

Built-in Transparent OLED Display for Hockey Helmet

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My Story of Initiative



I started playing Hockey for 13 years, playing for HongKong Representative and China Junior.

It's a wonderful sport that requires a lot of hockey IQ.

Prep/Varsity School: Tactics of Teamwork > Individual Skill



-SEM Prep Team



- 2020 NHL China Camp

Question: What is my project for and why needed?

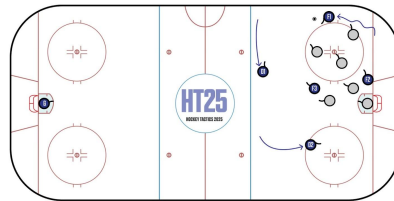
01

Learn Faster +
Lasting Memory

02

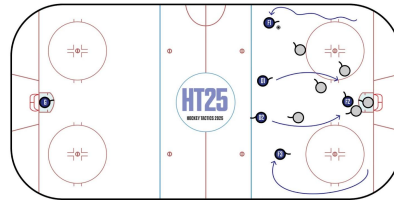
Help Players merge into
team quicker

Offensive Zone Possession: 1-3-1



The 1-3-1 is ubiquitous at 5v4 but seldom-seen at 5v5. As F1 carries up the wall, D1 slides across the blue line and D2 attacks down. This movement creates passing options against a conservative zone defense, but also exposes the attackers to an odd-men rush against if D1 misplays the puck at the top of the umbrella.

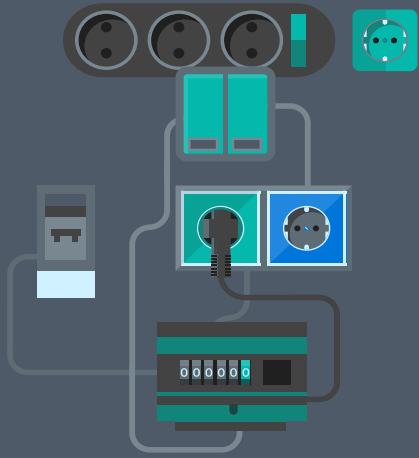
Offensive Zone Possession: 1-4 (OZ Funnel)



The 1-4 OZP is hockey's answer to Total Football. One skater (F2) holds the net front to attract defensive attention while the other four curl up and funnel sequentially through the slot. This creates a series of mini rushes that catch zone defenders flat-footed and force man-on-man defenders to over-extend. Once at the net, attackers keep their speed and reload to the blue line to stay above a potential counter-attack.

-Example of how PlayBook looks like

Background Research



New Combat Goggles from Microsoft

Tech in Sports (Golden State Warrior)

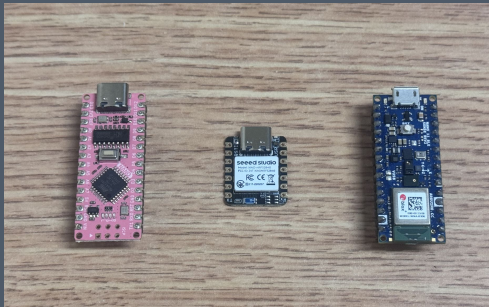
Car Head-Up Display (HUD)



Golden State Warriors using robots that rebound and pass

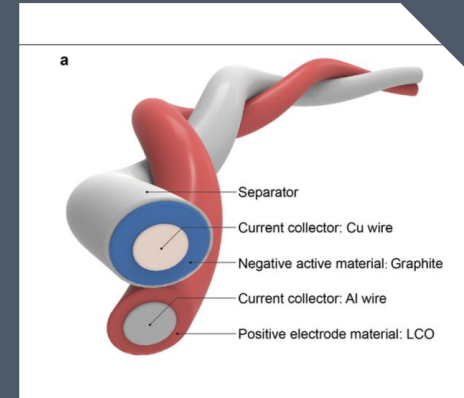
Components

1. **Transparent OLED Screen:** provide instruction while not blocking view



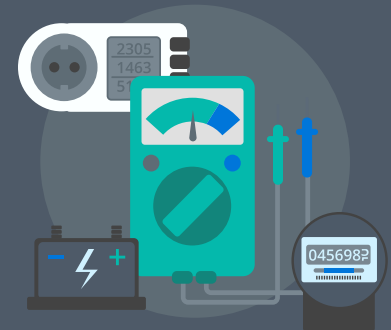
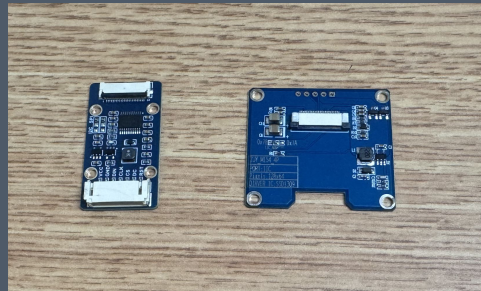
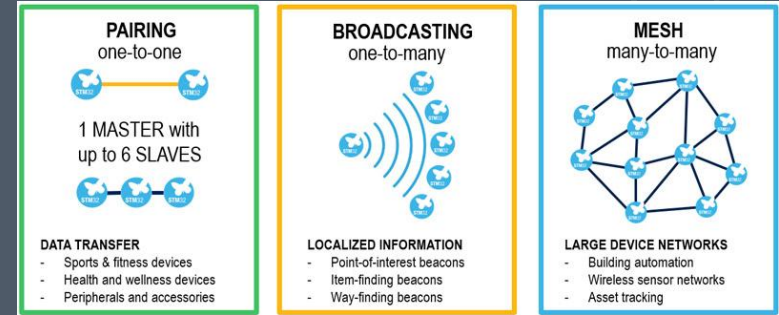
2. **Microprocessor:** transmit data and receive Bluetooth signal

