

An Innovation Funnel for Machine Learning Projects

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ABSTRACT

The innovation funnel is a popular tool in the project management world that allows a team to track numerous projects at various levels of maturity and imposes a well-structured operational model to integrate them into the main product. It is characterized by stages and gates [1]. Projects can only move to the next phase if they have passed the criteria defined by the gates. These stages and gates can be defined based on where the funnel concept is being applied.

For instance, one funnel can have incubation, inception, production, and transition as the stages and identification, business, market and engineering gates. When a new idea is identified (passes the identification gate), it enters an incubation stage where a proof of concept is implemented. If there is a business need for this idea, then the idea can be turned into a project and moved into the inception stage where more experiments can be performed to verify viability, mature the implementation, etc. Next, the project must pass the market gate where the interest of possible buyers is gauged and a market is defined for the project. At that point, the project enters the production stage where more emphasis is placed on turning the proof of concept into a fully functioning product (or integrated within an existing product) that can be released to business users for beta testing. Finally, if the beta release goes well, the project passes the engineering gate where the technology is transitioned to an engineering support team that takes over the feature which is now integrated into the product.

Applying the innovation funnel to machine learning projects may not be as straightforward. Many challenges arise when attempting to marry traditional software development operational models with machine learning development. One such challenge is estimating the time it would take to implement a proof of concept in the first stage. Machine learning development tends to be iterative and can take anywhere from weeks to months depending on how well the model performance with the initial parameters. Another challenge relates to data scientist or machine learning engineers and software developers not seeing eye to eye or being able to see the other person's perspective when it comes to collaborations. Machine learning is a probabilistic software system that doesn't behave predictably; software developers expect predictability and reliability, spending a lot of time crafting test to ensure the system behaves as expected. If not designed carefully to account for the probabilistic nature of machine learning, these tests may fail frequently causing software developers a lot of anguish. In this talk,

we discuss some of these challenges and possible ways to mitigate them or resolve them to create a more machine learning friendly innovation funnel.

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1 APPENDIX

Relevance Our talk relates to "Collaboration with product development" under "Managing Machine Learning Projects" from the CfP. Specifically, we discuss how to structure the collaboration between research and product business units to more organically drive innovation into the product especially when that innovation is based on machine learning technology.

Discussion Points. There are many points to discuss including but not limited to: how to structure research and product collaborations; how to align research processes with product processes; challenges of fitting AI into traditional software processes and others.

Company and Project Portrait. IBM Research is an industrial research lab with over 3000 researchers in 17+ labs around the world developing advancements in AI, quantum and many other fields within IBM, a multinational technology corporation. The talk draws on the authors' experience collaborating with product teams on multiple AI for automation in business enterprises.

Main Presenter Bio. Vatche Isahagian's research spans a broad set of disciplines across distributed systems, AI, and business processes. As a research staff member at IBM Research, he worked on several projects including business process insight and service composition, OpenWhisk large scale Serverless Computing framework, and the IBM Deep Learning as a Service. He currently co-leads a team of researchers focused on improving business processes using AI capabilities such as planning and conversational interfaces. Vatche has published in top-tier conferences such as CACM, BPM, AAAI, KDD, VLDB, SDM, and INFOCOM. He co-organized several workshops, and served as a program committee member, demo co-chair, and publicity chair on several conferences.

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