



Economic Home Security System

Uma Abu, Lucas Jedlicka, Merin Mundt, Kamini
Saldanha, Sohumi Sawant, Andrew Tran

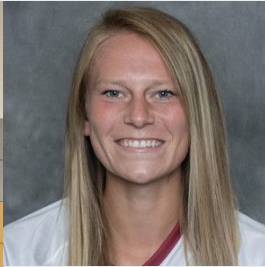
Senior Design Group, May 42



Team Members



Lucas Jedlicka
Dev Ops



Merin Mundt
Frontend



Andrew Tran
Backend



Uma Abu
Frontend



Sohum Sawant
Backend



Kamini Saldanha
Backend



Outline

1. Problem
2. Supporting Information
3. Our solution
4. Deliverables
5. Constraints
6. Diagrams
7. Testing
8. Technology Stack
9. Design Considerations
10. Future Plans
11. Prototype
12. Conclusion



The Problem

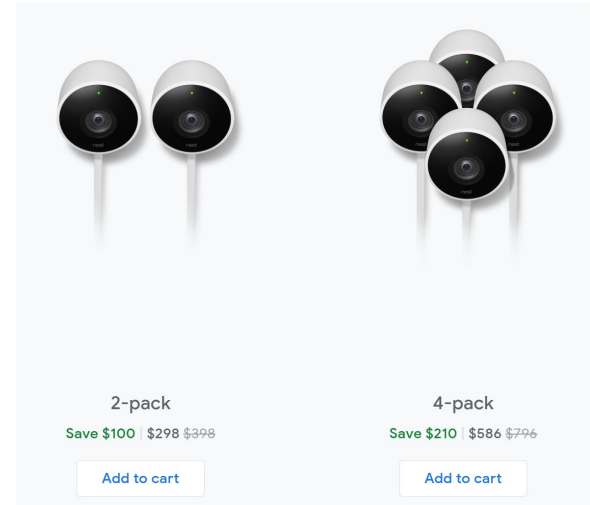


The Problem

- Large number of crimes every year in the U.S.

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- High cost of security systems



Your Custom Security System

1 Base Station	\$114.99
1 Keypad	\$69.99
1 Yard Sign	\$3.99 Free
Accessories & Batteries	Free
Fast, Free Shipping	Free
<input type="text" value="2"/> SimpliCam	\$198.00
40% Off	automatically applies at cart
Free Camera	automatically applies at cart
<hr/>	
Your System Total	\$382.98

[Add To Cart](#)

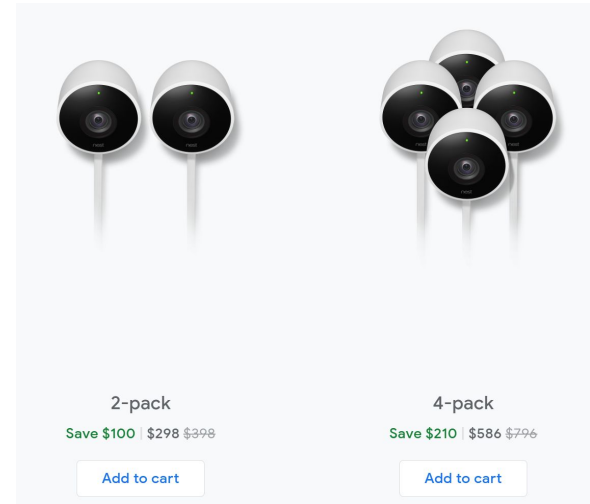
Top: Nest
Bottom: Simplisafe

The Problem

- Large number of crimes every year in the U.S.
- High cost of security systems
- Observation:
 - Smartphones sitting unused



Top: Nest
Bottom: Simplisafe



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Motivation and Supporting Information



Motivation

- Need for security cameras in homes



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Source: <https://www.alarms.org/burglary-statistics/>

Motivation

- Need for security cameras in homes
 - Roughly 2.5 million burglaries a year
 - 66% are home break-ins
 - 13% reported cases solved
- Less than 20% of unwanted smartphones are recycled a year

Source: <https://www.alarms.org/burglary-statistics/>

Source: https://www.wastecare.com/Articles/Cell_Phone_Recycling.htm



Source: Paul's Hardware - "I Have a LOT to Learn About DIY Home Surveillance."



