



6199A WIREDcats
Atlanta, GA, USA

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CYBEROBJECT REVOLUTION: THE FUSIONAI GENESIS

Our Team



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Builder, Driver



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Coder, Builder



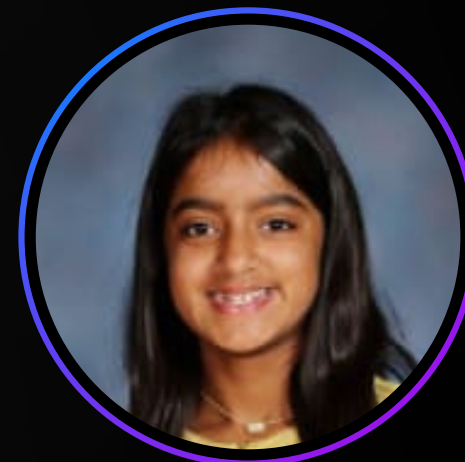
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Nora Alikhani
Coder, Builder



Owen Daum
Coder, Builder



Sufi Momin
Builder, E-Notebook



Introduction



With the rise of artificial intelligence in our rapidly advancing society, the main focus of engineering is geared towards technology. Consequently, this causes more issues that arise with the status quo of applications and websites, explaining why software developers hold such a coveted occupation.

In a pursuit to understand the phenomenon that is A.I. and to analyze the engineering process at a deeper level, we explored CyberObject, a company that utilizes state-of-the-art intelligence in their business process unlike anybody else.

Document containing commands

You are [pronouns] <first_name of employee> <last_name of employee>, living at <home_address of employee>, <city of employee>, <state of employee> <home zip code of employee>. Born on <date_of_birth of employee>, you got your current job on <date_of_hire of employee>. You are <marital_status of employee> and claim <number_of_dependents of employee> dependent on your W4. Last four of social is <ssn4 of employee>. Cell number <cell_phone of employee> where <employee id of employee>=value(<employee_id of employee>). Does everything sound right?

Custom Digital Agent

You are Mister Randy Purdue, living at 200 Peachtree Street, Atlanta, Georgia 40045. Born on 11/22/1989, you got your current job on 11/25/2018. You are married and claim 2 dependent on your W4. Cell number 999-111-3301. Does everything sound right?



Why CyberObject?

In recent years, generic A.I. platforms such as ChatGPT and Flint AI have dominated the Internet because they utilize Large Language Models (LLM) which help them generate solutions to many of the world's problems. CyberObject developers took this idea and incorporated it with other AI technologies such as Natural Language Processing and Logic Computing.

Using these elements of Artificial Intelligence they were able to create a platform called Fusion AI used by customers to make their own chatbots and applications. Additionally, they simplified the process of app development by replacing code with text. All the user needed to do was create a text document or workflow and the chatbot would respond to the user's questions using the information provided.

I was inspired to research CyberObject's engineering process not only because of its incredible results but also because of the similarities it shared with the development of our robot.

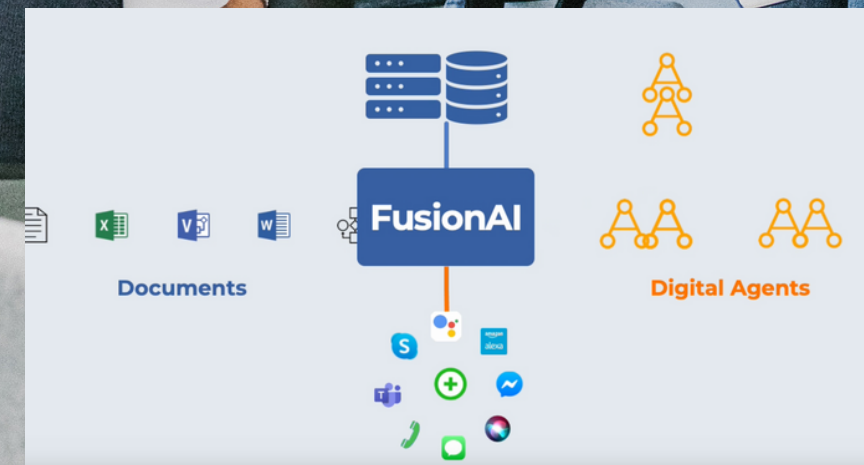



Diagram portraying the FusionAI system



“Innovation is seeing what everybody has seen and thinking what nobody has thought.”
–Dr. Albert Szent–Györgyi

