KAIST ME & NAVER Labs

Capstone Design 2018

Team 必勝

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Dongha Nam, Kyeongwon Park, Jeongseok Oh

Advisor:
Professor Philseung Lee | TA Sooyong Kim

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01. Team Name: 必勝

必 Pronunciation: 필, Phill
Meaning: 반드시, Must

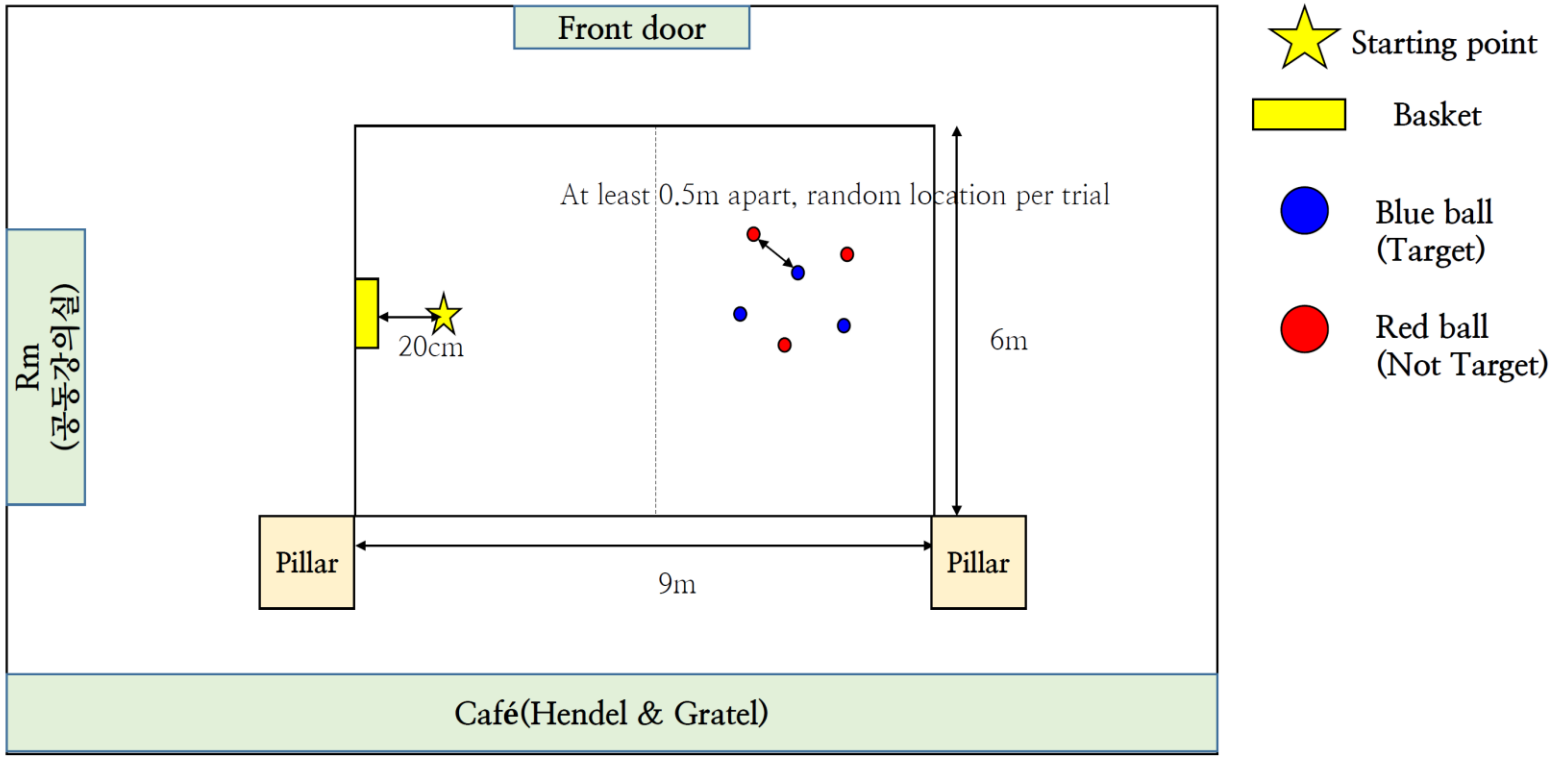
勝 Pronunciation: 승, Seung
Meaning: 이기다, Win, Victory

必勝 in Chinese letter means must, or will, win. This represents our team's strong will to win the first prize with professor Philseung Lee in Capstone Design 2018.

Also it could be re-interpreted as 'feel-seung', which means 'feel victory'.

02. Problem Definition: Mission Statement

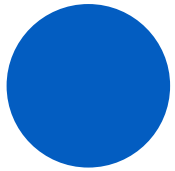
Collect blue ball_with high accuracy & speed & efficiency

