GeneXus and Artificial Intelligence

By Breogán Gonda | August 2020

GeneXus™

· GeneXus and Artificial Intelligence [1]

GeneXus and Artificial Intelligence have worked together since 1984 in our labs, building and enabling the evolution of GeneXus to always remain on the cutting edge.

By Breogán Gonda [2]

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[1] In this paper, the word "we" is frequently used. With this word we sometimes refer to experiences or developments of the author, or of Nicolás Jodal, or both, but in general it should be understood that we refer to experiences or developments of our team. The strength of GeneXus lies in this team, especially in the generous and often anonymous work of its members.

[2] Engineer, Researcher, Co-founder and Chairman of the Board at GeneXus.

· The Genesis of GeneXus

From the beginning, in 1984, Artificial Intelligence has played an essential role in the creation of GeneXus.

Our initial purpose was to **"automate everything that could be automated."** How? By providing it with intelligence to perform increasingly more important tasks automatically, such as:

- Extract and systematize the knowledge contained in the data, formulas, rules, and other elements of data views.
- Automatically build the normalized data model.
- Allow developers to define redundancies in the database and automatically write the additional rules needed to maintain those redundancies.
- Automatically generate and maintain, for the platforms selected (Hardware, Operating Systems, Database Management Systems, Programming Languages, etc.):
  - Database creation programs.
  - Database reorganization programs (structure and content)
  - Application programs, apps, etc.

Since its release in 1989, GeneXus has greatly evolved, both by improving on itself and by always supporting all the leading platforms.

In addition, from the beginning there were questions that we asked ourselves and that, above all, clients and prospects asked: Where is the limit? What can and can't GeneXus do? What has been the result?

For the past 30 years, we –as well as our clients and partners– have faced an ever growing, ever changing, ever more demanding reality.

Today, we have about **9,000 clients distributed in more than 50 countries** and many hundreds of partners whose business is to develop with GeneXus their own products and/or customized solutions for their clients. What type of solutions? The necessary ones in each case. Of what size? With what transaction system? For what size of clients? In general, these systems...

What can we say about them? Their diversity is immense, endless. For example, some GeneXus clients have huge systems involving several hundred million instructions that work perfectly, and it would simply be impossible to develop them manually due to the high costs in terms of money, time, and errors.

So, what is the limit? What problems can we solve? So far all those faced by our clients, but some will say that the accumulation of successes does not prove generality.

If we can describe something accurately with GeneXus, then GeneXus can automatically generate and maintain everything that is needed

Once again: Where is the limit? The limit is set by us humans; it's a lot more about not daring to do something than about not being able to do it! The limit lies in our ability to understand and then accurately represent reality!

The sky is the limit!

· The Evolution of GeneXus

From the beginning, we created mechanisms so that using GeneXus was future-proof, and since its release, for everything we manage to describe accurately, GeneXus automatically generates and maintains everything necessary (databases, programs of all kinds, etc.).

GeneXus works with pure knowledge, without any physical implications, and none of its descriptions depend on elements of the technology running it.

We only use the platform at generation and execution time.

Why is GeneXus future-proof?:

When some of these elements change, GeneXus is modified accordingly (it is our responsibility to do so).

The knowledge acquired by the client through GeneXus during the application development process remains valid and doesn't need to be modified.

Then, taking that knowledge and its own update, GeneXus automatically generates the new executable version of the system.

In short, GeneXus cannot be separated from Artificial Intelligence because it is embedded in its roots and its essence.

Our use of Artificial Intelligence started with GeneXus, but it doesn't end with GeneXus.

In 1985, when we were taking our first steps, a number of companies with very substantial human and financial resources were developing "Expert Systems," mainly for diagnostic areas, using, like us, Artificial Intelligence methods and tools.

All of us who were engaged in that race resorted to the knowledge provided by experts in the domain of the problem to be solved.

It seemed like a good approach, and there were initial successes. But soon it would become increasingly difficult, with costs rising sharply and the expected results not being achieved.

We could clearly see the challenge, because the experts in the domain of the problem (creating business systems) were also Nicolas and me.

Finally, we arrived at the conclusion that this approach is only useful for very small expert systems, because it has a big problem: The knowledge of human experts is limited and not free of subjectivity.

This is not a good approach! Knowledge has to be extracted, it has to be pulled out of the data! In 1985 we changed to this new approach.

What happened to the others? Some kept trying, others went bankrupt, and others stopped to think, to look for different approaches.

In 1989, we launched the first version of GeneXus. It was a plain version, but it performed the essential tasks: for everything we managed to de-scribe correctly (which was not yet 100%), GeneXus automatically gen-erated and maintained the necessary execution elements.

We have gradually improved GeneXus, always adapting it to the most advanced execution platforms available and never losing sight of our purpose: to automate everything that can be automated.

· GeneXus Today

Everything has changed so much in these 30 years. Today's systems are different because they have to be increasingly more complex internally in order to be more user-friendly; also, they are much more critical, and everything is much more urgent.

Time passed, and there were about 20 years of darkness for Artificial Intelligence. But in the last 15 years some major players in the Western world (Google, IBM, Microsoft, SAP, Amazon, etc.) and others from the rest of the world, mainly from China, began to achieve remarkable success in the fields of **Machine Learning and Deep Learning.**

Somehow our paths converged. Nowadays, we all extract or "pull out" the knowledge contained in the data!

The Deep Learning research market is reserved for very large companies, because of the enormous investment in human resources and funds needed to take part in it.

But will these companies, on their own, be able to cater to a huge and varied market, made up of businesses of all types and sizes?

GeneXus has a unique and highly advanced technology for building and supporting business systems. Many of our clients need to add Artificial Intelligence components to these systems, and while many of these components are quite simple, others are rather complex.

Some clients have asked us to build the necessary Artificial Intelligence components with GeneXus to add them to our GeneXus systems. These first clients want us to build those components, as appropriate, using Artificial Intelligence software from SAP, IBM, Microsoft, Google, and Alibaba.

We're working on it.

· Some Final Thoughts

Someone will say "These people do very different things!"

On the one hand, they use Artificial Intelligence as something essential that is part of the "soul" of GeneXus.

On the other hand, they add Artificial Intelligence components to operate at runtime in their clients' systems.

That's what we're working on now! We are "problem-solving" engineers! What will we do in the future? Whatever our clients need.

However, there are things that do not change and we can gladly see that the purpose we started with more than 30 years ago still guides us every day: **"To simplify software development, automating everything that can be automated."**

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