The Process



1

Analyze



2

Design



3

Prototype



4

Evaluate

Analyze

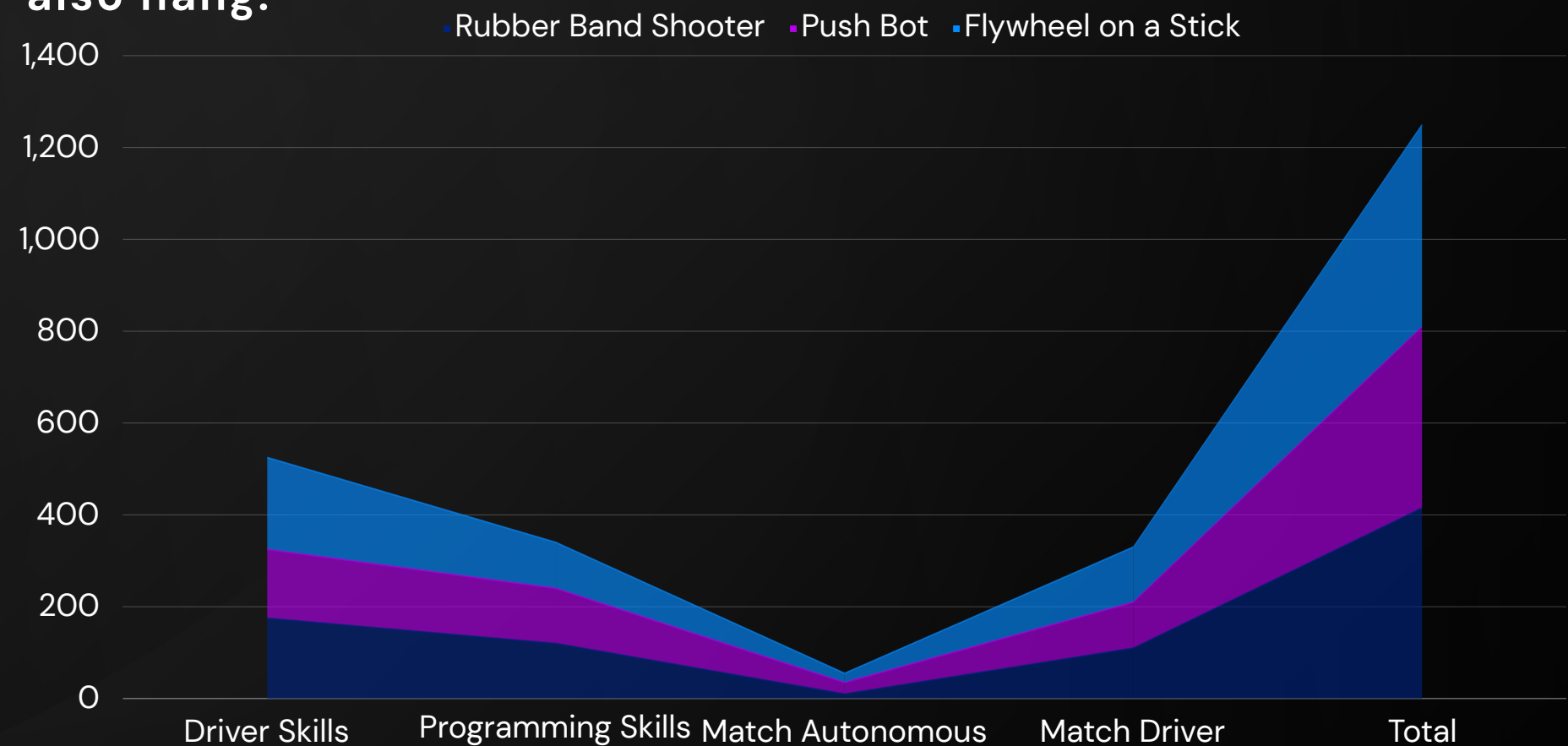
An interesting aspect of the software development process is that it begins with the client.

At CyberObject, the clients come first. To achieve the most specific design, they ask various clients for details about their problems. In this stage, the sky is the limit for innovation and creative designs.

By analyzing an important need, CyberObject places the stepping stones for Fusion AI to create efficient alternatives to coding.



Our team took this step and integrated it into VEX Robotics. Last year, we had many instances of redesigning because we did not plan our outline of time. To prevent this, we analyzed the game to find out what robot designs could score the most points. By using a chart, we found that the Flywheel on a stick had the most versatility because it could score triballs and also hang.