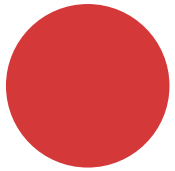


Map of Mission Field

02. Problem Definition: Mission Statement

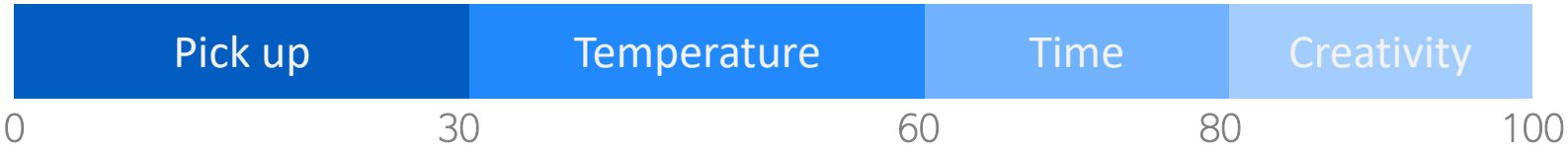
Rules

 = +10 points

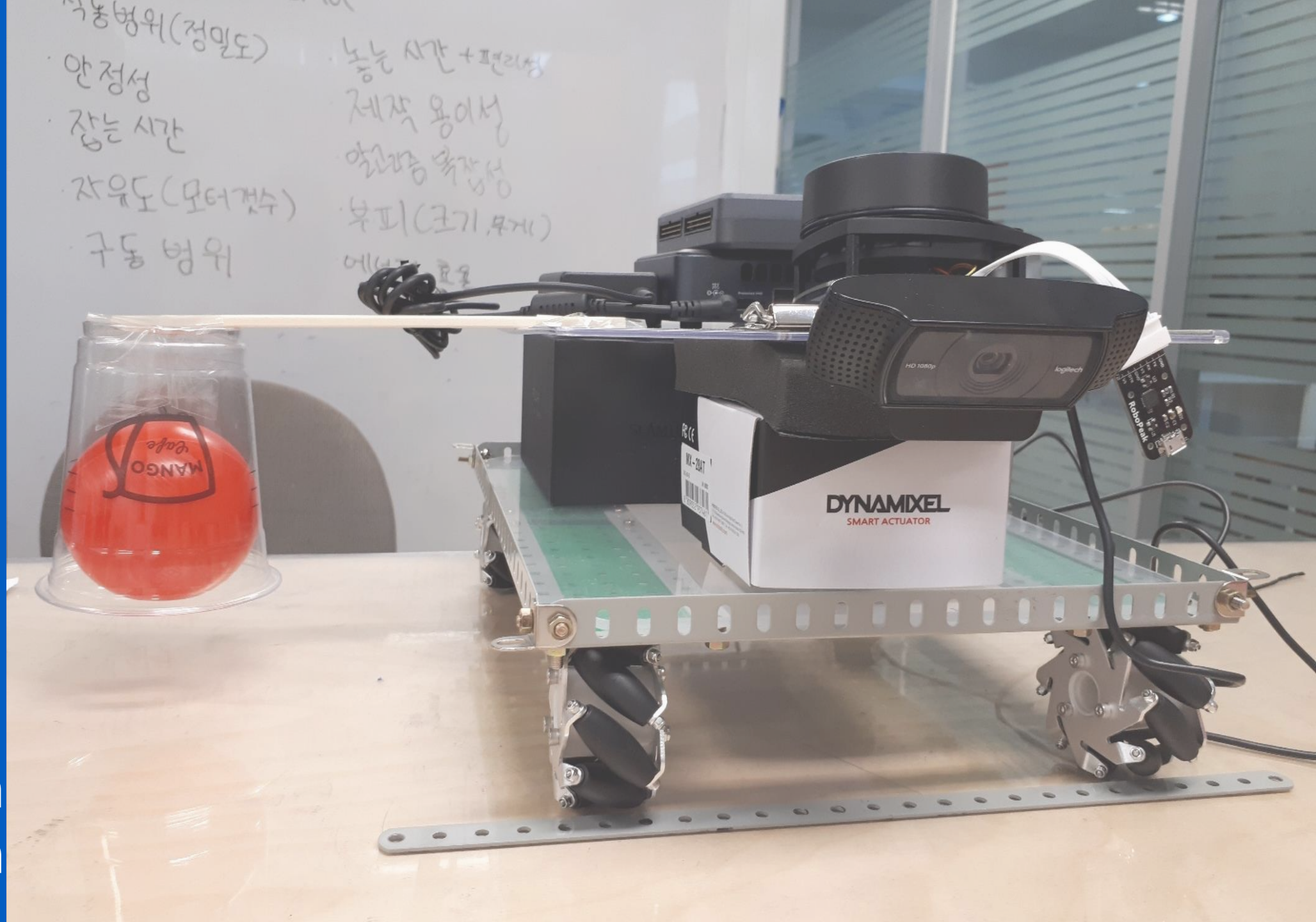
 = −5 points

2 sets of ball position, 5 min time limit, 2 trials

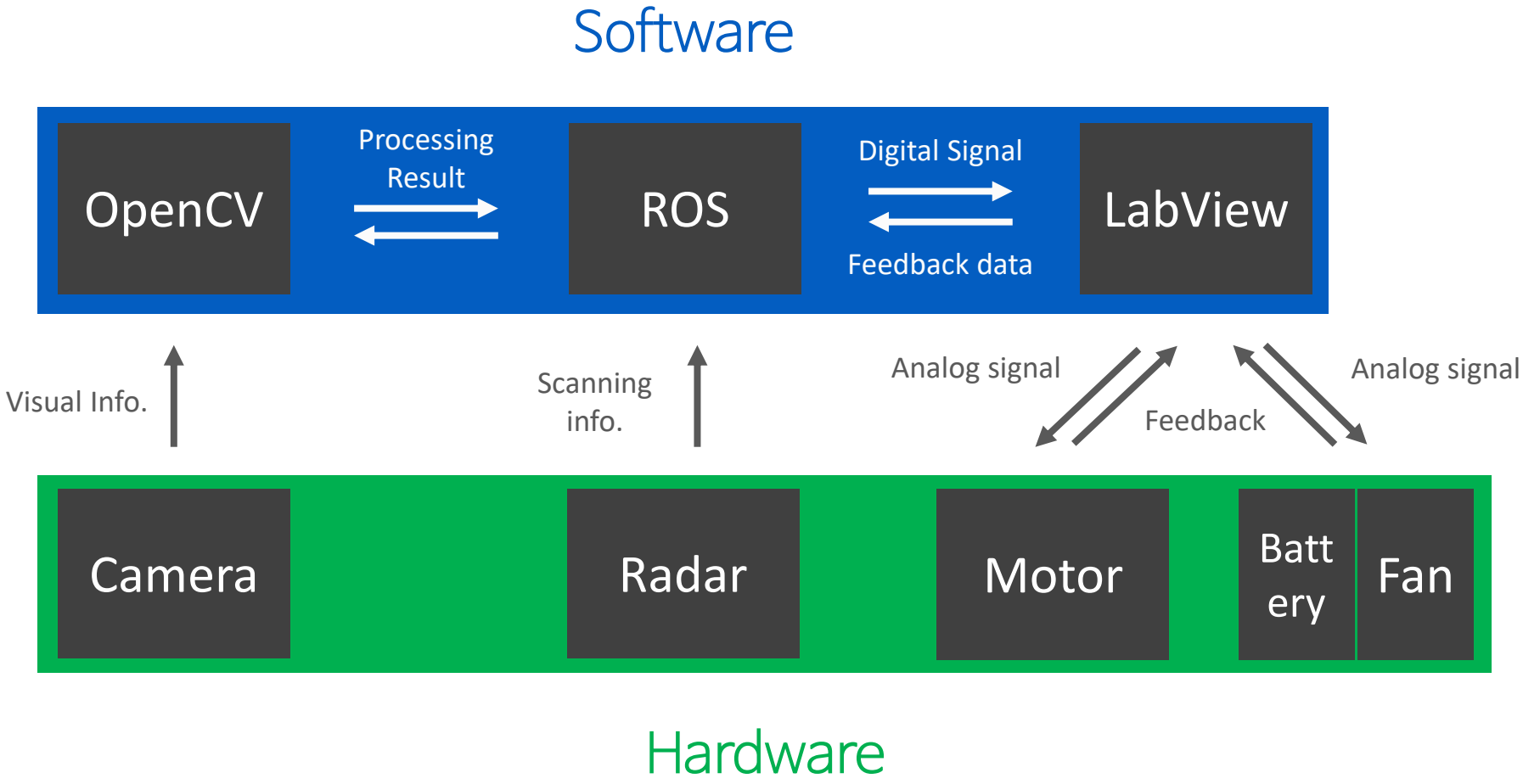
Scoring



03.
Solution System

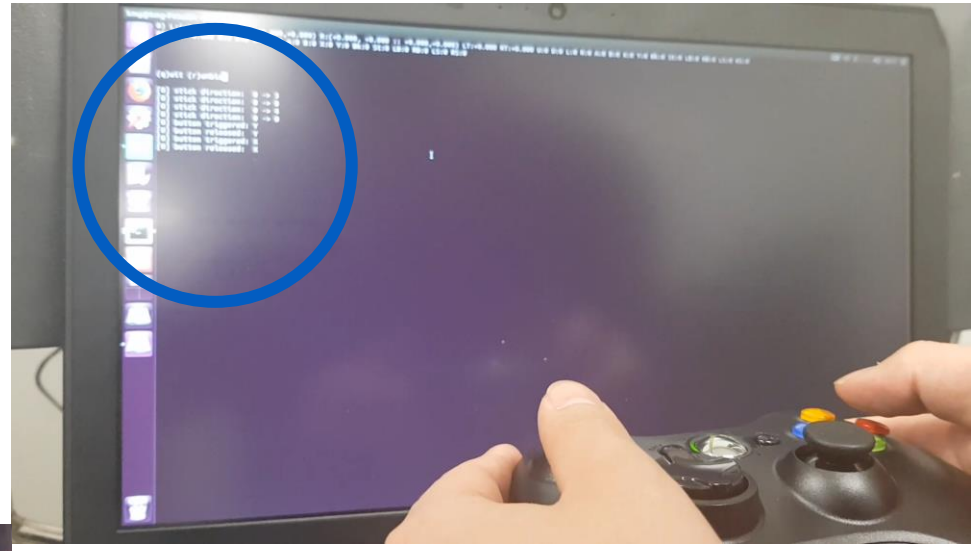