Supporting Information

Customers may pay upfront cost
and monthly fees using a service



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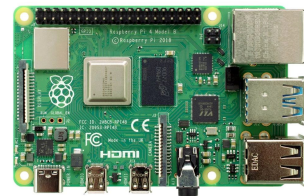
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DIY Home Security Systems

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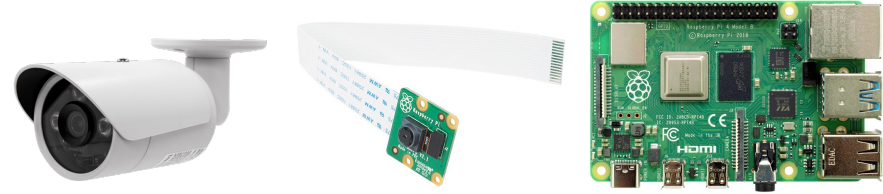
DIY Home Security Systems

- Raspberry Pi copying files to storage on network from IP Cameras

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- Raspberry Pi with camera module

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DIY Home Security Systems

- Raspberry Pi copying files to storage on network from IP Cameras
- Raspberry Pi with camera module
- Dedicated computer running software
 - Free software (ContaCam or iSpy)
 - Per camera fees





Solution

Build a security system from recycled smartphones

- Allow users to disconnect from the cloud





Build a security system from recycled smartphones

- Allow users to disconnect from the cloud
- Avoid monthly fees



Build a security system from recycled smartphones

- Allow users to disconnect from the cloud
- Avoid monthly fees
- Use old smartphones





Deliverables

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- User login and authentication



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- Phones locally detect motion



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 - Begin recording upon detecting motion



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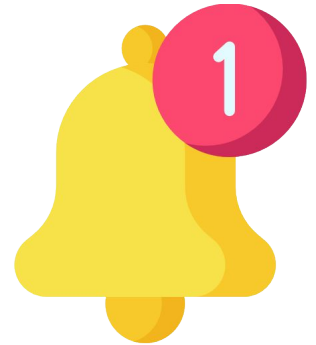
Deliverables

- User login and authentication
- Phones locally detect motion
 - Begin recording upon detecting motion
 - Continuous recording until kill signal is sent
- Person detection



Deliverables

- Send notifications or alerts



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 - Email notification



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- Store clips



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 - Email notification
- Store clips
 - Encourage user to delete clip
- Accessible from any modern web browser
- Respond to an event within five seconds





Constraints

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- Only Android 4.4+ and iOS 11+ devices can be used



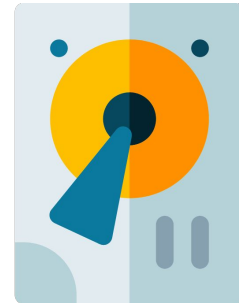
Constraints

- Only Android 4.4+ and iOS 11+ devices can be used
- Host computer needs:
 - At least 5 Mbps symmetric internet link