This method proved successful as we were able to make it to the state competition without any rebuilds or redesigns.



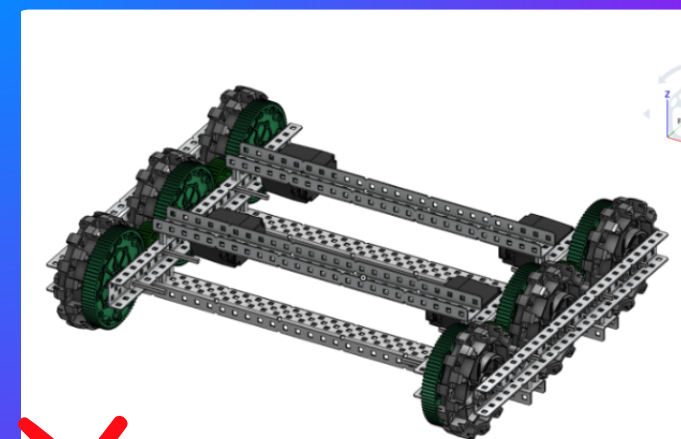
Design

Once the programmers have figured out their end goal, they begin to prepare the hardware needed for the process.

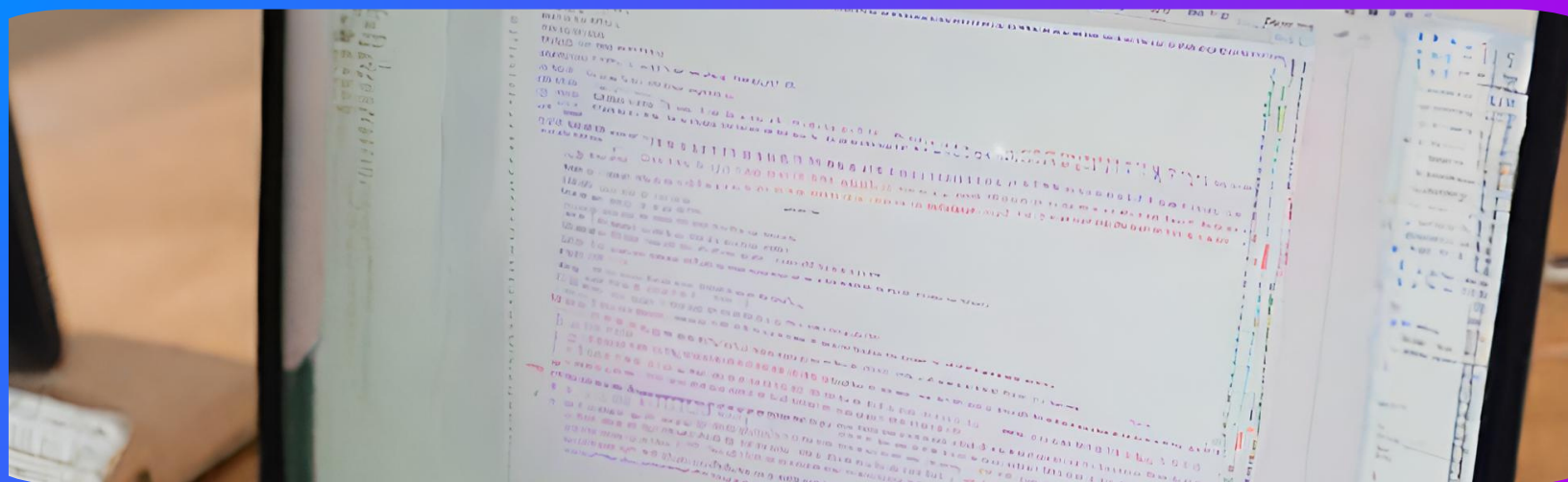
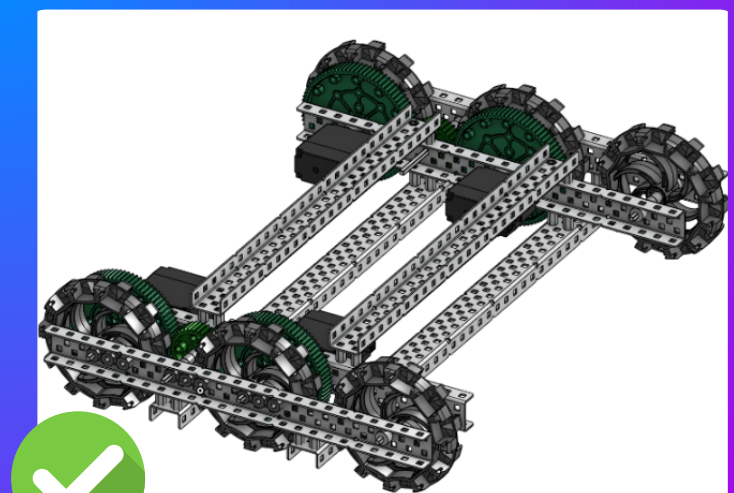
In this phase, test strategies and execution plans are brainstormed. Also, key elements for the prototypes are established in this stage. For the employees to navigate the development process, they create Data Flow Diagrams, which explain how the data will be processed throughout the software. Developers are also responsible for the technical details, which include the interfaces and structures. These steps will all aid in the future development processes.

