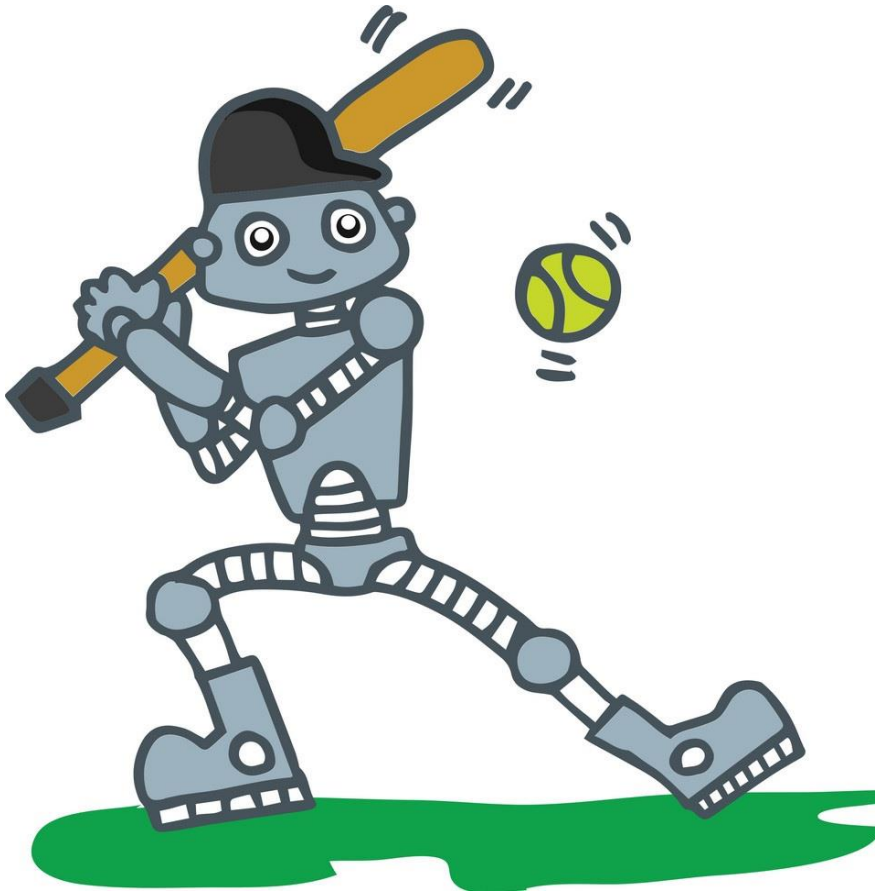

Droid on the Baseball Diamond –

(Baseball Training Robot)

Developed by: Kevin Nolan

Created for: Austin Hogan

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User Research Summary

Stakeholders

Name/Role	Description
Austin Hogan – Primary Client	He is the primary client for this project and will be the one to approve all features. He has past baseball experience as an avid fan and player for a short time. He will be the one primarily providing the requirements for the robot.
Baseball Players – All ages	Baseball players of all ages will be able to use and benefit from the robot. Youth players will be able to use the robot to help work on their skills to make the team. While older more professional players could use the robot to improve and/or hone their current skills.
Baseball Coaches – All levels	Baseball coaches from all levels of play can benefit from the robot as it can help aid them in helping a player on certain skills. It can also help by doing tasks like throwing a ball at a certain speed that the coach may be unable to do.
Baseball Training Center Staff	There are several training centers located throughout the world that help baseball players train. The staff would be able to use the robots to help assist the players in ways that they cannot. It can also help reduce the amount of staff needed at a training center at any one time.
Parents of Young Athletes	Parents of young athletes (like 8-14 or high school level) can obtain the robot and use it for individual training with their child. A lot of parents aren't skilled in the sport so the robot would be a good supplement to aid them.
Community Group	A local community may not be able to afford to hire a coach or professional trainers to help teach their kids how to play baseball. The robot once bought (or donated) would be a cost-effective way to teach and/or train youth on playing baseball.