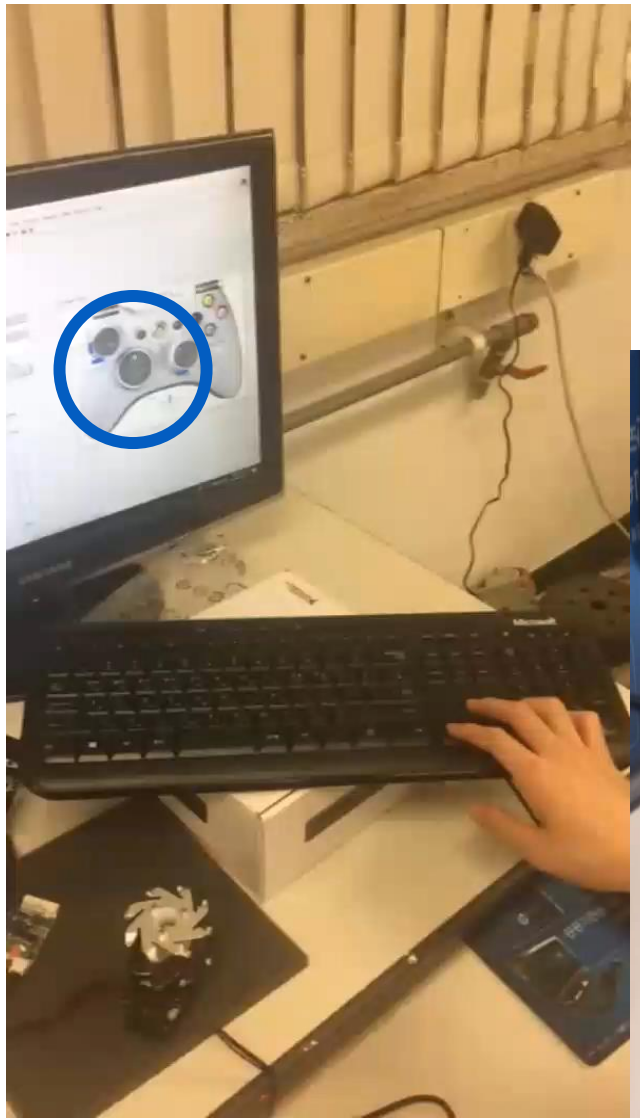
03. Solution System Description



03. Solution System: Control

ROS_receive data

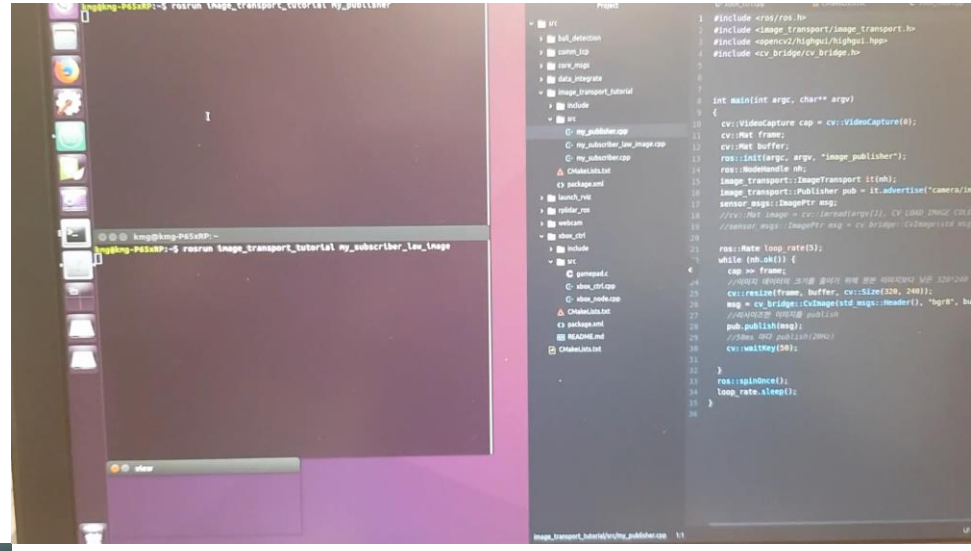