To build a robot, we must also make a roadmap for our designs. Onshape is a useful tool because it allows us to foreshadow if a build would work or not. In the design to the left, the intersecting C channels do not line up with the holes on both the left and right sides. Onshape allows us to fix the problem without having to physically disassemble any parts. Anyone on our team is welcome to help with the design since at this stage, creative ideas are a priority.

Cad v.1



Cad v. 1.1

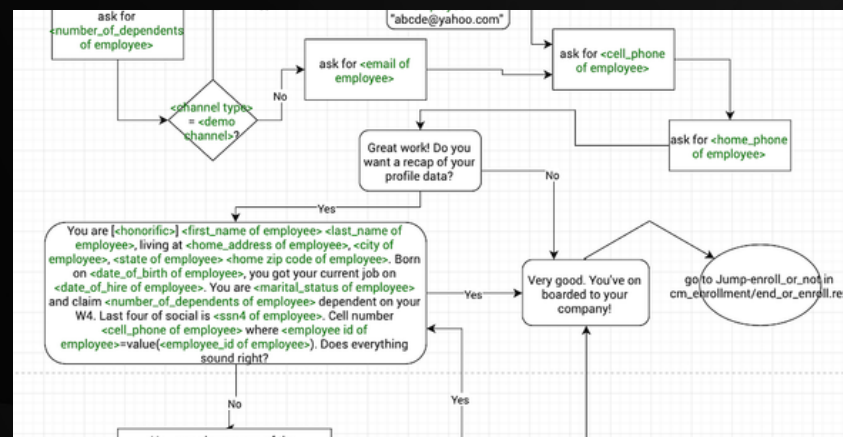


Implement

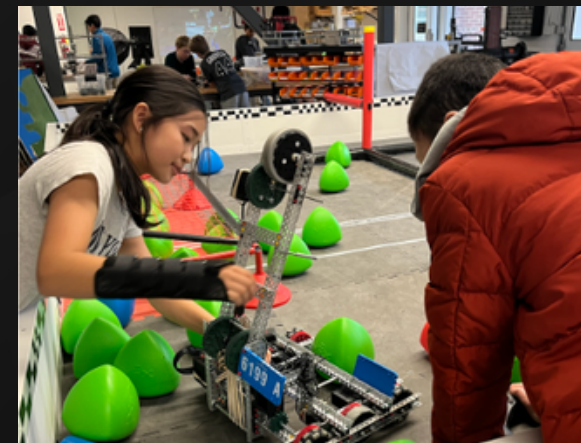
Now CyberObject is ready to create a prototype of their software. There are 3 stages of prototyping: Low Fidelity, Medium Fidelity, and High Fidelity. Low-fidelity prototyping is the most basic representation of their model. This stage is important because it allows the developers to grasp a deeper understanding of the software and make changes if necessary. Medium Fidelity comes after the Low Fidelity Prototype and adds more depth to the software. This can include a User Interface (UI) to allow human interaction with the application. The High Fidelity stage is the most detailed version of the prototype. It should closely resemble the final product.

Our Robotics team noticed that CyberObject employees usually all work on one prototype at the same time. We initially thought this would eventually lead to one person doing the majority of the work. Instead, we can split our robot into different sections and small groups will piece together the sections bit by bit. This allows for more engaging and collaborative work. It also allows work to be done more efficiently. In the end, the finished build is very rewarding.