Research Methods

- Method #1 – Interview with Partner -

For my primary data gathering source I conducted a semi-structured interview with my partner. I started off the interview with more general questions pertaining to the robot, like “What is the main goal of the Droid on the Diamond robot?” and then led into the specific feature questions. For the specific feature questions, I dug into each feature and asked questions based on what options were important for that feature, like for the Pitching feature I asked, “Will certain pitch types require certain speeds?”.

I used questions that were more open ended and descriptive for the more general aspects of the droid but tended to go more specific and direct for the questions related to the individual features. This interview was an important part of the data gathering process as it really helped me gain a better understanding of what Austin wanted the robot to do for the user. I was able to learn more about the specific features and what he desired for each of them and could tell by his facial expressions when questions I had were things he hadn’t even thought of. Ultimately, the answers to these interview questions helped discover what I didn’t know and led me to my second data gathering method.

- Method #2 – Instructional Websites Learning -

For my secondary data gathering source I used a collection of various instructional websites that helped me learn more about the different terms and stats of baseball. My main reason for doing this is because I learned from my interview with Austin that I wasn’t aware of the specifics of various baseball hits, pitches, etc. Austin was able to give me a general run down of certain things (like different pitch or hit types) but for more detail I would need to dig in to each feature. In order to do this, I found 5 different websites that each detailed different aspects of baseball that related to the app features.

While doing my research I was able to find that there were several resources I could take advantage of to learn more, but I didn’t need overwhelming info. In other words, one site I found goes over each pitch type in 2-3 sentences with exact speeds I needed but another one went into 3-5 paragraph details on logistics that I wouldn’t necessarily need. I considered going to a training facility instead but the websites I found gave me more concrete information and the details Austin gave me related to the robot being at several types of locations.

Research Collection - Findings

Baseball seems like a pretty straightforward sport from the outside looking in, but has several different layers to it that regular fans do not fully grasp. In order to fully understand each feature of the robot and what the app should include, I interviewed the primary client Austin Hogan. My questions to start the interview helped me surmise that the robot's primary goal was to help train all levels of baseball players at any location, both inside and outside. The robot would incorporate its features off the age level selected by the user and height as well for certain features. One primary benefit of this is that the user wouldn't need a coach or second person around to assist them in their training, the robot could do all of that stuff for them.

Next in my interview, I gathered the main features were Hitting, Pitching, Catching and Ball Retrieval. I learned that the Pitching feature would include 4 types: Fastball, Curveball, Changeup and Slider. Austin wasn't too concerned with setting pitch speeds but asked that I do more research for the various types in order to learn if this would be a benefit to the system. In the Hitting feature, while there were several to choose from he chose Line Drive, Grounder, Flyball and Bunt as the main types he was concerned about. He mentioned a few ranges of speeds and that the user would need to select their field position. As this feature is based on the robot hitting balls to the player at a certain field position, I questioned whether it would've been better to use "Fielding" as the name of the feature. He decided "Hitting" made more sense in that the droid would be hitting the ball to the player.

The last 2 features were not as detail oriented as the previous ones but were still important. The "Catching" feature would detail whether a pitch thrown was a ball/strike, the speed and if it matched the type that the user was throwing. I questioned if maybe Austin would like to add some sort of "Fielding" option for the droid to field hits and throw it to him. He expressed though that the "Ball Retrieval" feature is important as it saves time for the user and keeps track of balls. The user will be able to choose retrieval after task or when the droid's storage system runs out. While my original idea for the interview was to get specific data and numbers for each feature, the final results led us to agree that I needed to use more instructional sources for more concrete data.

My first goal was to identify the pitch types for the "Pitching" feature and their speeds to learn more about them. I found the Baseball Pitches Illustrated guide webpage to be a simple and detailed way for me to learn about the pitch speeds and types. The site used pictures for each pitch type and gave general guidelines for speed and helped me learn that location doesn't determine the pitch which also helped me in the "Catching" feature. I then found a website named Rookie Road to help boost my knowledge of the different types of hits for the "Hitting" feature as it gave easy descriptions for novices to baseball. I still needed more details on how big of a factor speed of the hit was for fielding which led me to a resourceful article by Blast which went over the various intricacies of swing speed. I learned that essentially the average speeds varied starting at 40s for young age and up to the 80s for more professional players with bunts not having a defined speed.

