Project Overview

Mines Action Canada (MAC)

Team 2

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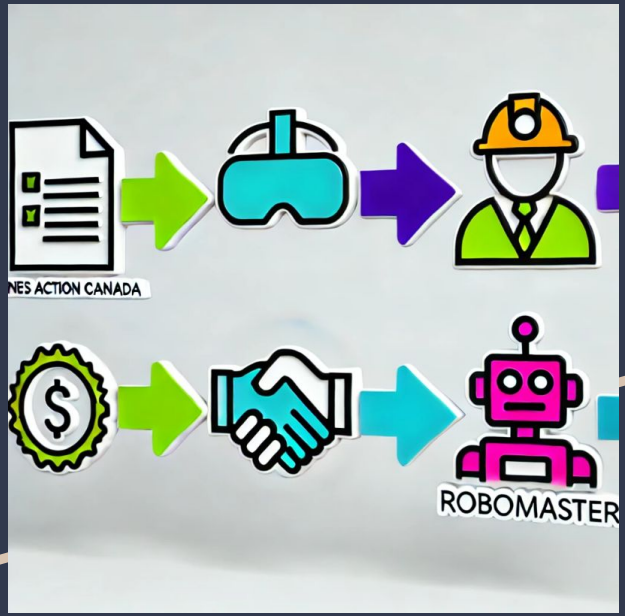
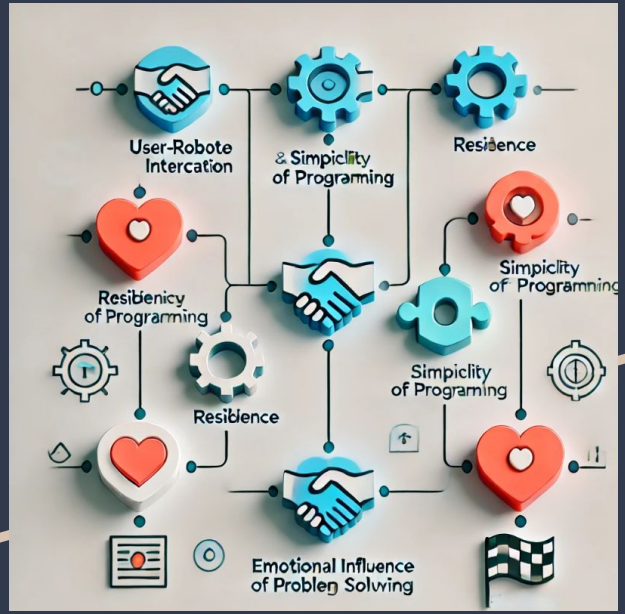
Beginnings of the project



- Mines Action Canada contacted us with a complaint.
- Create a virtual real experience to address ethical problems.
- Client meeting #1 clarified several aspects of the project.
- Initial confusions before the first meeting, shifting from VR to utilizing a RoboMaster.

