FARMERS EDGE CASE STUDY ISAIC

ISAIC
Industry Sandbox & AI Computing

THE BACKGROUND

About the company, their experience with AI/Compute and how long they've been in business.

Farmers edge started in 2005. Focused on Precision agronomy services. Variable rate technologies to maximize ROI. It allows you to apply less fertilizer where it is less needed to optimize business.

In 2015 they got into data drive, analytics. Started collecting field centric data (Weather data, historical data) across Canada and the US. now 5 countries.

They started hiring data scientists in 2017.
To unlock some of the value in the data, and get into prediction. Predicting soil nutrient levels. Optimal fertilizer amounts.

Expanded into predicting crop fields which is useful for insurance, rotation planning etc.

We have been getting into satellite imagery. To automatically identify clouds and cloud shadows in satellite images, which is critical because we run downstream analytics on those masked images.

We can then detect when crop health has changed. We run high value analytics downstream.

Loren was able to produce a new model that masks images with even higher accuracy than we get from the satellite image provider themselves (for our application).

So we continue to look at satellite images of farm land, what crops are being grown there and predict early on in the season how the crop is doing.

This is a snapshot of the kinds of things that Farmers Edge is doing now.

Anything where imagery comes into play, imagery is very information rich.

We need large computing and storage resources to be able to handle those projects and that's where ISAIC has come in and really accelerated our efforts.

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Book a discovery call with us at support@isaic.ca

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THE USER EXPERIENCE AT ISAIC

It was very simple. Very easy to make use of a variable number of GPUS to make our experiments run faster. It's a very streamlined way to get up and running, compared to using one of the big name cloud providers.

Formerly we were using a cloud provider (big name) at a significant cost. Those providers tend to have a multi-tiered pricing model, where you can pay a premium to have dedicated access on demand, or you can pay a discount rate to use whatever resources are available at the moment, and they may or may not be available.

Whereas at ISAIC, our machine is dedicated to us and we can access it when any time we need it.

WHY ISAIC?

(Early users)Edmond Lou (professor) connected us to ISAIC, he approached Farmers Edge and it was a perfect fit. We had not invested too much into any other cloud provider before our project was ramping up and then the opportunity to work with ISAIC presented itself.

WHAT DOES THE FARMERS EDGE TEAM LOOK LIKE TODAY?

7 people now. A couple senior developers, junior developer, and a couple data scientists. Software development/ML. Other developers who have a deep knowledge of m/l classical stats background. Diverse team.

Not currently working with co-op students or Mitacs students, but looking into that in the future for projects. We spent the last year building a lot of our data infrastructure, and were in a better place where we can do analytics a lot more easily without spending weeks and months collecting data first.

WERE YOU FAMILIAR WITH THE ONBOARDING PROCESS? HOW DOES IT COMPARE WITH OTHER OPTIONS?

One of the things you are faced with with a big cloud provider is that they provide too many options and choices, services and cost structures that are complex. For running experiments it is nice to have simple access to a very powerful machine. An extension of your own desktop but much more powerful. It was easy to use.

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WHAT KIND OF PROJECTS DO YOU USE ISAIC FOR?

We do primarily R&D. Then we produce the models which the company and customers make use of. We have an R&D focus.

THE IMPACT

WHAT ARE THE COST SAVINGS IN COMPARISON TO A LARGE CLOUD PROVIDER AND ISAIC?

Hundreds of dollars per month for comparable service.
It has saved us hundreds if not thousands of dollars in cloud computing costs on our project and it has definitely saved a non-negligible amount of hours in time (labor) because we do not have to babysit (administrate) it constantly.

For a three months project it saved weeks. It probably would have taken me 20% longer. We could have scaled up our big-name provider resources to match ISAIC, but the cost of those things doesn't scale linearly with the amount of computing power. It would have been very expensive.

It has certainly contributed to our sales, but also to business partnerships. A lot of the partnerships for Farmers Edge are around things like imagery & the analytics we can offer for industry in this area. *There has been an impact.*

WHEN A PRODUCT GOES LIVE FOR PRODUCTION, DOES THAT GET TRANSFERRED TO A LARGE CLOUD SERVICE PROVIDER?

We use ISAIC to develop the model. For production we transfer to a large cloud provider where they can be deployed on a large scale.

If we ever had a model that has a large batch of predictions once a year it would make sense to run it at ISAIC. There may be a use case for recurring model training to happen at ISAIC.