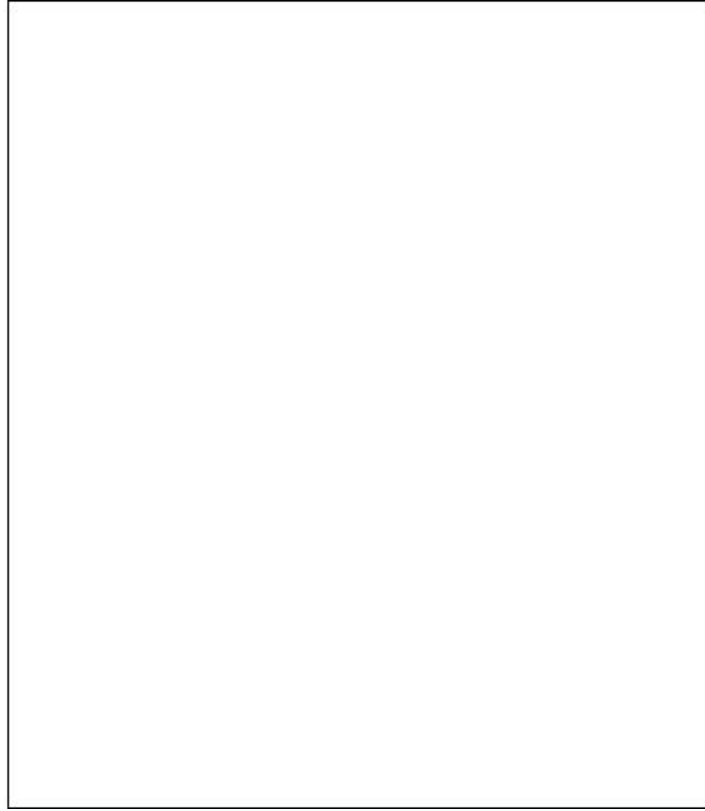
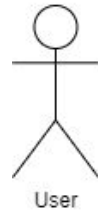
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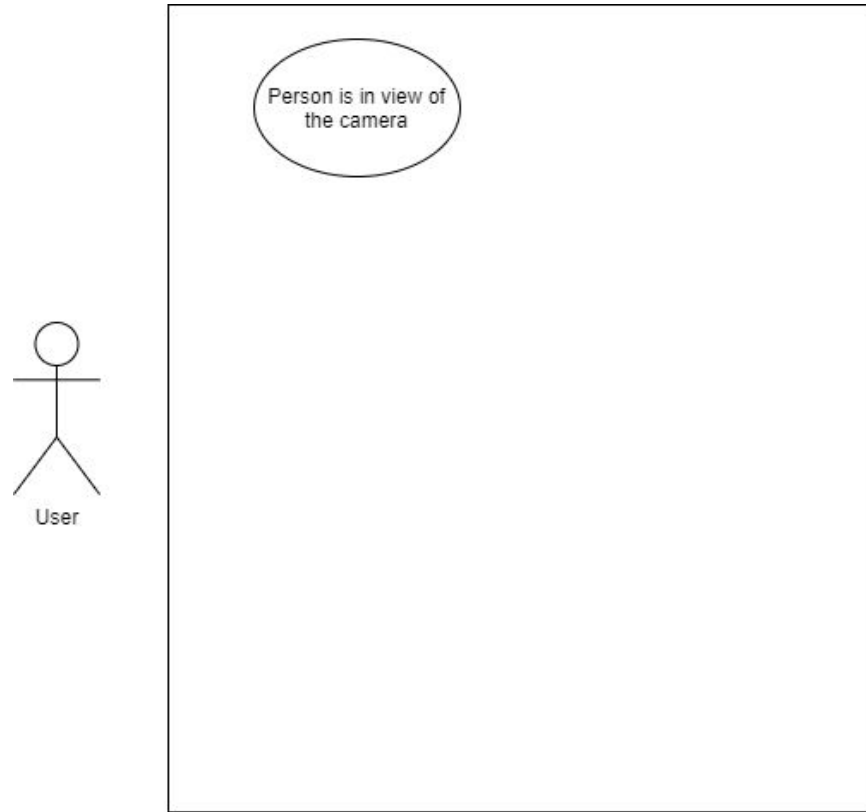
- Only Android 4.4+ and iOS 11+ devices can be used
- Host computer needs:
 - At least 5 Mbps symmetric internet link
 - Generous free disk space