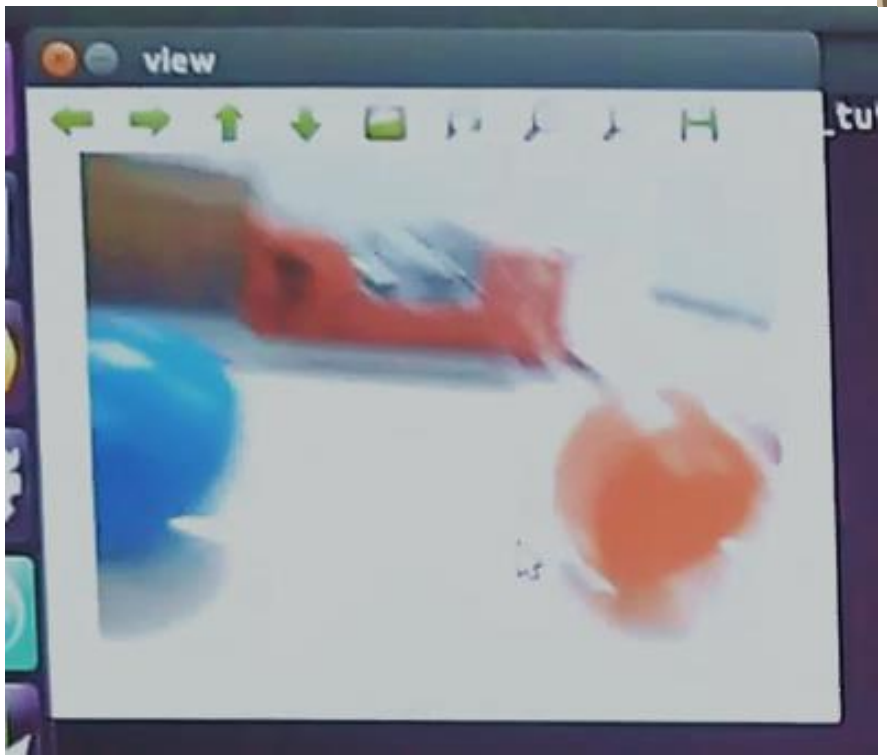


LabView_convert & send data

03. Solution System: Vision & Vibration

Vision input



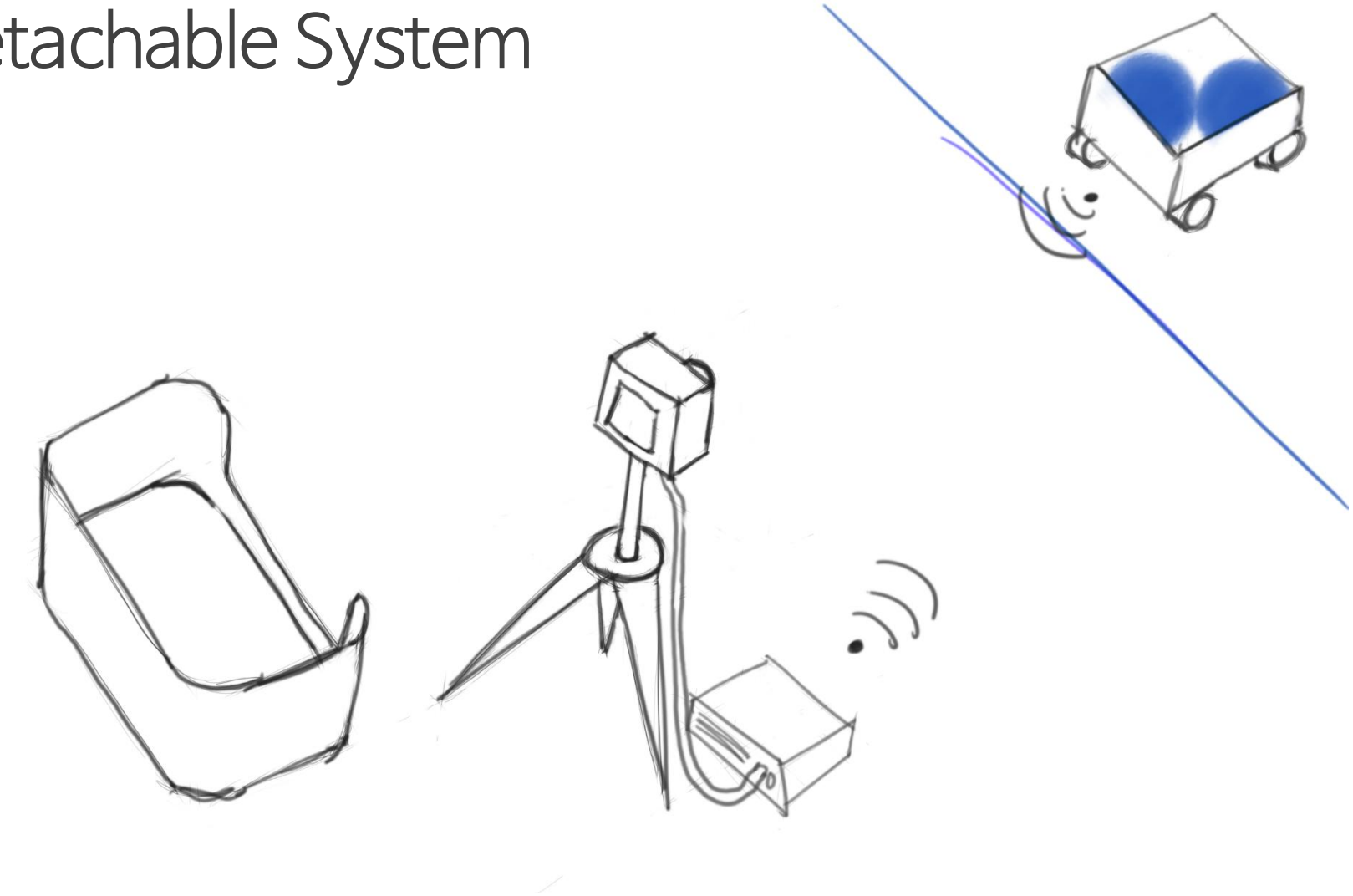


Main problem in vision:

