Final Presentation - IDE401

Who are the customers and stakeholders

Customers

Customer 1: Government Agencies

Our first customer type is government agencies like the military. Obviously, the military has a lot of use for drones. They use them for surveillance, for reconnaissance, and for combat. For these uses, they need both versatile and secure drone technology.

Customer 2: Commercial Enterprises

We also aim to satisfy the needs of commercial enterprises. We know that companies like Amazon and Google have been working on drone delivery technology for years. And not just for delivery, but in other sectors as well. For example, in the agriculture sector, drones are used to monitor crops and livestock. By creating a drone that can navigate without GPS that is both efficient and reliable, we can pitch our product to these large companies.

Customer 3: Research Institutions

And finally, we aim to satisfy the needs of research institutions. It turns out that drones are used in a lot of research. In our research, we found that >50% of location based research uses GPS. While this stat includes research that is not drone based, we still think that there is a large market for our product in the research sector. They will require a drone that is customizable so that they can use it for their specific research needs.

End User

And ultimately, the end user of our product is the drone operator. The person who is flying the drone. We want to make their lives easier by creating a drone that can navigate without GPS. And we will need to ensure that our product is easy to use and intuitive.

Stakeholders

We also have some additional stakeholders that we need to keep in mind. The first is regulatory authorities whom we need to ensure that we are following all of their rules and regulations regarding drone flight. The second is the enviornmental groups who might be concerned about the impact of our product on the enviornment. And finally, we have the general public who might be concerned about the privacy implications of our product.

Problems being solved (with supporting data)

Problem 1: Overreliance on GPS

Problem

So the first problem that we aim to solve is the overreliance on GPS. GPS is a great tool, and we use it all the time. Whenever we want to go somewhere, we just type in the address and follow the directions.

But what happens when we don't have GPS? What happens when we're in a place where GPS doesn't work?

Well, we're lost - that's what happens.

Nowadays GPS is used all over the industry. From the military, to research. In fact in our research we found that current research instututions use GPS in >50% of their location based research.

Action

What we're creating is a system for a drone to be able to navigate without GPS. We're using a combination of computer vision and machine learning that will enable the drone to navigate without GPS without the need for any offboard reliance.

Result

This is gonna be a game changer. It will allow drones to be used in places where GPS doesn't work or is unavailable.

Currently the drone market is worth around $20 billion. In a study by PWC they found that the potential market for commercial drone applications is worth $127 billion. And that's just the commercial market. It'd be real cool if we could get a piece of that pie.

Problem 2: GPS Spoofing

Problem

Another problem that we have with GPS is that it is easily spoofed. GPS spoofing is a technique that allows an attacker to manipulate the GPS signal which ultimately causes the GPS receiver to report the wrong location.

New York Times reported about a British study where they found that a 5 day disruption of GPS would cost the UK economy $6.3 billion.

There was also a recent incident involving an Embraer Jet where their GPS was disrupted and they almost flew into Iranian airspace. Disasters like this can be avoided if we have a system that can navigate without GPS.

Action

Creating a drone that can navigate without GPS will help to mitigate the effects of GPS spoofing. While this isn't a plane, this entire concept of knowing where you are without the help of external systems that can be manipulated is a step in the right direction.

Result

This will help to mitigate the effects of GPS spoofing, making the world a safer place.

Value Proposition

Value Map

So the gain creators for our product is that

1.) It will utilize a sophisticated computer vision system that will allow the drone to navigate without GPS. This will allow the drone to operate safely and efficiently in areas where GPS is unavailable. 2.) Would be that it is a customizable platform that can be used for a variety of applications. This will allow the drone to be used in a variety of different industries. 3.) And the third would be that it would allow deployment of the drone in a variety of different environments.

The pain relievers for our product is that

1.) It will be equipped with a top of the line GPU and CPU that will minimize the latency of the system. This will allow the drone to operate in real time. 2.) Also, the sophisticated computer vision system will reduce the risks of accidents.

Customer Profile

Our customers can expect a significant improvement in both safety and reliability thanks to the advanced technology that we are using. It's a system robust against GPS challenges like spoofing and jamming. And it's a system that can be used in a variety of different environments.

It'll serve as an ideal testing platform for research institutions. And it'll be a great tool for commercial enterprises like Amazon and Google who are looking to use drones for delivery.

Competitors

Our competitors are the other companies that are working on autonomous navigation systems. And there are a lot of them.

For example there's this company called Honeywell who's developing an autonomous navigation system that's being used for the military. For them, instead of using a SLAM system to map the enviornment like we are, they're doing this thing called the map technique- where they essentially use pre-existing map imagery and compare it to the imagery that they're getting from their camera. And they're using this to navigate.

We also have competitors like Asio, and DJI. They use a variety of techniques including SLAM.

Invention/Innovatoin and IP Filing

This product would be considered an innovation. Computer vision and machine learning are not new technologies. Neither is this whole idea of an autonomous drone. However, we are combining these technologies in a new way to hopefully create a product that is better than the competition and unique in the market.

As for IP Filing - we haven't considered that a possibility yet. It's doubtful that we will be creating a product that is unique enough to warrant a patent. However, if we do create something that is unique enough, we will definitely consider it.

Project Scope

So the scope of our project is to create a drone that can navigate without GPS. We will be using a combination of computer vision and machine learning to create a system that can navigate without GPS. Specifically, we will be using SLAM to map the enviornment and then we will use that map to navigate.

We won't be designing the drone for any particular purpose like combat, but rather we will be focusing on the navigation system. At least for our initial prototype. We'll also have to adhere to NJ drone laws and regulations. Our progress hinges on effective communication with our sponsor, a $10,000 budget, and timely receipt of reliable components.

The deadline for this project is May 2024. And we have to complete it with our given resources and staff.

Obviously there are some risks. Some that we have identified with a high probability of occuring are 1.) The fact that we have other academic commitments that might interfere with our project. 2.) The possibilty that there are software bugs that might occur that will delay our project.