Volvo PATS project brief

This project brief is an initial outline, and the information does not constitute a final project plan. Rather, it is meant as a brief to set the overall project aim and spur discussion among the project participants.

Context

The Volvo PATS (Predictive Analytics for Technological Success) project is a collaboration between Volvo Car Corporation, UC Berkeley, Chalmers School of Entrepreneurship (CSE) and Sahlgrenska School of Innovation and Entrepreneurship (SSIE) to be performed between October 2017 and June 2018. Together, the actors will tackle one of the most complex issues in the field of technology management.

Background

While an increasing speed of technological change can be seen across many industries, it is extra prominent in the automotive industry where technology fields like autonomous driving and electric vehicles disrupt the very core of what used to be a linear development process. These fast changes bring increasingly difficult questions to incumbent actors, and companies like Volvo have to continuously adjust their technological offerings to stay relevant. But how should they choose which technologies to invest in and which to scrap? For instance, will there be a standard for electric vehicle charging, and if so, will it be cordless? Which sensing technologies are likely to be most used in autonomous cars ten years from now?

Experts continuously try to predict the future, but studies have indicated that they may be just as biased as, laymen (see “On the Accuracy of Predicting Breakthrough Technologies” by Funk, 2014). On the other hand, recent progress in the field of Machine Learning coupled with vast amounts of available patent data creates new opportunities. Where correlations might be invisible to the human eye, machine learning-based methods have proven themselves effective in identifying valuable patterns. Can such methods assist Volvo in making the right decisions when entering a new automotive era?

Project aim

The main project aim is to develop a decision support system for predicting technological success using patent data.
Project outline

The project will consist of two phases; a pre-study phase to be performed from October to Christmas 2017, and an execution phase to be performed from January to June 2018. The pre-study phase will aim to define how the project should be executed, i.e. what data should be used and how that data should be acquired, analyzed, and presented. This will then be used to outline a project plan for the execution phase. In order to assess the feasibility of our proposed plan, it would also be good to perform some small-scale testing of crucial parts of the system.

Pre-study aim

The pre-study phase will be exploratory to get a better understanding of the project and to build a foundation for the execution phase. Below are some aspects and questions that might be useful to ignite a discussion.

1. Defining terms needed for the analysis
   ○ How should we define terms like technology and technology success?
2. Understanding the field of predictive analytics
   ○ How do experts predict technology success today?
3. Understanding how an inductive, ML-based approach could be used to make predictions about technology success
   ○ When it comes to electric vehicles and autonomous driving, what level of aggregation should we use when predicting a technology’s success? E.g. should we look at batteries or cathodes?
   ○ Should we look at patents on an aggregated or individual level? Or both?
   ○ Should other data sources be used? Publications? News articles?
   ○ When analyzing a technology, how might we group patents belonging to the technology? E.g. generating keywords, IPC classes, etc.
   ○ What data is needed to assess if a technology is a success or not?
   ○ How could we find the necessary training data? Supervised learning methods would require some kind of labels on previous examples as “technology success” or “technology failure”, but labeling this manually will most likely be too time-consuming to reach an adequate amount of training data. Perhaps there is some way to perform this using unsupervised learning?