Processing images is the use case that we needed ISAIC for originally, but the ease of access and affordability allows us to use it in other scenarios.

FUTURE USE AT ISAIC. HAS WORKING AT THE HUB MADE WORKING ON MORE PROJECTS POSSIBLE?

Having the dedicated machine that is always ready to use makes more possible.
We have used it for things outside of our main project. Our team was able to run a lot of experiments that may have not been so simple to log on at ISAIC and running the tests. It allows us to go in when we do want to try something and test it, and it's simple. Low barrier to using it.

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CONCLUSION

HOW CAN ISAIC HELP BUSINESSES LIKE THIS? WHAT WOULD YOU SAY TO OTHER COMPANIES CONSIDERING USING ISAIC

The value has been the cost savings and having the machine being dedicated to us and accessible when we need it has provided a lot of value to us. You don't need much expertise or familiarity with how to use the services, it is very straight forward. If you know how to SSH into your computer...which is something that you know coming out of University then you can use ISAIC. To get up to speed on a big cloud provider you need to train and learn about their products and how to use them. Less training required to get started.

I would be able to easily recommend ISAIC to a friend at another company as an easy way to solve a problem that they have. Without a need to sort of get a lot of buy in from their company on how to spend time on ramping up for google or amazon.

WHAT DO YOU WISH YOU HAD KNOWN BEFORE YOU STARTED WORKING WITH AI?

I am still learning a lot day to day. It is important to know where NOT to use AI. Everyone wants to use it even if it is not the right tool for the job. You don't always need an AI solution. I did not have an AI background. I spent time and several months doing courses on AI and how to write good software, and still not as trained as someone trained in AI.

AI can not be used in isolation like there is still a lot of conventional software practices that have to be built around it to get it into a real situation where it can be used practically. I wish i had known that earlier on.

To do AI well, there is no substitute for experience. It helps to partner with hands on expertise.

When it comes to companies that want to get started with AI It starts with what data sets you have access to. You can only solve a problem with ML if you have a data set for it. That is an important consideration for businesses. The data sets are where the value is.

The other issue is the reproducibility issue. The concept is that you do a bunch of experiments and you make a model but 6-12 months down the line it is no longer accessible or reproducible. If you apply software engineering principles to AI development you can avoid SOME of the reproducibility pitfalls.

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FEEDBACK AND INSIGHTS FOR ISAIC /FUTURE ML DEMAND:

The demand pattern for machine learning is not a constant demand. It's spiky. You do an experiment and then you sort of what the experiment to be finished as soon as possible. So, the ideal case you could have as many GPUS as you wanted and make your job run very quickly. You don't have to wait for it to finish. I could see customers wanting a large amount of GPUs for a short amount of time.

For our case we enjoy having dedicated GPUS available all the time. But we could be in a similar situation if we said we have to train a large data set and 4GPUs is not nearly enough. We may need 24 GPUs temporarily. This would be a great value and service to offer at ISAIC.

If there is a middle ground that is provided that would be best. Scheduled access that is easy to submit and be approved.

IF TIME PERMITS, PRESENT AI ADOPTION FRAMEWORK AND ASK THE INTERVIEWEE TO VERIFY IF IT ALIGNS WITH THEIR ADOPTION JOURNEY.

Previously to working at Farmers Edge I did work at a brand new company that was adopting AI. Aspects of all these things happened. Not all in this order. It was a mish mash of all of this happening at once.

Back in the 90's there were a bunch of researchers looking at what the data mining process should be, and they came up with flow charts that look very similar to this one, but they always would have feedback loops from every step to the previous step to show that you know when you try to deploy the model you might realize that your data platform cannot actually handle this use case, so you go back a step.

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1 STEP ONE

Yes, that is good and that is what we did. We reached out to profs and experts to try to plan with what we could do with AI.

2 STEP TWO

There are different ways that AI is deployed in production. Sometimes you may need a data platform because the data is an ongoing part of the ML. With Netflix it continually learns what you click on and what you watch. SO, it needs that data platform to always process your data. Other applications, data might be more static and may be more of a one-time thing, or an infrequent thing, where you may not need a huge platform around the data.

3 STEP THREE

Execute AI project. That is probably more of an ongoing iterative thing. It is never really going to be as good as the company wants it to be, and there is always room to improve and push it further. So maybe you could put some type of feedback loop or iterative step in there.