

Using Prediction Markets to Motivate Public Participation in Patent Examination

[Extended Abstract]

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ABSTRACT

The United States Patent and Trademark Office (USPTO) is overburdened with a large volume of patent applications while having limited resources to conduct patent examinations. The patent examination process is too long and the quality of issued patents is questioned by the public. I propose to alleviate these problems by setting up prediction markets for each pending patent. In these prediction markets, traders buy and sell bets for the outcome of the patent examinations. These proposed prediction markets can create social value in two ways. First, they generate forecasts about the likelihood of the pending patents being granted. Before the USPTO completes the examination, decision makers in need of information about the outcome of the patent examination can use these forecasts to make strategic decisions about research and development plans, or investments in the technologies being patented. Second, our proposal creates explicit incentives for public participation in the patent examination process. The proposed prediction markets reward traders with insights into the pending patent, potentially motivating traders to independently perform prior art search — a central task in evaluating patentability. The USPTO can then collect these prior art for reference by giving small rewards to traders who submit relevant prior art.

Categories and Subject Descriptors

H.4 [Information Systems Applications]: Miscellaneous

General Terms

Design

Keywords

Intellectual Property, Patent, Markets

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1. INTRODUCTION

The patent system was set up to foster innovation by granting the inventors exclusive rights to extract monopolistic profits from their own inventions for a limited length of time (Article 1, Section 8 of the United States Constitution). Fundamentally, the patent system was based on the premise that patents were truly “inventions” that deserve such privilege. If a patent which was not truly innovative was granted by the USPTO, the system would impose a dead weight loss of efficiency on society due to the unjustified monopoly. Over the recent decade, the USPTO’s performance in patent examination has come under sharp criticism, especially the long delays in the examination process and the low quality of the patents granted.

Patent examination takes a long time, and the time it takes has increased in recent years. In the last fourteen years, the average pendency — the time in months from filing to either issuance or abandonment — has been above 18 months. In 2008, the average pendency across all technological fields reached 32.2 months. In the field of Software & Information Security, it has reached 42.4 months — more than three years.¹ The long pendency of patent examination exacerbates the patent hold-up problem, which occurs when a firm has invested in developing a technology before it discovers it infringes on another firm’s patent. As patent examination has been largely a secret process in which only the examiners and the applications are involved, the longer the pendency, the more likely that a hold-up problem will occur. Increased pendency also leads to high damages to the firm being held-up.

There have been controversies over the quality of some high-profile patents. A well-known one was Amazon’s one-click shopping cart patent (US Patent 5,960,411), which was granted by the USPTO in 1999[13]. One possible reason for the decline of patent quality is that the USPTO is inundated with patent applications and has limited resources. The USPTO receives about 1,000 applications every working day [7, Ch. 5]. Each patent application receives about 20 hours of attention on average from its examiners [12, 2], sometimes as little as 8 hours [7, Ch. 5]. Further, patent examiners face particular challenges in identifying non-patent prior art, due to their lack of participation in the scientific community, thereby not being up-to-date on where the latest inventions are published [17].

¹These data are published by the USPTO.

2. PUBLIC PARTICIPATION IN THE PATENT EXAMINATION PROCESS

Various reforms of the patent examination rules have been suggested [19, 18, 7], most of which require a long time to take effect. Entities other than the USPTO have initiated projects to bring the public into the patent examination process, achieving varying degrees of success. A few examples are BountyQuest (2000 ~ 2003), Wikipatents (wikipatents.com) and Article One Partners [15].

My proposal is built on Peer-to-Patent (P2P), a pilot project launched by the USPTO in 2007, to harness the “wisdom of the crowd” to identify prior art for pending patent applications. For each patent application published on P2P, anybody can post prior art or vote for the most relevant prior art already posted. Four months after the listing of a pending patent on P2P, the USPTO collects the submitted prior art and considers them in their examination process. P2P achieved moderate success during its first year [1]. The first 27 patent examination decisions issued during the pilot phase showed use of P2P submitted prior art in nine rejections. Also, non-patent prior art was submitted to the patent office through the P2P site, compensating for the lack of expertise on the patent examiners’ part on non-patent prior art search.

P2P has not gone without criticism [4, 5], particularly about the incentives to participate in this community. Currently P2P relies entirely on members’ altruism to voluntarily contribute prior art, which is not a robust type of incentive. Especially for experts in specific technological fields, the opportunity cost of time can be high.