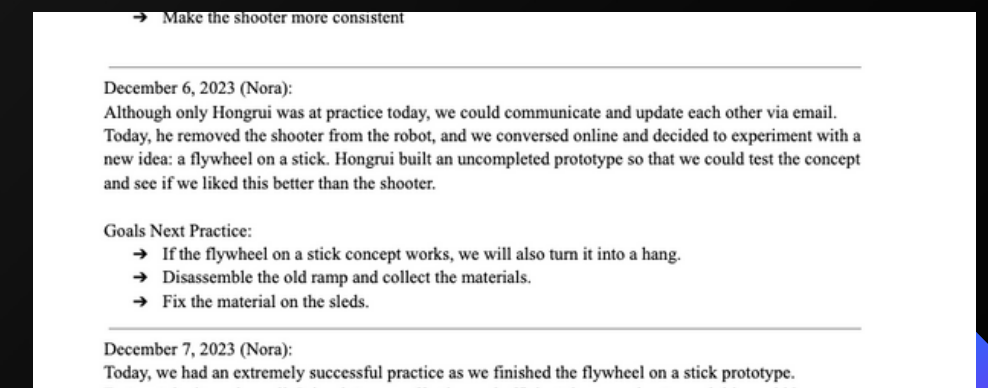
The most important part of the *Implement* stage is communication. If somebody misses a day in Robotics, they can check the engineering notebook for the progress made on that day. This is a priority because it allows everybody to catch up on the status quo.



A workflow created in the prototype of FusionAI



Darrel and Olivia working on the shooter



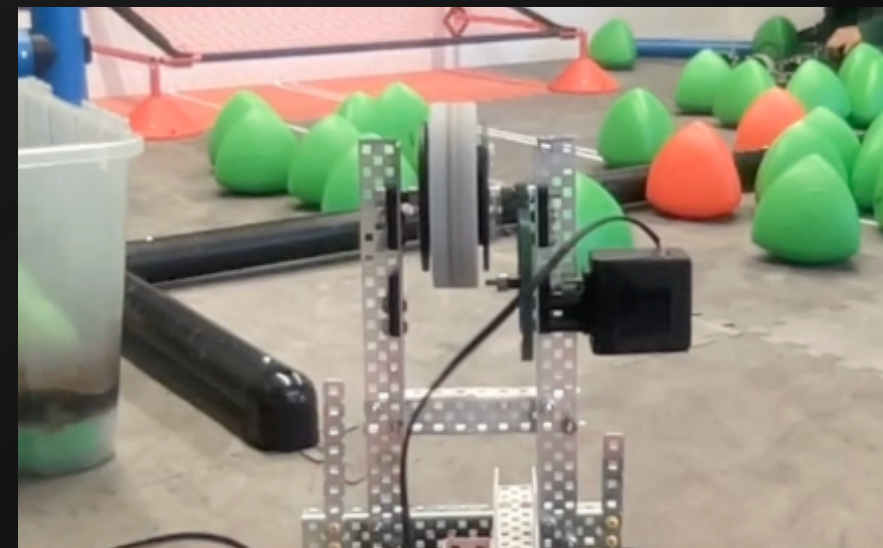
E-Notebook Entry

Evaluate

After CyberObject have finished their design, they are ready to seek feedback from employees and clients. This includes the testing and evaluation of the software. In this stage, testers are welcome to give feedback to the developers. This can range from large functionality issues to a small bug. If the developers accept this feedback, they retrace back to the design stage to fix their prototype. If necessary, they can also go through several cycles of this process.



Our team tests the finished prototype on the Over Under field. To do this, we organize a single practice that everybody can attend. This is so each person can see what they have done to contribute to the final product. After each component is tested, we reflect on the positives and negatives of the trial. As a bonus, we ask other teams in our school about the areas we can improve in. Similar to CyberObject, we can also go through many iterations of evaluation.



Testing and evaluating shooter prototype on the field





How will VEX prepare us for the future?

Organization + Teamwork

Before the year, we thought there was always going to be 1 person who was the master builder, programmer, and driver, as it has been for other teams in our school in the past. This is when we noticed that the software engineers assigned roles to each person depending on their specialty. This is required in Robotics as our team must have everyone feel like they belong. Ever since then, we have been collaborating in small groups, working efficiently, and creating closer relationships with each other too.

Real World Challenges

Of course, not all will go well, even in VEX Robotics. Many hardships and malfunctions could happen during the season. Through our collaborative effort, we have put our mistakes behind us and used them as stepping stones to never make the same errors again. In the real world, many engineers will face rejection, hardships, and devastating losses. VEX has taught us that robot malfunctions are not the end of the world and that they will only improve our teamwork going forward.

Sources and References

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