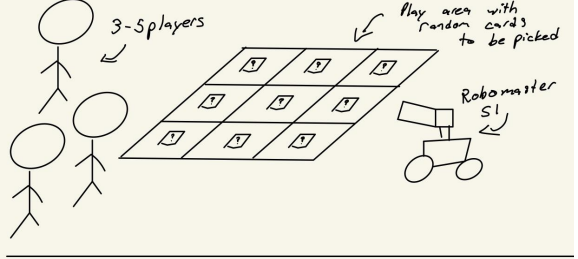
Important design criteria

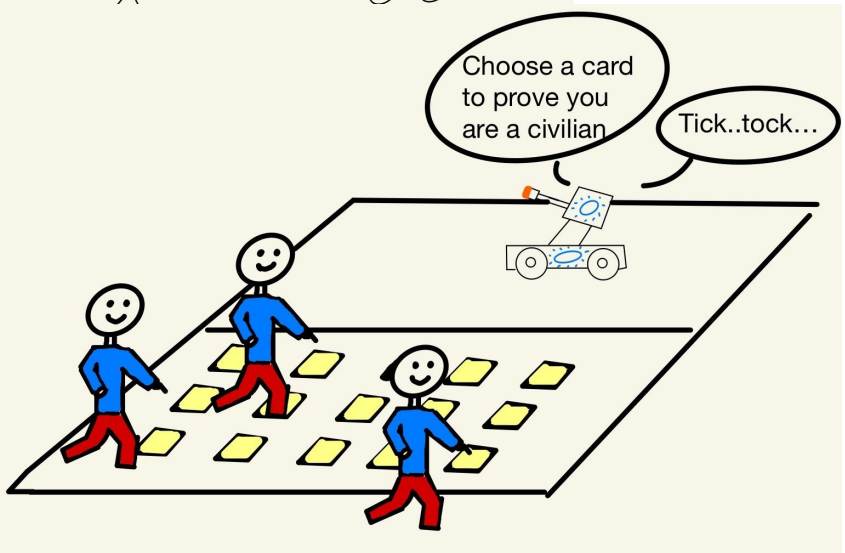


- User-Robot Interaction
- Resilience and simplicity of programming
- Difficulty, a reason for issue solution
- Emotional influence on the user; message delivery
- Finalization

Our problem statement

“Mines Action Canada requires an interactive and engaging experience for the general public that illustrates the ethical concerns of Lethal Autonomous Weapons Systems through a game scenario using a Robomaster S1 that is simple, neatly programmed, and portable.”





Concepts

- Concept 1 - picking a card, robot chooses whether you live or die. Correct card means progressing, incorrect means elimination

- Concept 2 - picking a card by choice, lining up, rolls down the line, eliminates players if card is “wrong”

Feedback From Client Meeting 2 and Iteration

Feedback

- Simplicity of concept 1 beneficial
- Ethical concerns displayed better in concept 2
- Robot movement is too complex
- Speakers are loud enough for use
- Ensure all player lose
- Feel frustrated and annoyed

Iteration

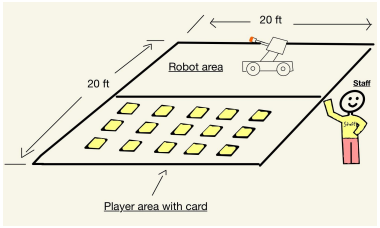
- Combining simplicity of robot movement from concept 1 with the gameplay of concept 2
- Rounds of guaranteed elimination to ensure no players left
- Card categories to encourage problem solving

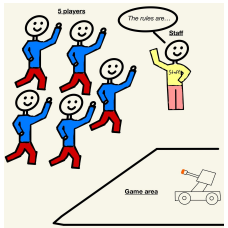
Prototype 1

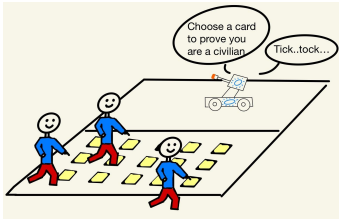
- Most important criteria being portrayal of ethical concerns
- Storyboard determined to be the best method
- Measure communication of ethical concerns and simplicity

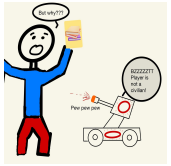
Prototype 1

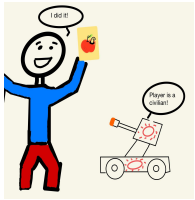
- Storyboard presented to target users (general public).
- Surveyed for results (ethical concerns found)
- Results showed our targeted ethical concerns were well illustrated, game perceived as simple.

