

## The CrowdJury, a Crowdsourced Justice System for the Collaboration Era

By Federico Ast (@federicoast) and Alejandro Sewrjugin (@asewrjugin)

### ABSTRACT

Jeremy Bentham and James Madison built the 18th century institutions on the hegemony of three actors: court system, postal service and uncensored newspapers. The postal service and newspapers were heavily affected by new ways of doing things because of the digital revolution. In this paper, we propose CrowdJury, a framework for court processes of adjudication adapted for the blockchain era. It combines the advantages of crowdsourcing and blockchain to create a system of justice both transparent and self-sustained. CrowdJury seeks to lay down the principles for a p2p court system based on collective intelligence.

[crowdjury.org](http://crowdjury.org)



**Ekklesiasterion.** Where the Greek Assemblies met.

### The justice system as an epistemic engine

*“Acquitting the guilty and condemning the innocent—the Lord detests them both”. Proverbs 17:15.*

**Jerome Facher:** *What's your take?*

**Jan Schlichtmann:** *They'll see the truth.*

**Jerome Facher:** *The truth? I thought we were talking about a court of law. Come on, you've been around long enough to know that a courtroom isn't a place to look for the truth.*  
*A Civil Action, 1998.*

A court process is an epistemic engine, a tool for ferreting out the truth about some event that happened or did not happen from a confusing array of clues and indicators. There is a procedure (judicial process) where an agent (jury) uses some input (evidence) to produce an output (verdict). The truth value of the verdict is dependant on such variables.

$P(\text{VERDICT IS TRUE}) = F(\text{JURY, EVIDENCE, PROCEDURE})$

In medieval trials by ordeal, inference of guilt of the defendant was based on his ability to pass some Monty Pythonesque challenge such as surviving for 10 minutes under water. If he died, it was considered proof of guilt. If he survived, it meant God had saved an innocent man. Truth sensitivity was obviously very low.

In the 12th century, juries were invented in Great Britain. Jurors performed the triage of facts, interpreted the law and settled questions of guilt and innocence. They were allowed to interrogate whoever they wished. While it was an improvement over trials by ordeal, the system was still severely flawed. Many trials lasted less than 10 minutes, too little for data collection and analysis, and torture was considered a legitimate method to extract a confession.

The Enlightenment brought nation state judicial systems, professional prosecutors and defense attorneys. A whole body of literature concerning evidence and proof was created. Rules established what sort of testimony a jury could hear, who could testify and what sort of evidence was valid.

While this was an improvement over medieval trials, there were critical voices. Jeremy Bentham argued that the system crafted by judges formed "so thick a mist" that one cannot, if "not in trade" manage to receive justice. Bentham charged judges and lawyers ("Judge & Co.") with creating artificial rules producing a factitious system full of procedural obfuscation at the expense of their clients and the public (Bentham and Moses, 1792). Epistemologist Larry Laudan points out: "If we can briefly step away from the legal context, it is easy to see how artificial and sclerotic the system has become" (Laudan, 2006: 216).

The digital revolution enabled profound changes in many industries and institutions. Yet the judicial system was relatively unchanged.

Recent developments in collective intelligence, open government, social epistemology and the blockchain technology enable a radically different way of structuring courts, a way that is both epistemically efficient and financially sustainable. This is what we call the CrowdJury framework.

In this paper, we seek to answer the following questions: can advances in information technology be leveraged to increase the truth-sensitivity of courts? What would a judicial process look like if its fundamental concern were finding the truth with the tools available today?



**Water Ordeal.** The defendant was immersed in the river. If he drowned, it was a sign he was guilty. If he floated, it meant that God had saved an innocent man.

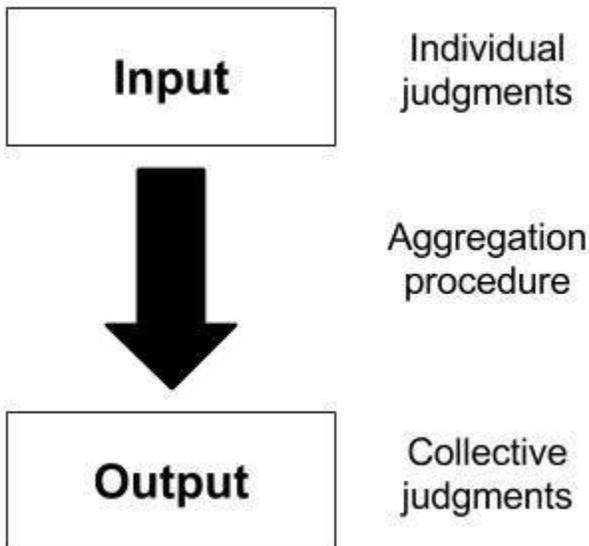
### **What the Greek knew about justice**

Bentham argues that publicity has three desirable features. First, it helps discover the truth. The wider the circle of dissemination of a witness's testimony, the greater the likelihood that a falsehood will be ferreted out. Second, it helps education. If trials are public, judges and lawyers feel compelled to explain the reasons motivating their actions. Third, feeling observed by the public increases the discipline of the judges. Transparency is the main guarantee against corruption and manipulation (Resnik, 2011).