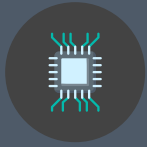
3. **Battery:** supply energy to maintain proper functionings of device.



Phase 1: The Connection of Devices

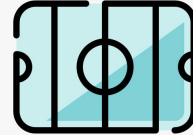
- Use of **SeedStudio BLE Board (Bluetooth Low Energy)**: save energy used
- **Bluetooth Meshing**: to enlarge the range of connection, as the scatter of player may fulfill the goals.
- **SPI / IIC Interface**: most common types of screens' interface, require adapter board to transcribe the code and voltage level.





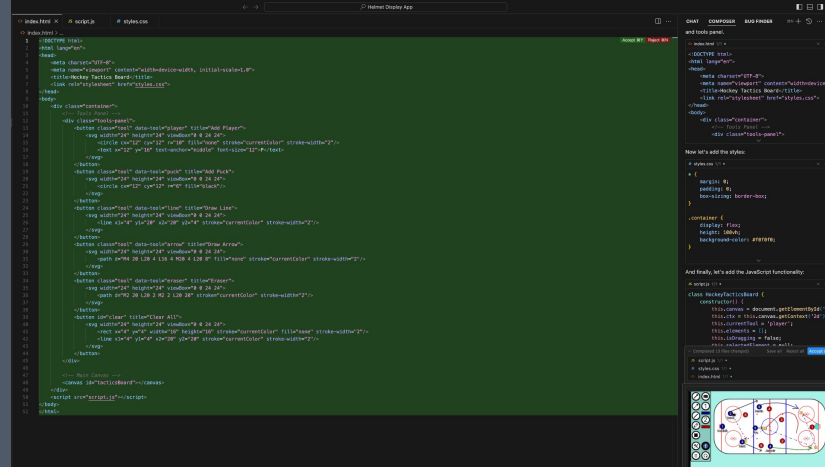
Phase 2: Data Conversion

1. Conversion: Data files from pixel movements to displayable format based on what screen was used



2. Software (Still Working):

Utilize Cursor to develop a software to make tactics making interface more user-friendly, and automatically convert and export to SeedStudio Board



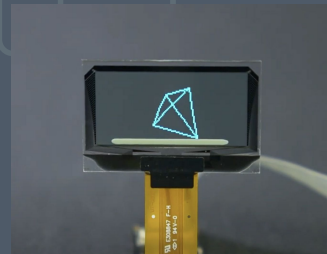
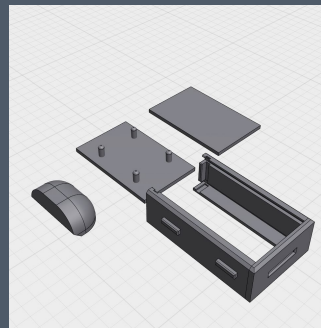
What is My Progress So Far

Pros:

1. I already tested my prototype and everything works well
2. The vision is surprising clear (~65% Transparency)

Cons (Potential):

1. Using too much space for some components that aren't necessary
2. The screen might shake if moving
3. The screen can't be retracted to the device, but only removed.



- Prototype device holder

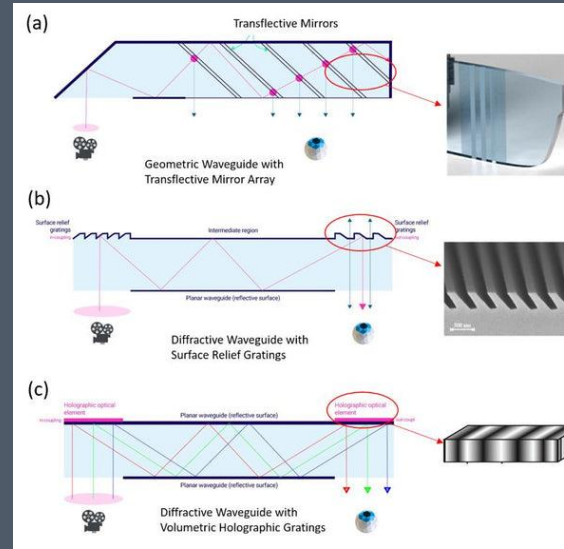


Future Improvements



Display Method

Waveguide is by far the Best Method, but require extremely high level of manufacturing skill.