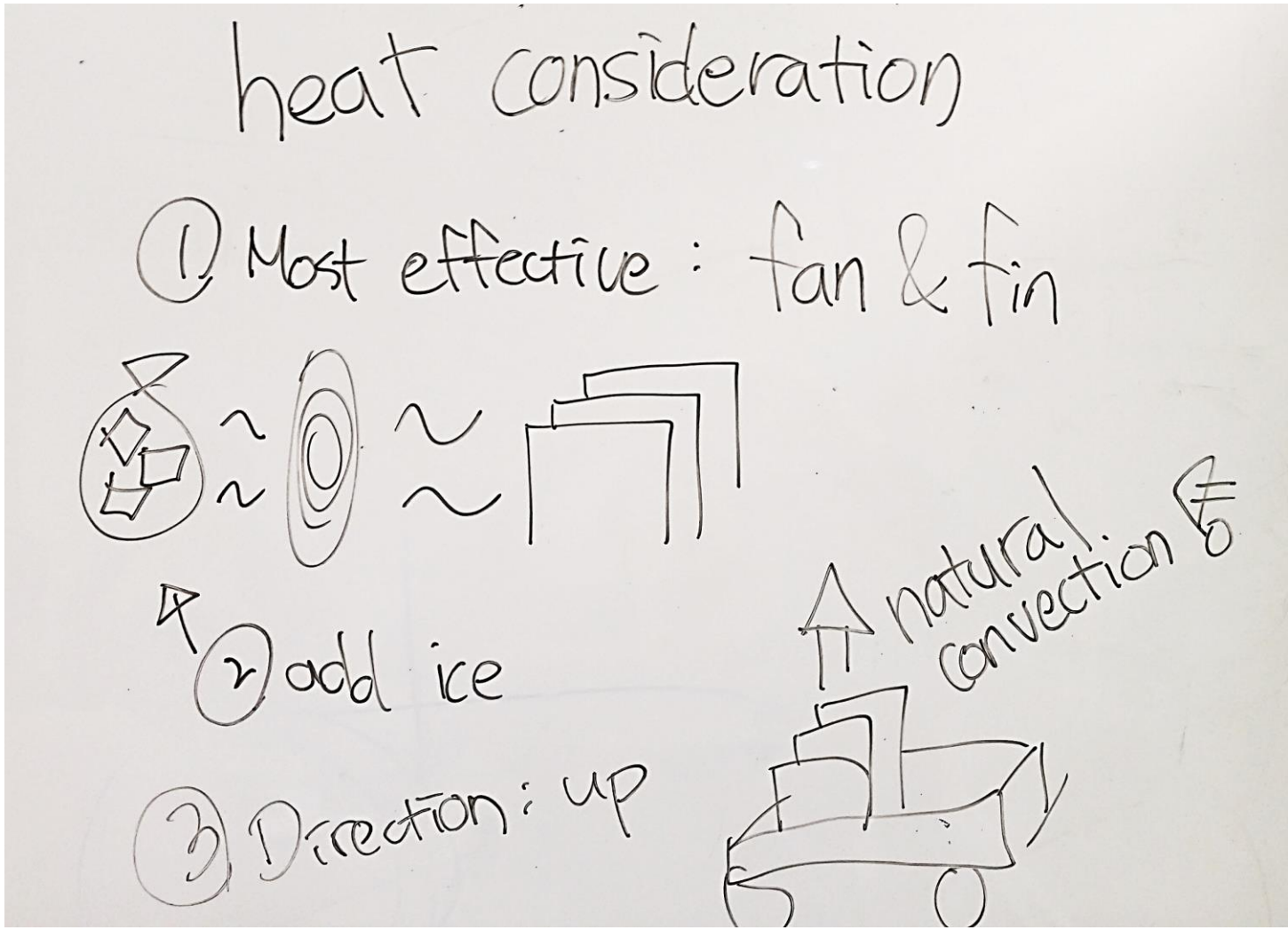
Vibration

03. Solution System: Vision & Vibration

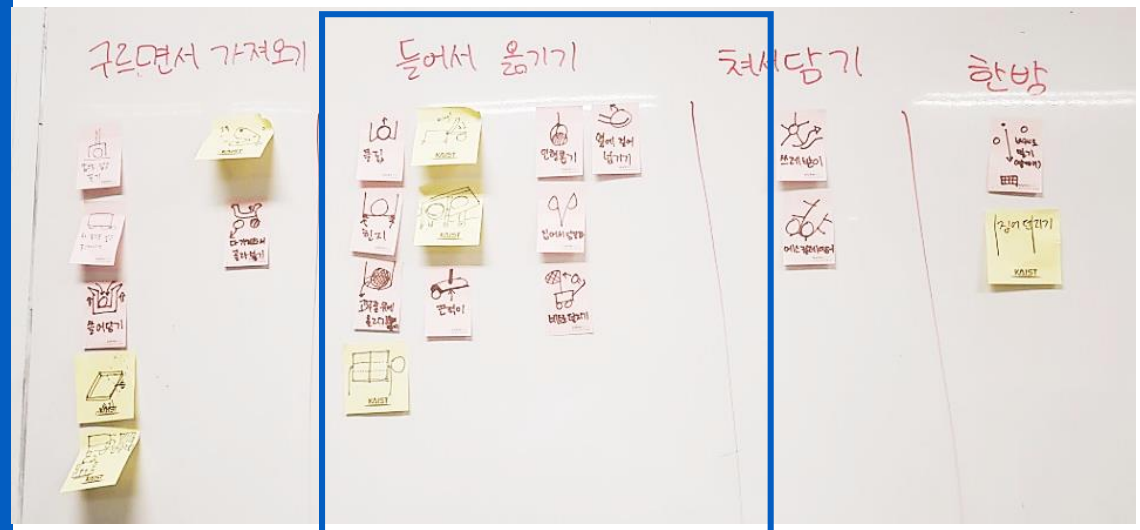
Solution Suggestion: Detachable System



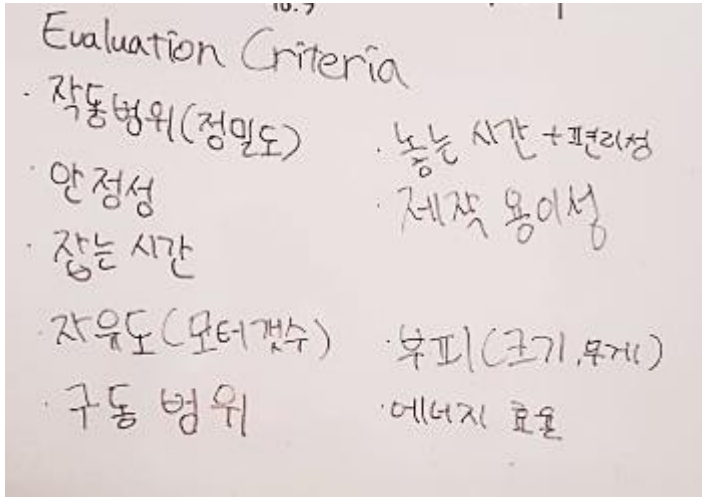
03. Solution System: Cooling



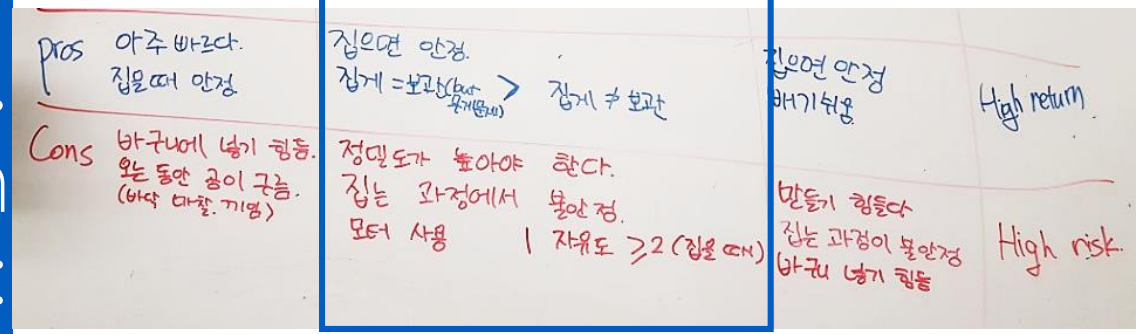
03. Solution System: Picking up



1. Idea brainstorming



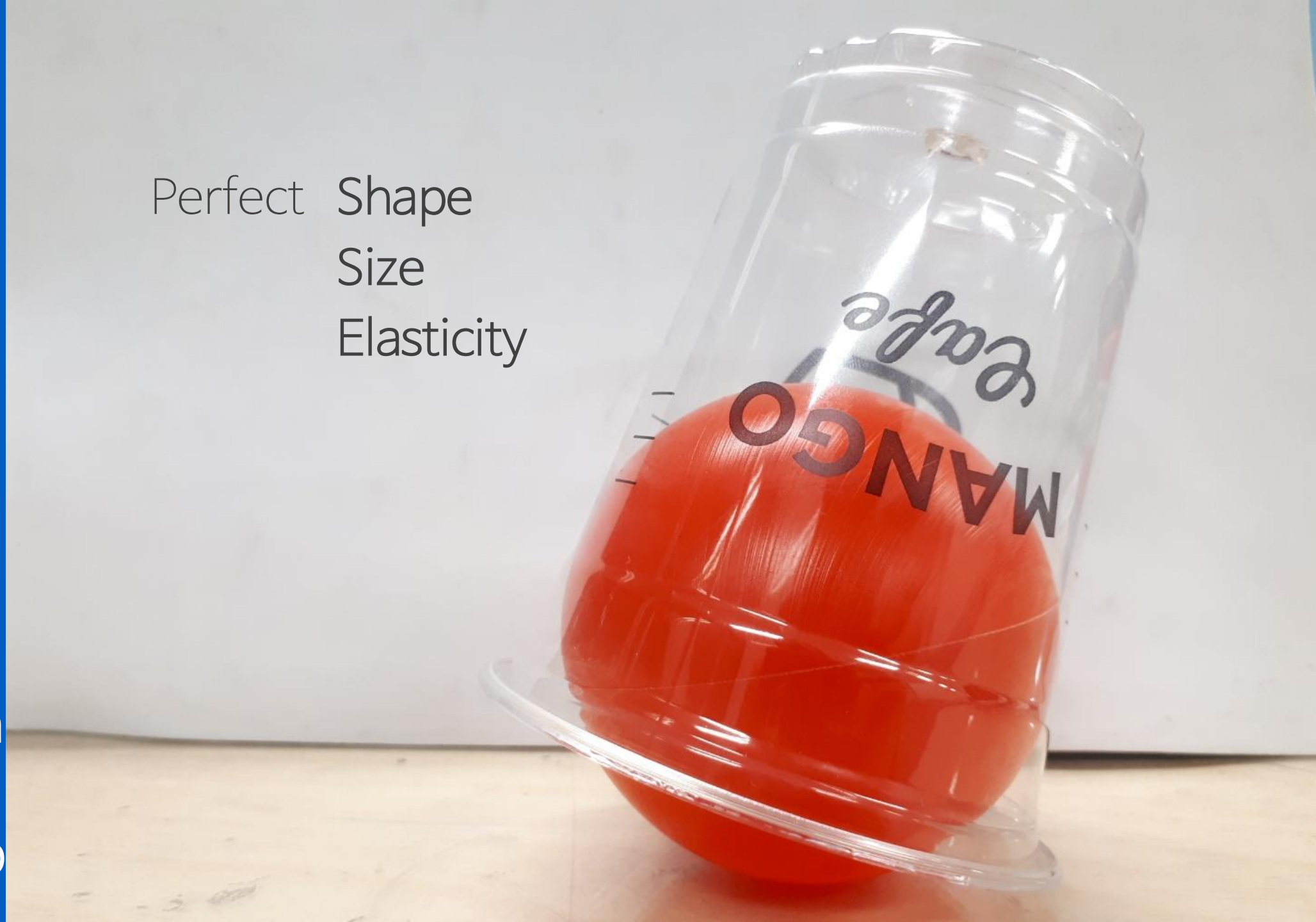
2. Evaluation criteria



3. Idea evaluation

03.
Solution System:
Picking up

Perfect Shape
Size
Elasticity

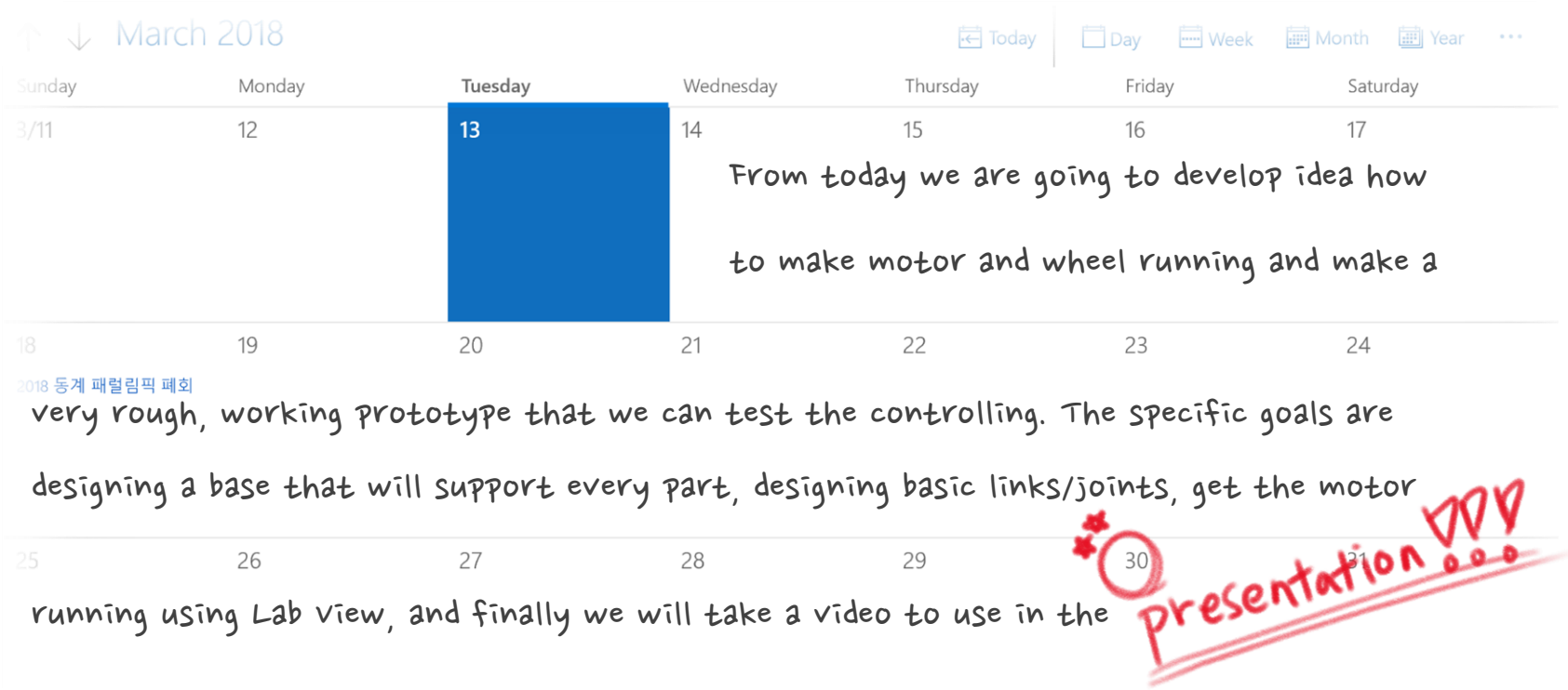


03. Solution System: Picking up

+

04. Expected Time Schedule

03.13.~



04.01.~04.20.

For about 2~3 weeks, we will work on image processing and control.