3. CREATING PREDICTION MARKETS FOR PATENT APPLICATIONS

I propose to implement a prediction market for each pending patent application. Such markets will reduce the long pendency problem by providing early assessment of the likelihood of issuance of the patents. More importantly, they will improve on the P2P project by creating explicit incentives to participate in the prior art search.

In a prediction market participants trade securities whose values depend on the outcome of future events. A prediction market for a patent facilitates trades on the security based on the USPTO’s action on that patent. Prices in such markets fully aggregates all individual traders’ private prediction [14], and reflects what the market as a whole “thinks” the probability of the patent being issued is.

Prediction markets’ advantages in aggregating multiple individuals’ private predictions have been demonstrated in a large number of markets. The Iowa Electronic Markets (IEM) consistently outperforms opinion polls in predicting the two-party vote shares of U.S. presidential elections [3]. In corporate settings, prediction markets outperform traditional forecasting methods such as face-to-face meetings [6] and surveys [8].

3.1 The thin market problem

Thin markets are markets in which only a small number of buyers or sellers are willing to transact at any given time.

As a result, the market price may not reflect the true relation between supply and demand. My proposed prediction markets are likely thin markets, due to which the accuracy of their predictions might suffer. First of all, a large number of patent applications are filed to the USPTO each year [7]. There may be a large number of markets on the same site simultaneously. It is likely that each market receives a small number of trades. Second, most patents are in specialized fields, in which only a small number of experts have sufficient insights to participate in trading. Third, knowing there might be expert traders in the market, non-expert traders may hesitate to participate for fear of loss.

To avoid the thin market problem, I propose to implement the prediction markets using the market scoring rule (MSR) format, proposed by [9]. MSR based prediction markets solve the thin market problem by having a market maker — an automated trader who is ready to trade with anyone at any time. Even if there is only one interested trader, she can still trade with the market maker, and her private information can thus be elicited. This property is desirable in specialized markets in which only a small number of experts participate, such as our patent markets.

3.2 Submitting prior art

To encourage traders to submit prior art that they have discovered, I propose to augment the prediction market with a channel which allows submission of prior art. If someone already has found some prior art, it costs her very little to share it. The main incentive for conducting a prior art search comes from the potential to profit in the prediction market. Individuals can then be offered a small lump sum of money for sharing the prior art they have already found, if their contribution is cited by the USPTO.

This lump sum monetary reward may not even be necessary. Individuals can benefit from submitting the prior art they have discovered. Presumably, if an individual has discovered a useful piece of prior art, she would be trading toward the direction that the patent will be invalidated. If she submits the prior art she discovered, there is a higher chance that the USPTO will invalidate the patent, hence increasing the chance that she will profit in the prediction market.

4. IMPLEMENTATION ISSUES

A few issues remain to be considered before my proposed prediction markets can be implemented.

- **Manipulation.** Competitors of a patent applicant or the inventors themselves may try to manipulate the market price to influence the final patent issuance outcome or to misguide each others’ decisions on research and development activities. Both theory and empirical evidence have show than attempts to manipulate the market would only hurt the accuracy of the market predictions temporarily, because the presence of manipulators creates opportunity for legitimate traders to profit [10, 11].
- **Disclosure.** Some may worry that should a patent fail to be granted, disclosure in a prediction market would have given competitors opportunity to steal the invention. This worry is unfounded [16]. Currently, patent

applications are published after 18 months, granted or not.² Further, patent protection applies retrospectively to the date of invention. Thus whoever tries to steal the technology in the review process runs the risk of being sued for infringement should the patent be granted.

5. SUMMARY

In this paper, I propose to build a prediction market for each pending patent application, to alleviate both the pendency and the quality problem of the patent examination process. Prediction markets are markets in which traders buy and sell bets for the outcomes of future events. In our case, these future events are the issuance or abandonment of the patent application. These prediction markets generate an aggregated prediction for the likelihood of each pending patent being granted, before the USPTO makes a decision. It can reduce the occurrence of hold-up problems and can also help in incentivizing the public to participate in the prior art search, thereby increasing the quality of issued patents.

6. REFERENCES

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²The Administrative Procedure Act ("APA"), 5 U.S.C. §553.