries from sharp objects.

Heat sensor attached to tips and palm of gloves, temperature of liquid can be sensed.
Will produce a ‘beep’ sound if it senses the temperature is too high.

Pros and Cons 3

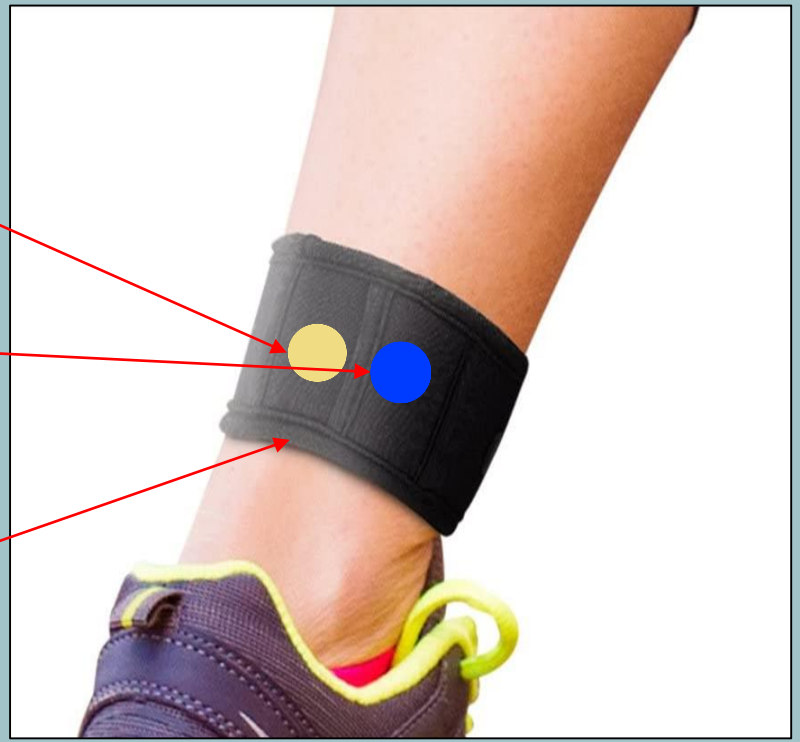
Pros	Cons
Protect the users' hands well.	Not suitable for hot weather, especially in Singapore.
In cold weather, it will be very useful as it keeps the users' hands warm.	Seems weird in public as people tend to have opinions.
Easy to detect when there is any sharp object around it.	Only protects the hands but not other parts, like elbow and arm.

Idea 4 Development

- Heat sensor
- It is able to sense the surrounding temperature of the user.

- Ultrasonic sensor
- It is able to sense if there are any objects that might cause the user to trip and fall on or get cut by.

If the sensors sense surrounding temperature is too high or if the object could potentially cut the user or lead him/her to fall, it will buzz for 3 seconds to inform the user.



Pros and Cons 4

Pros	Cons
Won’t be seen by others so it doesn’t have to be good looking.	Stuffy for users on hot days.
Easy to keep	Does not protect the other parts of the body.
Waterproof.	Sensor might not be accurate.

Idea 5 Development

Temperature sensor
It senses temperature of water coming out from tap.