+assembly of vehicle body, 1st prototype

04.20.~

Improving performance(time, recognition, control, heat, ~~collecting method~~, etc, +VIBRATION)

05. Thoughts & Comments

01.
Force Analysis_motor spec. and picker shape

02.
Ball -〉basket_how to put ball into the basket

03.
Gearbox_20m / (15cm/s) : more than 2 min

- Gear Reduction Ratio : 193 : 1
- Stall Torque : 2.3N.m (at 11.1V, 1.3A), 2.5N.m (at 12V, 1.4A), 3.1N.m (at 14.8V, 1.7A)
- No load speed : 54rpm (at 12V)
- Running Temperature : -5A ~ +80A
- Voltage : 9 ~ 16.8V (Recommended Voltage 12V)

04.
Power Management System_two separate bodies

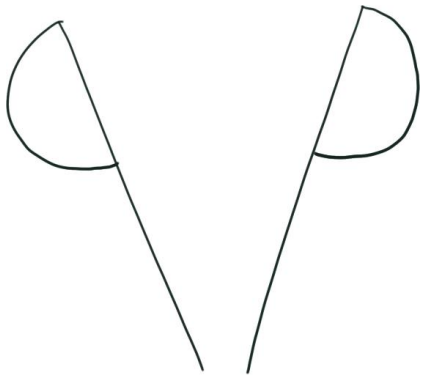
Thank You

Q&A
Discussion

