Watchdog

Mattew Gouws (AWS)

5Bits

Our Team (Left to Right)
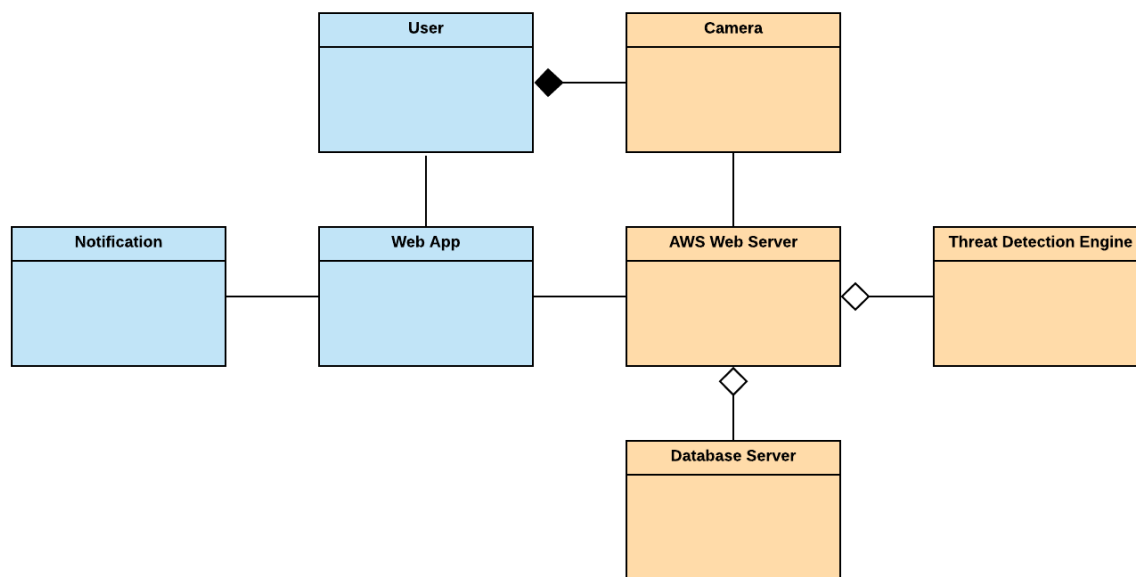
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[*] - team leader

Project Description

In today's times security is incredibly important. Thieves and home invaders are becoming smarter with their elaborate plans on breaking in, but nothing can escape the watchful eye of the Watchdog. The idea behind this project is to detect intruders and notify a security company and home-owner when a *suspected* intrusion has or is about to occur through facial recognition. The product's main concept is to use facial recognition to identify someone and make a decision on whether the person in question is an intruder or is meant to be there; additionally, a video stream or image service with motion detection needs to be built so that the owner may capture the person in question 'in the act'. The project is proposed to be run on AWS (Amazon Web Services) with a choice of open architectures.

Domain Model of Watchdog

Technologies We'll Use

- **Python:** Python is simple yet powerful and has extensive pre-existing open source libraries that will help specifically with this task. It will serve as our primary backend language.

- **AWS Rekognition:** AWS Rekognition will be used to do processing on the imagery, such as facial recognition. Rekognition has the capacity to do live analysis on video streams and will allow us to detect threatening behaviour using the pre-existing object and activity detection.

- **Python for API's:** Python will be used to provide Restful API's to the frontend.

- **AWS Cloud Storage:** We would like to use AWS cloud storage to store data securely and allow users to view their security camera feeds remotely.

- **Angular:** We would like to use Angular where frontend development is concerned. We are aware of the simplicity offered by Vue, but we appreciate the maturity of the Angular framework. This maturity comes with a large community as well. This will primarily be used to design the web app.

We are not yet familiar with the full capabilities of the AWS ecosystem, as we have so far mostly made use of open source platforms, we are therefore excited for the opportunity to consider any other technologies provided by AWS that we might be unfamiliar with. In the same vein, the aforementioned technologies are subject to change as more information comes to light during user story workshops etc.

Development Methodology

SCRUM is a lightweight process framework for Agile development. It is often used to manage complex software and product development using iterative and incremental practices.

Our team will operate in development cycles referred to as "Sprints" during which we will develop aspects of the system within a fixed time-box. Most of our sprints will be about 10 days in length, as this is a tried and tested amount of time to work effectively without getting too comfortable. This may vary slightly depending on the specific problem/user story to which a sprint is dedicated.

Our team chose this methodology due to its benefit of allowing the team to cope effectively with change, to be responsive to requests and to be in better control of the project schedule and state. As a result, this methodology enables our team to engage in frequent meetings for task planning and tracking, weekly reviews and Sprint retrospectives.

As the Product Owner, AWS, your role is to provide the Team, 5Bits, with the system requirements and developing a planned order of implementation for the project. During development your role will escalate to buffering features and bug-fix requests and being the single point of contact for all questions about product requirements. As the Product Owner, you retain the authority of setting the schedule for release of the completed system if you deem it to have satisfied the feature and quality requirements.