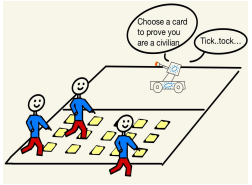


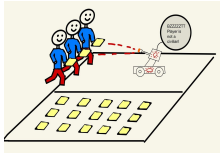


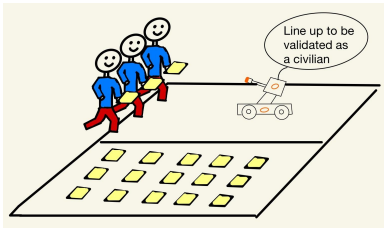


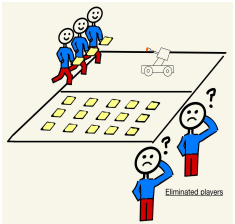


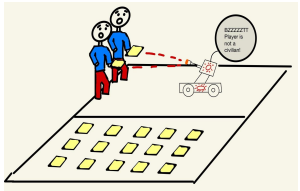


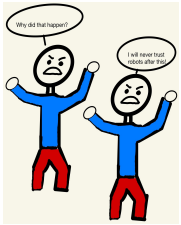




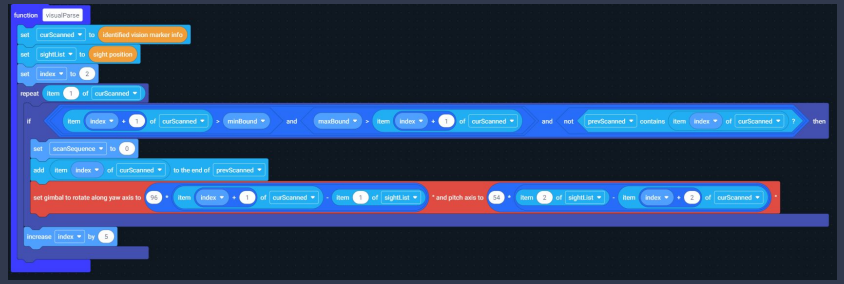








Prototype 2



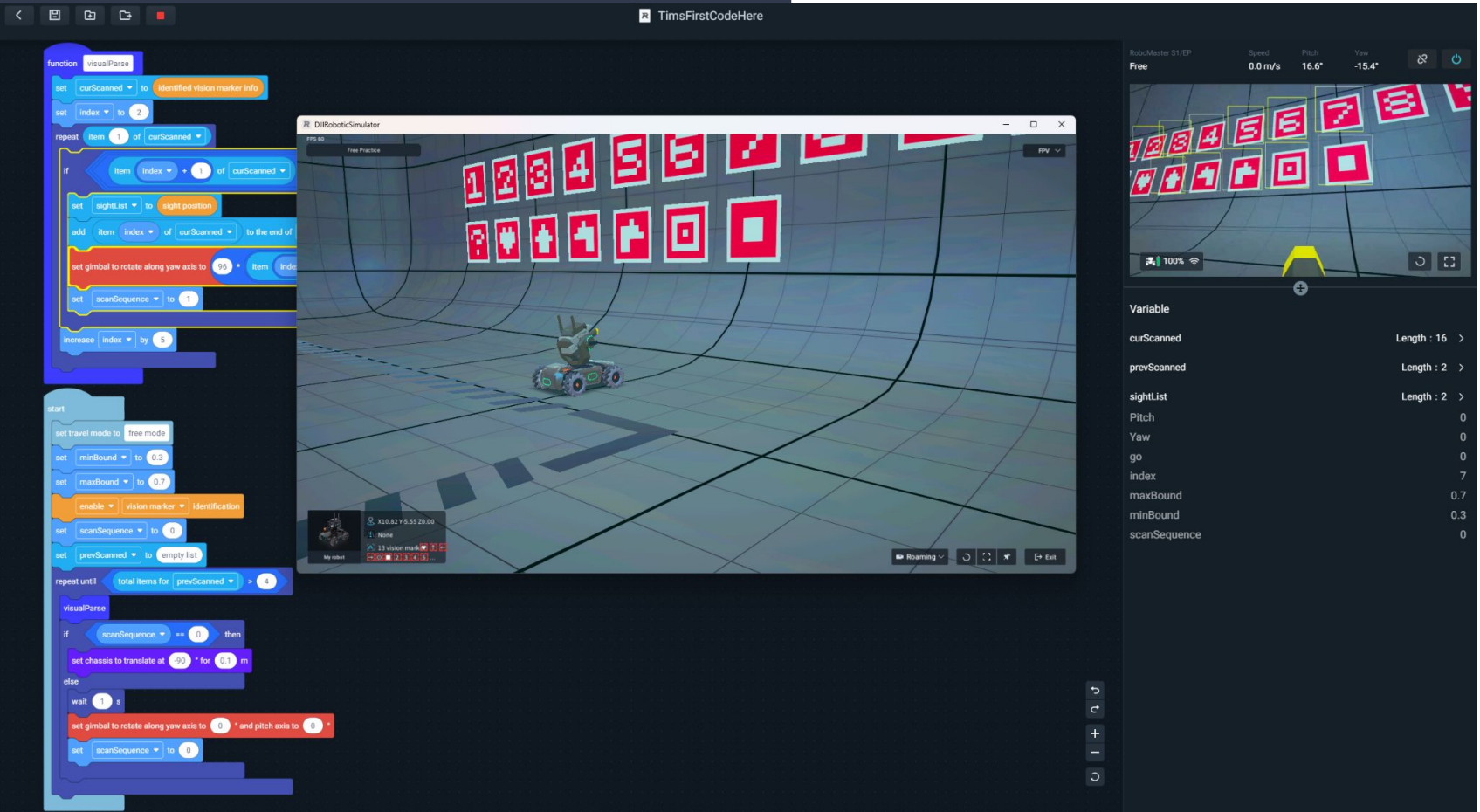
Prototype

- Issues with player/card scanning determined to be the most likely critical failure
- DJI simulations enable testing of these possible functional errors
- Use of the DJI hub was deemed to be the most accessible and time effective method to test prototype.