Data Gathering & User Analysis

Next I needed to learn more about the “Catching” feature with a set focus on the strike zone and how it needs to be set. I had already determined in my previous research about the pitching types that there was no correlation between type of pitch and the location. Due to this, I was able to surmise that there would be no need for a user to set a specific location for a type of pitch that they’ll be throwing to the droid. I was able to find an informative video by Baseball Rules Academy which used an actual MLB official to go over the actual definition of the strike zone. He then went through and showed the different locations of the strike zone and helped me understand the 3-d zone aspect of the strike zone. Finally, I searched for baseball training facilities to get a better understanding of how they were setup for both indoor and outdoor purposes with the Grand Slam site having the most detail in terms of visuals and what they offered.

In terms of planning, I had originally planned to do a questionnaire with my cousin and his friends who play baseball as a second research source. I ended up deciding against this as I felt Austin’s interview gave me good details on the “Why” of the robot and that I needed more details for the “What” in order to learn what each feature entailed. I had one “main” interview with Austin in person for all of the questions listed in the “Research Materials” section and then I had 2-3 quick emails with him to clarify certain notes I had made.

I ended up comparing several sources for the websites I used for my additional research as some of them took time to decide if the source was giving me the information I really needed. The “official” major league baseball website is a great resource for news and stats for individuals but I soon learned after an hour of digging that it didn’t give the direct information I needed. I also tended to find that there were plenty of videos out there demonstrating drills but not giving out basic info. While the Rules Academy company that posted the Strike Zone video was very helpful, unfortunately most of the other videos they had tended to show specific rules examples that didn’t help my basic robot. In the end, my interview in the first data gathering phase helped guide me to the specific details I gained in the second data phase and combined has given me a plethora of data to use for the droid app.

Robot Functionality and Features

Functionality: Baseball Training Robot

- Primary Purpose: Helps user with baseball training with various features that help incorporate all major aspects of baseball.

- Primary Features:

1. Pitching: Helps the user improve on their batting skills by throwing various types of pitches to the user. The user can specify the pitch type, speed and location.
    - Examples: 85 mph Slider in left corner, 100 mph Fastball down center, 89 mph Changeup in right corner.

2. Hitting: Helps the user with their fielding techniques. The user can specify a location for the ball to be hit towards, a ball projectile speed, and type of hit.
    - Examples: 92 mph line drive to third base, 80 mph flyball to center field.

3. Catching: Helps the user with their pitching techniques. The droid will report if the user has thrown a ball or strike based on a simulated strike zone. The user can select where they will throw the ball and what type of pitch they are going to throw.
    - Examples: User can select right corner changeup and droid could report it as a strike. User can select middle left slider and droid could report it as a ball.

4. Ball Retrieval: Droid will go around the baseball field and collect all baseballs from the ground. The user can set this feature to activate after each individual task or when droid runs out of balls.

Persona

Andy

Background

- 16, Male
- Public High School student
- Studious and Energetic
- Baseball player since 6 years old

Motivations

- Always being the best at his position in baseball
- Maintaining a high GPA to get into a good university
- Being able to make his parents proud

Frustrations

- Mobile apps that aren't quick and easy to use.
- Not being able to practice sometimes due to school studies.
- Coaches that don't help him with his pitching the way he wants.

Who is Andy?

Andy is a student at a local high school who loves playing baseball on the school team. He currently plays pitcher and center field position. His hitting skills are average but he is working as much as he can to improve them. He can't always make every practice due to school work.

Unlike some athletes at the school, he prefers to keep his studies as his #1 priority. He has already started looking at various colleges where he can play baseball and get into a great degree program. He is into Information Technology and likes to put computer hardware together.

Andy loves using his Android phone for everyday activities like Facebook, Twitter or Instagram. He is subscribed to the ESPN app to keep up with the latest sports news. He likes playing Madden or MLB games on his Xbox One or watching Dodgers baseball games in his free time.

Andy is energetic and always on the move. He hates just sitting around all day and would rather do sports with friends then just lay on the couch.

"It'd be cool to practice my batting skills with someone who can throw the ball where I want it."

Research Materials

Interview Questions

Listed below are the questions I used in my interview with Austin Hogan. My notes on his responses have been shortly summarized and typed below each question.

1.) What is the main goal of the Droid on the Diamond robot? What will it primarily help users do?