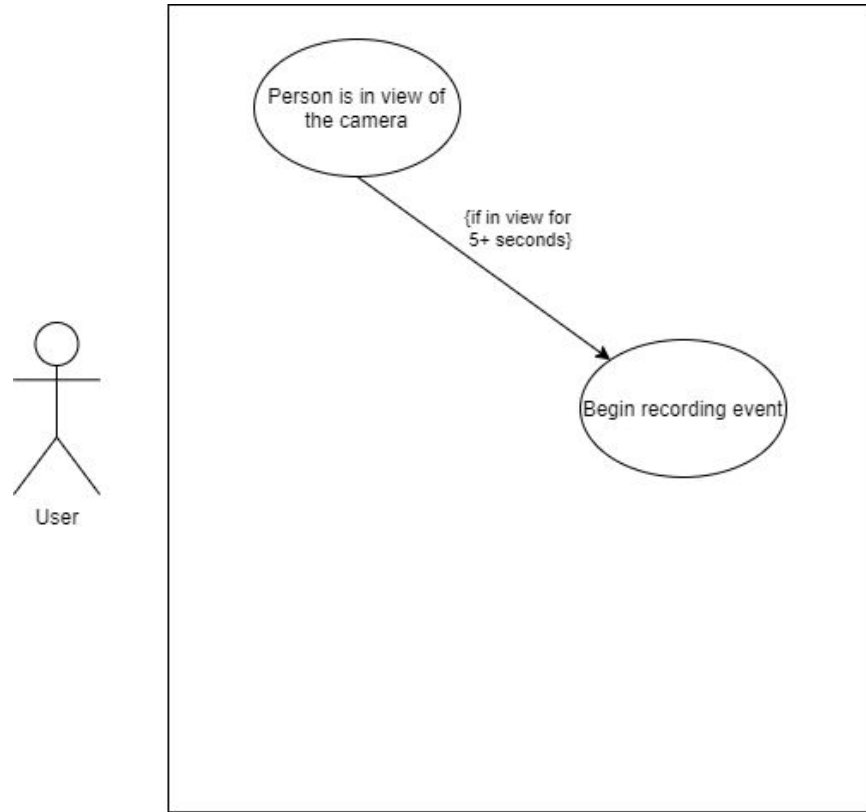


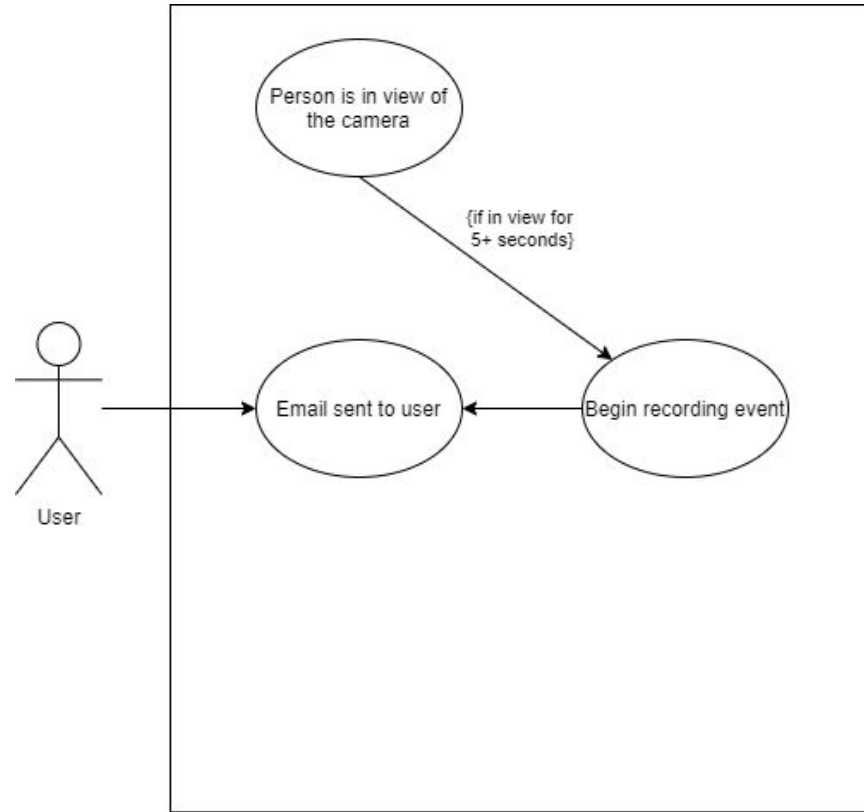


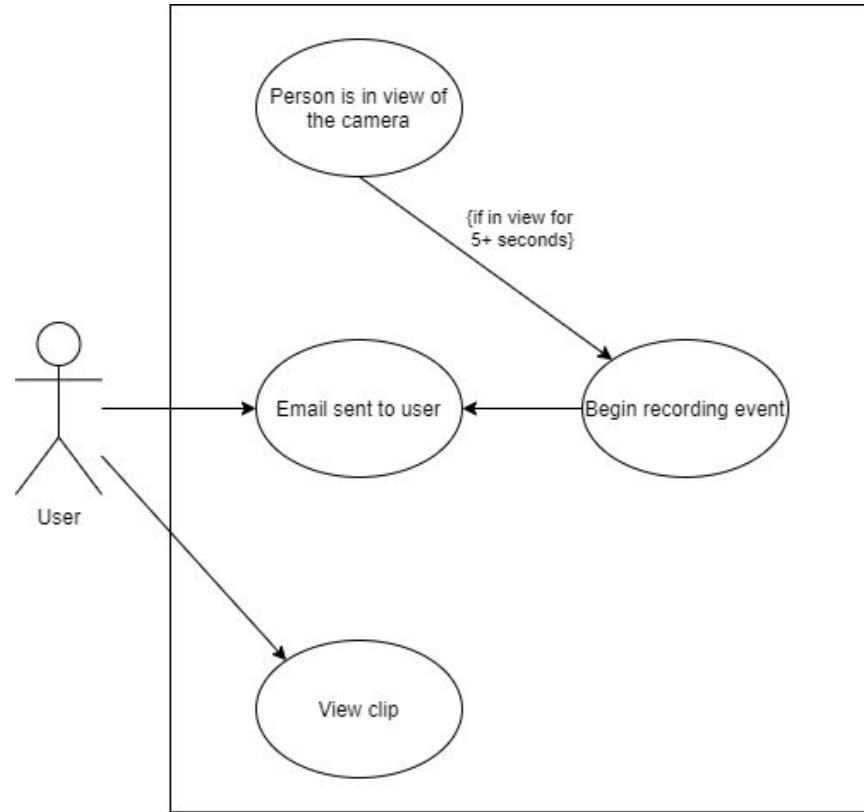
Diagrams

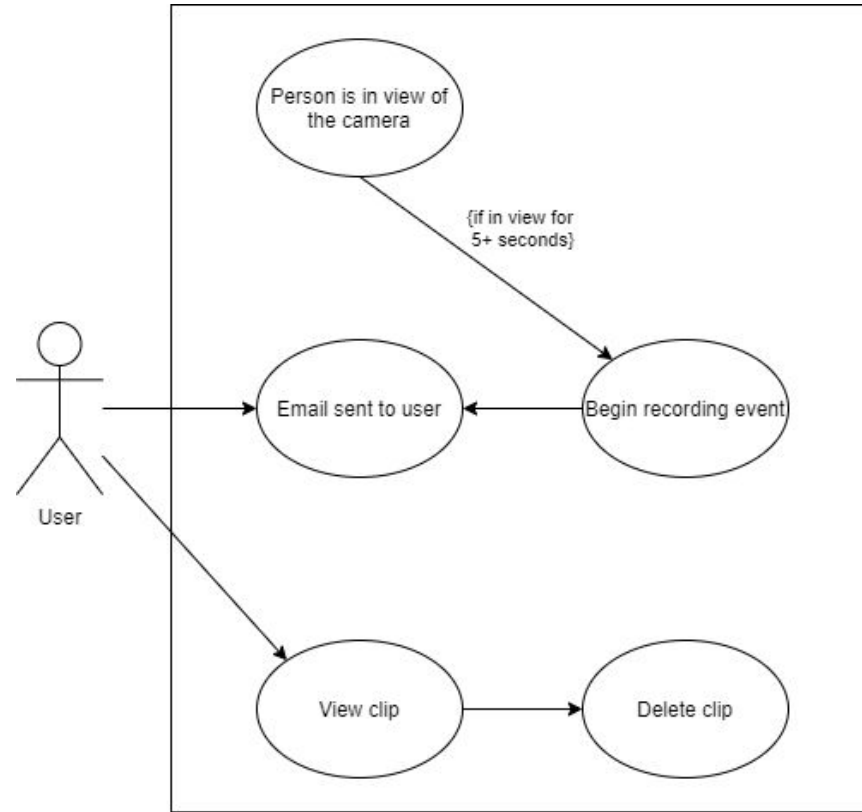


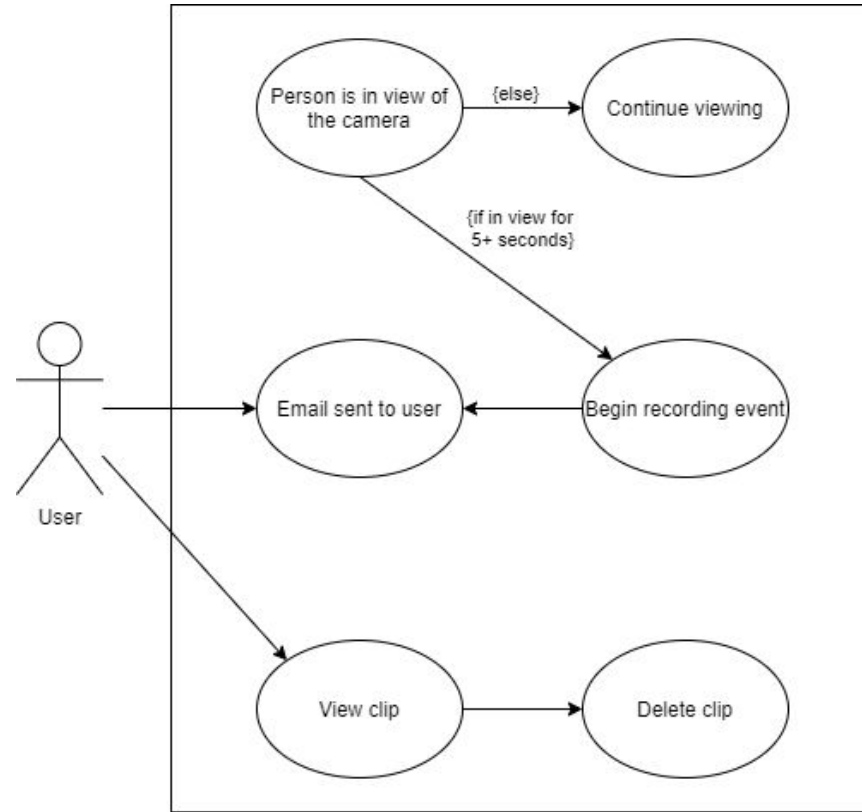


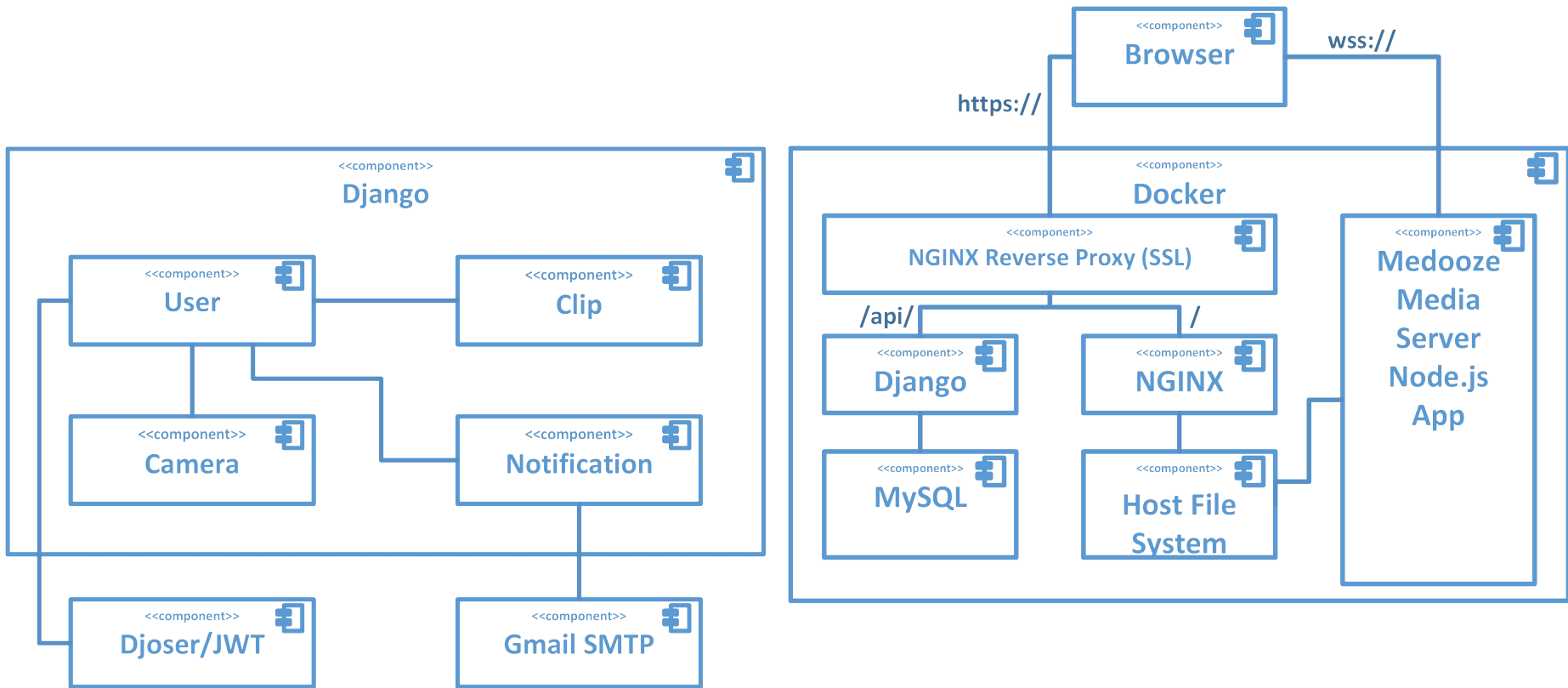




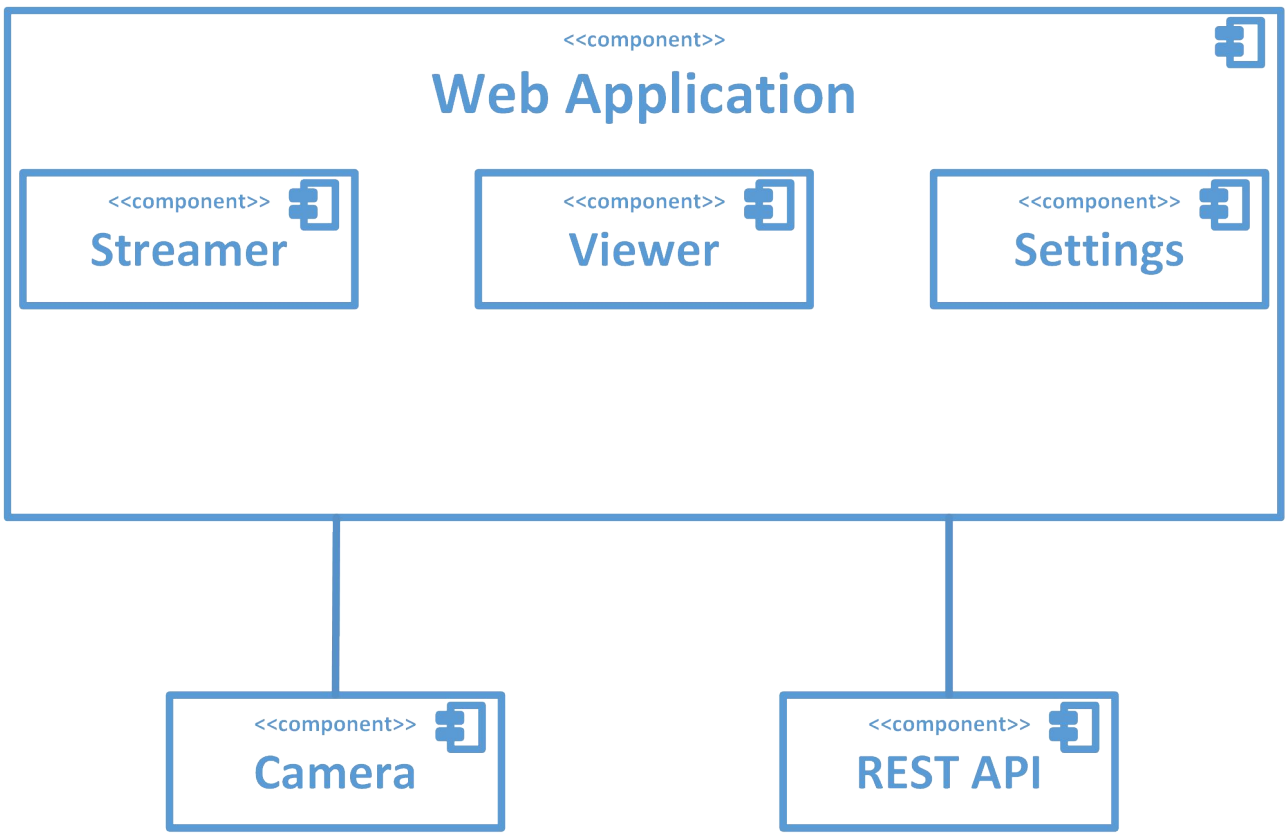








Backend Component Diagram



