Security Cameras: Visually Vigilant

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About

If you haven't read through my website, I recommend starting there. The website and presentation give some context about what I my goal was, and how far I got, and all the steps all the way. This, coupled with the in-line documentation, is meant to be more of an in-depth look at my final product and how it works.

Classes Used:

- Room
    - Contains Lists of
        - Walls
        - Cameras
        - Obstacles (technically)
- Wall
    - Contains Points
        - StartPt
        - EndPt
    - Used to delineate the exterior walls of the room.
- Cameras
    - Contains
        - Center Point
        - Color
        - Camera #
        - Is Camera On?
        - Functions
            - Change color, either based on camera number, or assigned color
            - Change status of on-ness
    - Camera # determines color
        - Based on modulo of max number of cameras
            - 1st camera (camera 0): Blue (0, 0, 127) (Values typical)
            - Green
            - Red
            - Cyan (0, 63, 63) (Values typical)
            - Yellow

            - Magenta
    - Center is used for calculation of position and for tracing rays of FOV.
- Obstacles
    - I wish I got to obstacles, but I ran out of time polishing the work I had complete.
    - Dr. McVey had the idea to add them as an object drawn similar to that of the exterior walls
        - Maybe add size parameters, and color the inside of the object for detection for removal
        - Personally, would not add movement of obstacles
- BitmapPixelMaker
    - Obtained from C#Helper
        - X and Y are formulated based on Cartesian X and Y, not Screen X & Y
            - See Orientation.pdf
    - Uses 1-D array to access every pixel on screen in Bgra format
        - Stride is length of a row in pixels *4
            - Blue
            - Red
            - Green
            - Alpha
        - Obtain an index calculated by X and Y cords
            - Individually modify that pixel's data
    - Class allows for
        - Get individual Pixel
        - Change all pixels on screen
        - Write to a WriteableBitmap Class
    - I added
        - Set individual pixel elements
    - I also messaged the creator of this class
        - Got him to add loading png's into class to edit

Other tips and tricks:

- There is an image file used for the cameras.
    - Image itself is within the bounds of this project.
    - Path is incorrect within solution, however.
    - In MainWindow.xaml.cs
        - Lines 550, 574, & 1149 require modification in order to obtain the correct path
- If you have this project next
    - Please get obstacles to work
        - That's gravy work

        - Don’t forget to implement the algorithms for % covered and # of cameras required
    - Add “doors” or other moveable objects which may block a camera’s view momentarily
        - Is the area still covered well?
    - Streamline code
        - Makes algorithms run faster
    - Expand Code
        - More than 6 cameras
            - This includes playing with colors
    - Good Luck, and Have Fun
        - This project was really cool

Afterword:

I really want to thank Dr. Pankratz and Dr. McVey for the opportunity to work on this project. When I first officially joined the major my junior year, I was super nervous that I wasn’t going to be able to pull this off within my remaining time on campus. Not only did they allow me the opportunity to complete this program, they made it one of the most memorable experiences of my college career. Besides being absolutely amazing professors, they also are willing to help you with anything outside of their coursework. This project was just an extra layer of icing on a very large, perhaps multi-layered, cake. St. Norbert doesn’t know how truly lucky they are to have such great professors leading their Computer Science Department. I wish both of them the best, both in their career, and well-deserved retirement, and beyond. I will truly miss having them as professors, and as mentors. Good luck, and mazel tov.

To any future student, don’t worry; you’re in the best hands.