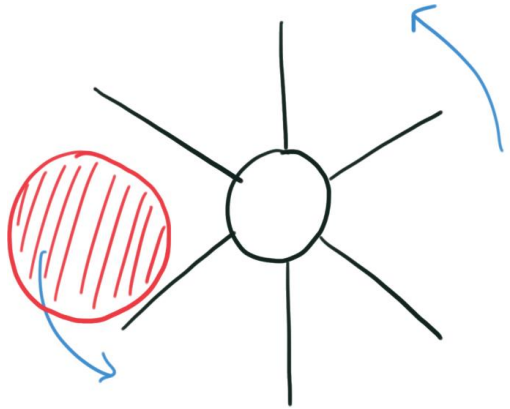
Appendix

Additional gripping mechanism

인 형 뽑 기



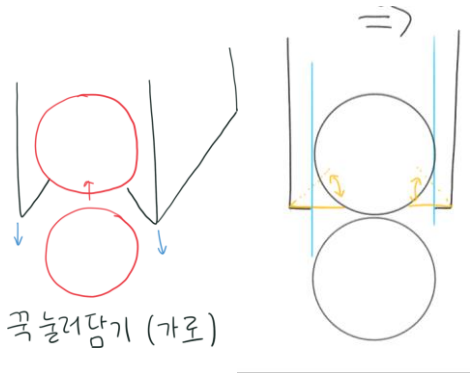
잡고 뒤로 넘기기



테니스공 collector

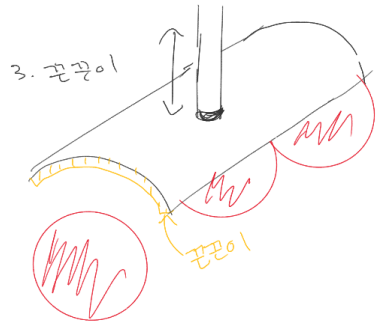
Appendix

Additional gripping mechanism



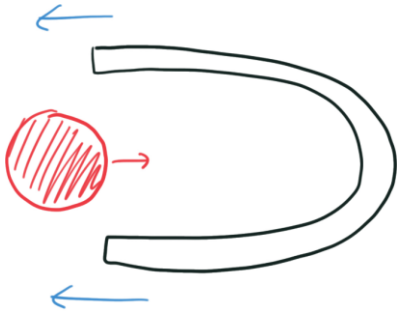
Narrow entrance

Variations:
clip, hinge, rubber band
vertical, horizontal
Advantage: stability & accuracy
Disadvantage: precision & rate of success



Sticky holder

Advantage: Picking letter
Disadvantage: rate of success, stability, size



Dragging

Advantage: simple implementation, intuitive, unique body, rate of success
Disadvantage: accuracy, putting into basket

Appendix

Naver corporation demo video screenshot