The main goal of the robot is to help improve the skills of the user for playing baseball. It will help users accomplish this by performing various features for the different aspects of baseball incase there isn't a skilled coach or partner that can do it.

2.) Where will the robot be located at? Will its location affect what it can do?

The robot will primarily be in baseball diamonds outside at either local parks or training facilities. It can be adapted indoors with limits to its individual features.

3.) Will each individual user need to put in specific data about their playing abilities in order to use the robot?

Only the age range, the robot will be set to a universal standard for players of that age.

a.) Will there be a targeted age group for the robot?

No, the robot can be used by all ages and levels.

4.) Will the user need set the number of times for each feature for the robot to repeat the task? If so, how many? Is there a timer to be set?

User will be able to set a desired amount of times the droid can repeat the task. User can set time intervals between repetitions of task. Droid can be set to go until it runs out of balls.

5.) **Pitching:**

a.) What specific pitch types should be included for the robot?

Fastball, Curveball, Slider and Changeup should be included.

-Will certain pitch types require certain speeds?

Yes, depends on age range chosen. More research needs to be done.

b.) How will the location be defined for the user?

User can set location based on quadrants of the home plate zone. Age set in system will determine how high the ball is thrown in the air.

c.) What speed choices and/or ranges should be used?

I will refer back to question a and use those answers to make this one clearer.

6.) **Hitting:**

a.) What "hit types" will the user be able to choose from?
The user can choose from Line drive, fly ball, grounder, bunts.

b.) What speeds will be allowed per hit type?
Bunts = 15-20mph, line drive = 85+mph, grounder/flyball = 60-70mph

c.) What locations can the user choose from?
Will be dependent on the player and where he chooses to play. Player will choose the position he'll field hits from.

d.) Should the robot have a timer set between hits? **Yes, set to 1 minute or a ball limit.**

7.) **Catching:**

a.) Will the user set the strike zone for the droid?
A universal strike zone will be simulated based on the user's age.

b.) Can the droid keep track of pitch count? **Yes, overall pitches.**

c.) Will the droid give feedback on pitch speed?
The user can choose whether or not they want speed feedback per pitch.

d.) Will the droid give feedback on pitch type? If so, which types?
The user can choose from the pitch types given in 5a and the droid can report if the pitch matched that type.

8.) **Ball Retrieval:**

a.) Will the user choose the amount of balls for the Robot to retrieve? **No, the droid will pickup until full.**

b.) Where will the robot place the balls it retrieves?
The robot will have a ball storage unit where it will place all balls.

c.) Will the robot automatically pick up balls after a task is complete or when it runs out of balls? **User can choose whether to have the bot do either option.**

9.) Are there any other features or aspects of the Droid on the Diamond robot that I should know about?

The droid is primarily focused on helping baseball players improve at the sport. Should be simple and easy to figure out so as to not waste their time.

Website Links

Listed below are the links to instructional websites that I used to further in my data research for this project. I have included a short description next to each.

1.) Baseball Pitches Illustrated – A fan's guide to identifying pitches
https://lokeshdhakar.com/baseball-pitches-illustrated/
This website was resourceful in that it helped identify each pitch type with a short description, but most importantly it gave me average speeds which were important for the app as I needed specific number ranges.

2.) Rookie Road – Baseball Hit Types
https://www.rookieroad.com/baseball/hit-types/
This website gave me a rundown of each hit type to help clarify what each type did. It also gives basic baseball facts and terms that are easy to understand

3.) Blast Motion – Baseball Hit Speed
https://blastmotion.com/blog/baseball-swing-speed/#gref
This website helped explain more to me about baseball swing speed and how it affects the different hit types. There were 2 good videos on the webpage as well that were informative on the subject.

4.) Baseball Rules Academy – The Real Strike Zone Explained (Video)
https://www.youtube.com/watch?v=Akx2kBavZ9Y
This video is done by a professional MLB umpire and fox sports reporter that go over the strike zone and how it's defined using a young player.

5.) Grand Slam Sports Center – Training Facility Website
https://grandslamsportscenter.com/
I toured this facility's website to get a feel of an indoor center. It had great visuals and went over the machines they had. This relates to how the droid can be used both indoors and outdoors.