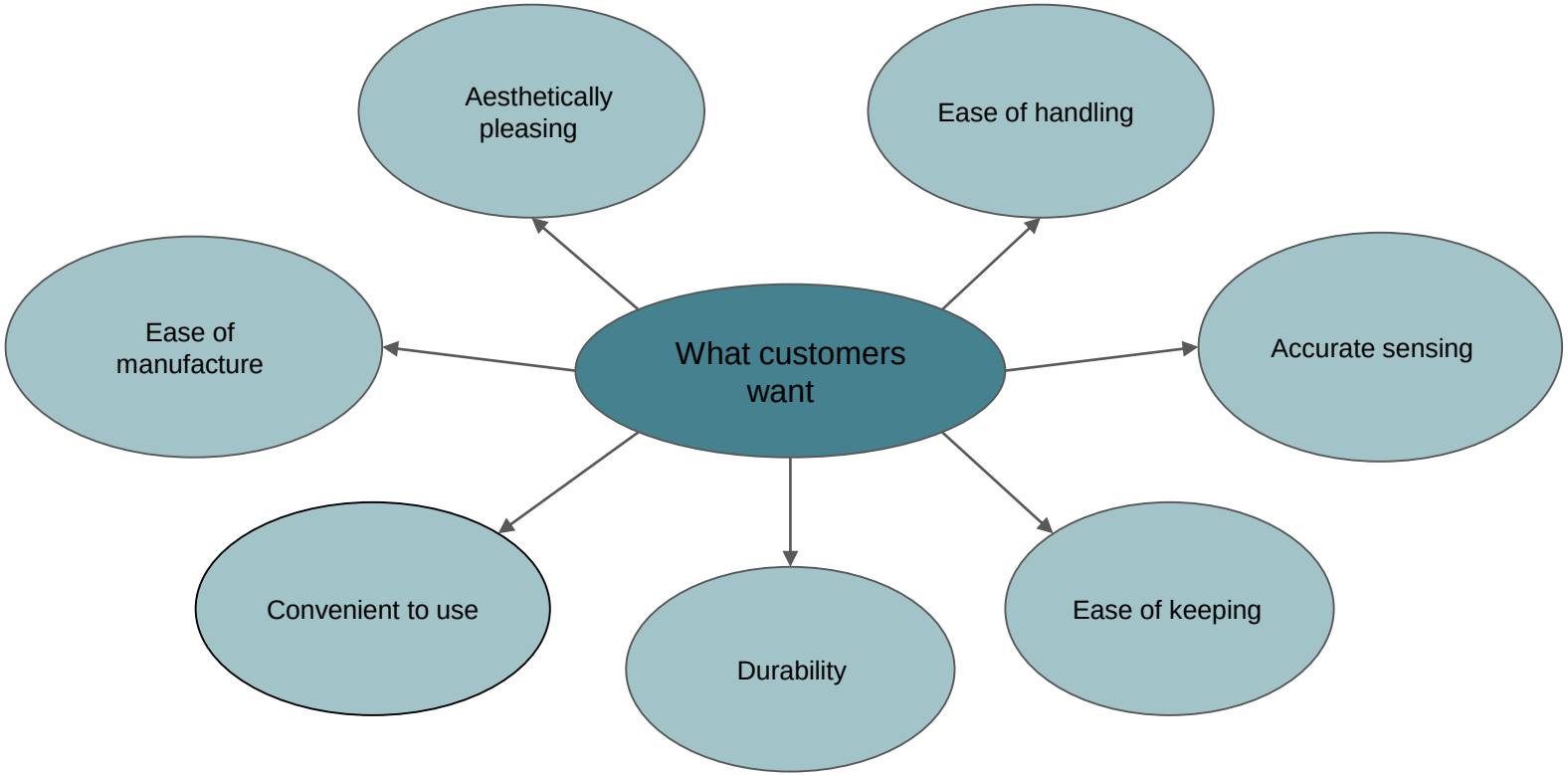
User able read the temperature sensed on the sensor and know if temperature of water coming out can hurt his/her hand.

Pros and Cons 5

Pros	Cons
Sensors are accurate as the product stay in a fixed position.	Unable to serve the users at all time.
Easy to use.	Not pleasing to look at for some users.
Used for a long time without changing.	Not easy to produce and manufacture.

Evaluation Matrix

What the customers want



Heat and Ultrasonic Sensing Wristband

Criteria	Importance	Rating	Weighted total
Ease of handling	10	7	70
Accurate sensing	10	8	80
Convenient to use	9	6	54
Durability	8	6	48
Ease of keeping	8	7	56
Ease of manufacture	7	4	28
Aesthetically pleasing	6	4	24
Total		-	360
Relative total (divide by 494)		-	0.73
Rank		-	3

Colour Changing Cup

Criteria	Importance	Rating	Weighted total
Ease of handling	10	8	80
Accurate sensing	10	7	70
Convenient to use	9	7	63
Durability	8	5	40
Ease of keeping	8	7	56
Ease of manufacture	7	4	28
Aesthetically pleasing	6	5	30
Total		-	367
Relative total (divide by 494)		-	0.74
Rank		-	2

Heat Sensing Gloves

Criteria	Importance	Rating	Weighted total
Ease of handling	10	7	70
Accurate sensing	10	7	70
Convenient to use	9	6	54
Durability	8	6	48
Ease of keeping	8	6	48
Ease of manufacture	7	3	21
Aesthetically pleasing	6	3	18
Total		-	329
Relative total (divide by 494)		-	0.66
Rank		-	4

Heat and Ultrasonic Sensing Ankle band

Criteria	Importance	Rating	Weighted total
Ease of handling	10	6	60
Accurate sensing	10	6	60
Convenient to use	9	5	45
Durability	8	5	40
Ease of keeping	8	7	56
Ease of manufacture	7	4	28
Aesthetically pleasing	6	4	24
Total		-	313
Relative total (divide		-	0.63
Rank		-	5

Sensor on tap

Criteria	Importance	Rating	Weighted total
Ease of handling	10	7	70
Accurate sensing	10	10	100
Convenient to use	9	7	63
Durability	8	7	56
Ease of keeping	8	7	56
Ease of manufacture	7	3	21
Aesthetically pleasing	6	2	12
Total		-	378
Relative total (divide by 494)		-	0.76
Rank		-	1

Conclusion

After evaluating our ideas, we have reached a conclusion where the heat and ultrasonic sensing wristband will be the most suitable idea for the problem statement. Although it did not get the highest rank as compared to having a sensor on the tap and a colour changing cup, it fits our main objective the most as it senses temperature and sharp objects around the target user.

THANK YOU