Testing:

- Demonstration game loop used for testing.
- Player/card scanning determined to be feasible
- Code implementation determined
- Subsystem completed

Prototyping-2



Work to be done

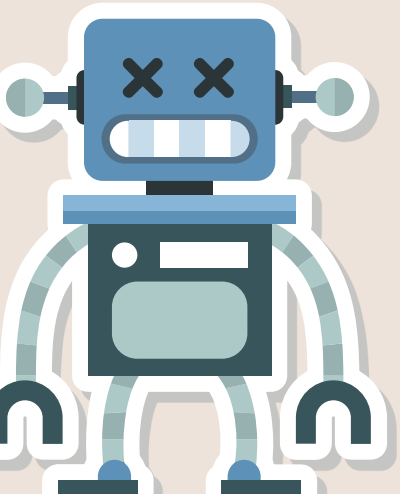
```
Start
Define all variables
Define robot position array
? Get number of players?
Repeat
{
    If stage is 1
    {
        Play instruction line - "choose correct card to prove you are a civilian"
        Do timer
        Play instruction line - "sit line with card facing robot "
        Do timer
        Set stage to 2
    }
    If stage is 2
    {
        If all players are eliminated for this round
        {
            If all players are eliminated
            {
                Stop
            }
            Otherwise
            {
                Return to start position
                Set stage to 1
            }
        }
        If the following code has not run yet this time
        {
            Call scanning for players function
            Move to player line
            Decide how many players to eliminate this round
        }
        If a (new) player and card are detected near the center of the view using visual parsing
        function
        {
            Stop
            Decide whether to eliminate player, via algorithm or if player is the last left
            If player is eliminated
            {
                Call eliminating player function for actions
            }
            Otherwise
            {
                Call player spared function for actions
            }
        }
        Otherwise
        {
            Move a small distance along player line
            Increment robot position
        }
    }
}
```

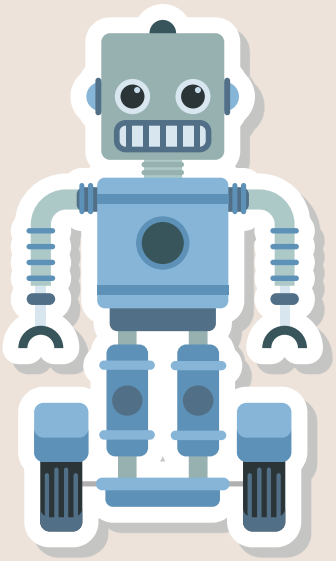
- Complete final prototype - comprehensive code
- Comprehensive, physical testing using the RoboMaster S1
- Complete user manual
- Submit finalized costs for approval

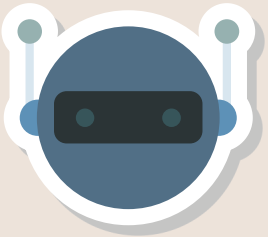
Lessons learned

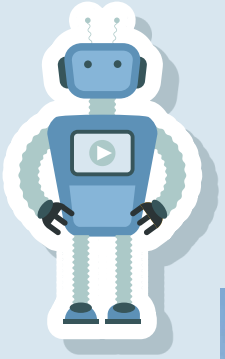
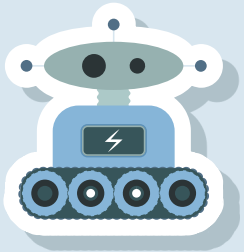
- Importance of task planning and time management
- Importance of proper design process and considering all aspects
- Adapting to unforeseen circumstances
- Team coordination & methods for division of labour.
- Simplicity is crucial

Conclusion







Questions?

- Please Feel free to Contact Any of the Members For Clarifications or Any Concerns