5Bits: Detailed

Stuart Barclay	
Current Skills and Knowledge	- BA Sport Psychology Completed 2017 at University of Pretoria. - Strong debugging and attention to details abilities. - AI and Security are some of my interests. - Proficient in C++, Java and Python - Proficient in both frontend and backend web-development technologies (React, C# MVC, HTML/CSS/JS and PHP Stack) NodeJS. - Proficient in MongoDB, SQL, MySQL
Application of Skills	- I have a large amount of experience with a multitude of different technologies. I am always willing to learn a new way of doing something and how the technology works. - I like to lead by example, keep the team happy and motivated, - something I learnt from my previous degree a happy team is one that works a lot more efficiently and effectively.

Quinton Coetzee

Current Skills and Knowledge	● Extensive knowledge of most major frontend and backend languages. ● Testing and debugging. ● Excellent problem solving skills and determination. ● Project management and planning. ● Leadership and diplomacy. ● Soft skills like communication. ● Photography and cinematography. ● Graphic design. ● Machine Learning and neural networks.
Application of Skills	● Programming knowledge including languages, frameworks and debugging skills that I already know, as well as an intense willingness to learn new programming skills will allow me to work hard and complete any aspect of the coding project. ● Interpersonal skills will allow us to work well in a team to keep one another motivated and ensure that we work hard from the offset and throughout. ● Years of photography and cinematography experience have given me extensive knowledge of the codecs and file formats which will be useful when it comes to the video and audio feeds needed for the security cameras.

Alistain Payn

Current Skills and Knowledge	● BSc Geology from the University of the Witwatersrand. ● Proficient at problem solving. ● Broad knowledge and experience solving problems in many scientific fields such as: Geology, Chemistry, Mathematics, and Computer Science. ● Written and verbal communication. ● Proficient at adapting and applying skills to new problems and fields. ● Proficient at programming, testing and debugging. ● Full stack development (C, C++, Java/Android, JavaScript/TypeScript, PHP, HTML5, CSS, SQL, Node). ● Frameworks (Qt, Flutter). ● Linux server setup and maintenance.
Application of Skills	● Creative problem solving in a broad range of scientific fields will be applied to modeling, designing, and programming the AI aspects of the project. ● Experience in scientific writing can be applied to creating good

	software documentation.
	● Experience in adapting to different fields will be used to adapt and overcome new challenges associated with the project.

Danré Retief

Current Skills and Knowledge	● Multimedia, Informatics and Computer science.
	● Language and communication skills (English, German, Afrikaans)
	● UX design.
	● Javascript/Typescript frontend frameworks (Angular/Vue) and progressive web apps (Ionic/Electron).
	● Backend programming (PHP, C#, Python[Django], Javascript[Node]).
	● Relational databases.
Application of Skills	● Creative approach to problem solving and formal training in multimedia, web design and human-computer interaction can be applied to design aspects of the project.
	● Aptitude for communication and problem solving will aid in team coordination and finding solutions.

Thato Tshukudu

Current Skills and Knowledge	● Computer programming and coding (with strengths in web development).
	● Unit testing and debugging.
	● Problem solving and logical thinking.
	● Written and verbal communication.
	● Interpersonal skills in teamwork.
	● Organization and scheduling.
Application of Skills	● My current programming skills and ones that will be developed through learning new frameworks and languages will be used for the code implementation aspect of the project.
	● I will be able to automate tests for various components of the application.
	● My capability in thinking logically will contribute to the team's effort to creating a good software solution.
	● My communication skills may be used to bridge communication between the client and the team or between me and one of my team members.
	● Interpersonal skills will be used to develop cohesion with other members of the team.
	● My organization skills will assist me in managing my tasks and

deadlines.

Possible Shortcomings
What we're missing:

Project specific experience. Seeing as none of us have created a security system before, we are not yet subject experts in this realm. There are some domain specific concerns we will have to address, like the connection of security cameras to our server.

How we'll get it:

Dedicated research. We are all motivated and excited to learn about both security in general and the development of a system to maintain security, and we believe that this will teach us valuable skills. We look forward to becoming experts in this field and using the knowledge we gain to solve this real world problem.

What we're missing:

Chemistry as a group. Though most of us have worked together to some extent in the past and we all find one another pleasant, we have not yet worked as a group on a large project. We recognise that it can be difficult to work as a team on any large project.

How we'll get it:

Contact time. We will have weekly meetings to discuss the project and check in on our progress, these meetings will allow us a chance to build chemistry as a group and stay on track. As soon as we are allowed personal contact, we will also have regular get togethers and in person coding sprints on campus.

Why You Should Choose 5Bits
Even though we have great technical skills and our team is made up of highly experienced individuals and multiple top achievers, we believe the reason you should choose 5Bits is passion. We take great pride in our work and set high standards for ourselves to achieve, not because we want to pass modules, but because we are passionate about software engineering and what we can achieve with it. Our willingness to learn, ask questions and to accept guidance when we need it will be paramount in this project. We believe that every individual has the right to feel safe and secure wherever they may find themselves and we are therefore grateful for the opportunity to tackle this problem with a security system for the future. That is why we chose your project and why we are hoping you choose us too.