Energy Storage

High-performance fibre battery with polymer gel electrolyte

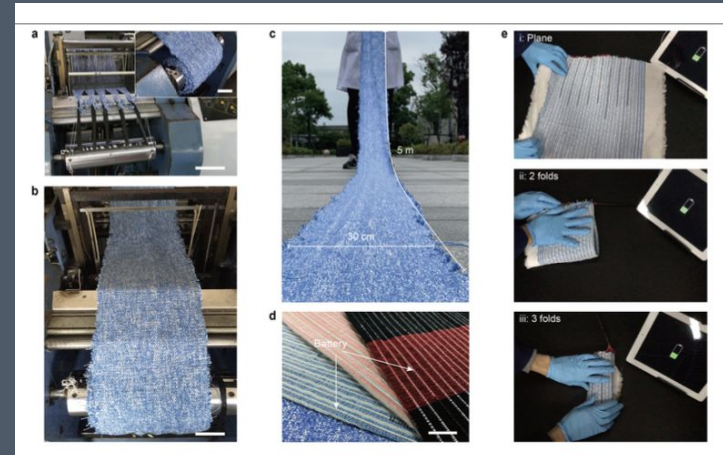
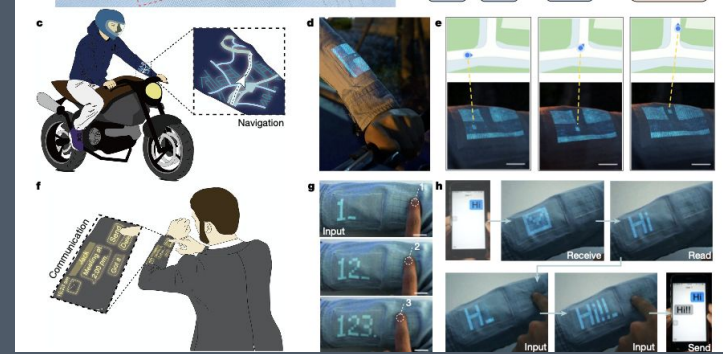
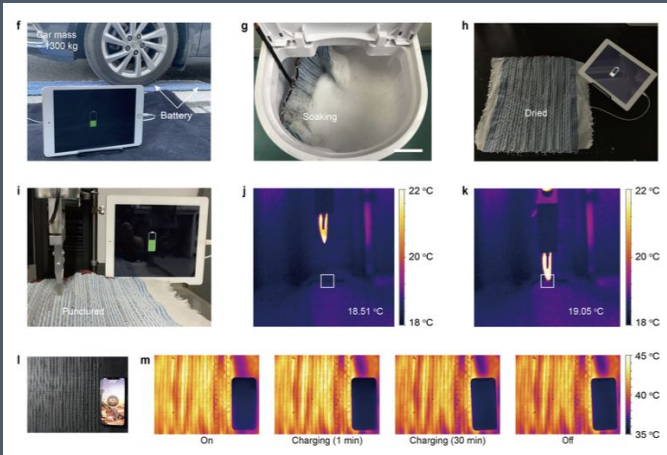
I reached out to the professor and might be able to get some samples for testing during March

Potential Substitute



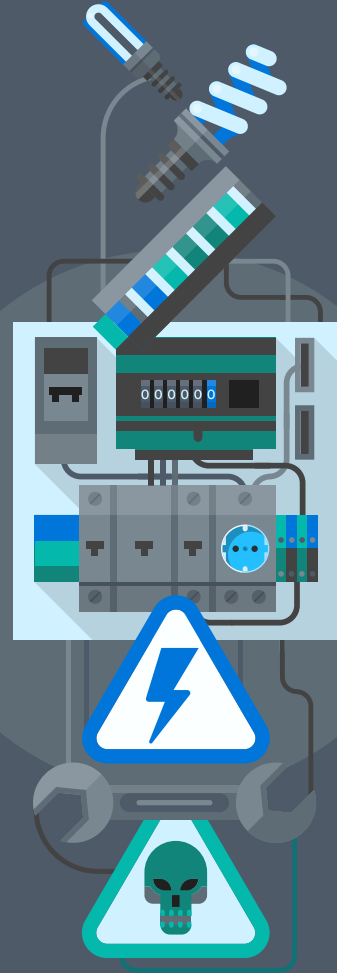
Display Textiles

- Fudan University invented a Large-area display textiles integrated with functional systems



Conclusion

It's a project that has a great potential and usefulness not only in hockey but also other sports. Also, there are vast improvement that will make this a finer product, which contribute to the athletic team.



References

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