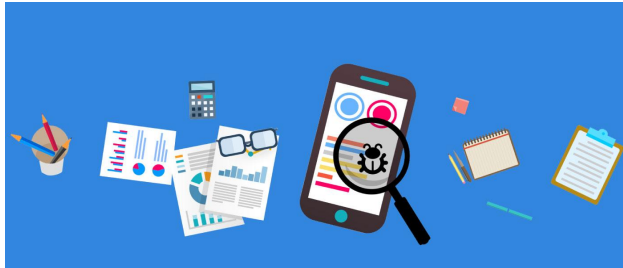
Frontend Component Diagram



Testing

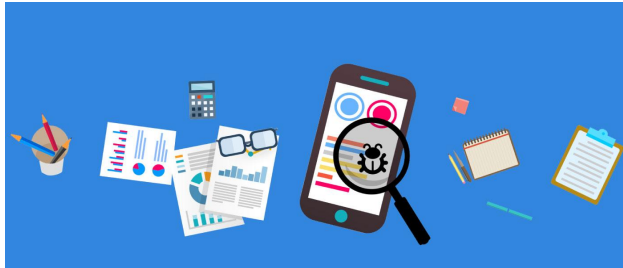
Testing

- Manual testing



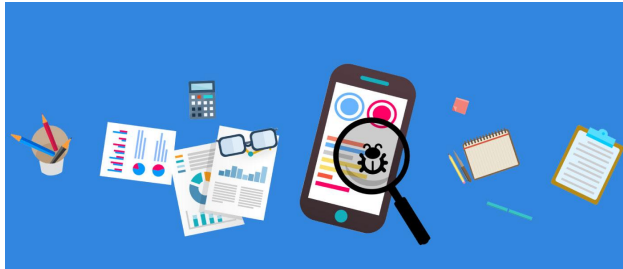
Testing

- Manual testing
- CI/CD testing



Testing

- Manual testing
- CI/CD testing
- Integration testing

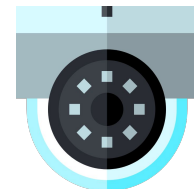
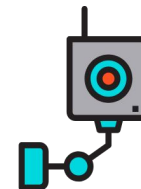
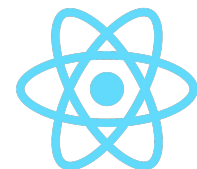




Technology Stack

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- Docker
- MySQL
- Django Rest Framework
 - Djoser/JWT
- React
 - NGINX
- Node.js
 - Medooze Media Server





Design considerations



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- Open source codebase
 - Allows more features and sensors for a more robust system



Future plans



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- Allow users to use IP cameras as well to stream



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- Communication between multiple devices



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Future plans

- Allow users to use IP cameras as well to stream
- Communication between multiple devices
- Identify specific objects of interest to search for
- Automated testing
- Stream viewing



Prototype

Welcome to your Home Security System
Choose what you would like to do

[Notifications](#)

[Stored Clips](#)

[Current Stream](#)

[Profile](#)

[Settings](#)

[Use Device as Camera](#)

[Log Out](#)



Conclusion



Thank you!