Bentham wanted to place lawmakers and judges under public scrutiny. He suggested legislature buildings should be almost circular, with the shape of an amphitheater. Bentham wanted to enlarge the audience by facilitating the flow of information to persons not physically present. The only exceptions allowed for the publicity principle affected cases with overriding privacy concerns. Bentham also advocated the secret ballot as a protection against corruption (Schofield,

2006). He was optimistic about the relationship between knowledge and judgement. “Publicity is the very soul of justice... It keeps the judge himself, while trying, under trial” (Bentham, 1827).

Researchers in collective intelligence have long studied how groups form collective judgments by pooling in information scattered among their members. Well organized groups can form collective judgments able to solve the correspondence challenge: did X occur? (List, Chp 9.)



Many of the Bentham criteria for an effective court system were met in Ancient Athens. Ober (2010) found that Athenian institutions were extremely effective at aggregating information among their members and making collective judgments. This was the result of fulfilling the three required conditions of good epistemic systems: low communication costs; an epistemic sorting device for distinguishing factual truth from falsity; right incentives for knowledgeable individuals to share what they know.

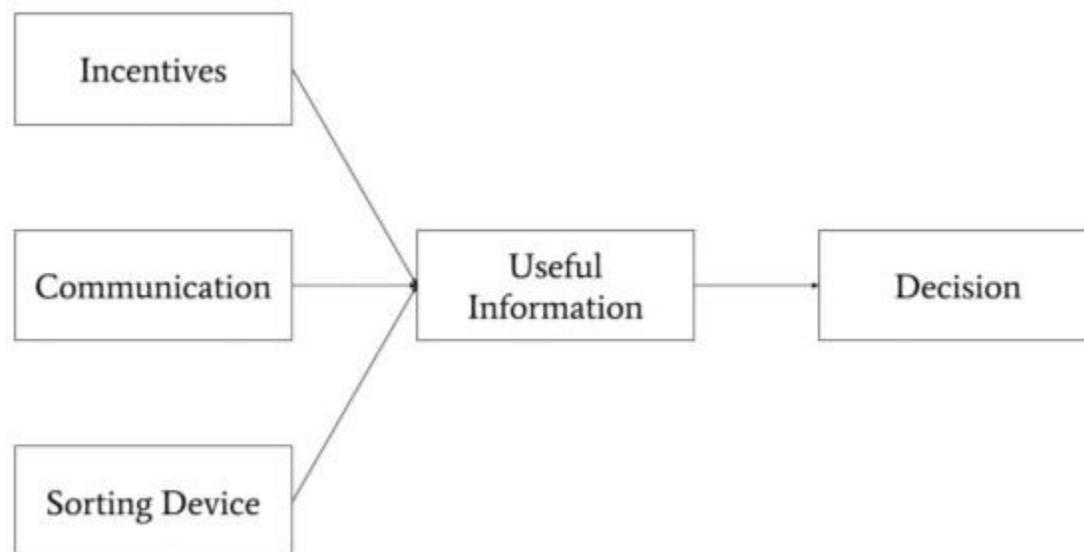
Ancient Athens popular courts had many desirable features for the epistemic quality of their judgments.

Juries were formed by tens or hundreds of people chosen shortly before the trial. A small jury could be bribed or intimidated. But it was harder to bribe or intimidate a large crowd. Jurors were selected with a randomization device called kleroterion (Κληρωτήριο), a stone block with a series of slots arranged in rows where every citizen introduced his personal identification card (called pinakia).

The Athenian system did extremely well at pooling the information scattered among individuals. It solved two key questions: How can someone who is not an expert in forensic techniques evaluate complex evidence? How can a large jury deliberate and issue a verdict?

Athenian democracy relied on reputation. The Greek Assembly met in a building called *ekklesiasterion* (ἐκκλησιαστήριον). Just as Bentham suggested, the architectural shape of the *ekklesiasterion* was optimized for each participant to see all the others and quickly find their trusted expert in each subject. This was critical for each individual citizen to decide their vote.

Athenian democracy and trials achieved a high epistemic quality because they were “fueled by incentives, oiled by low communication costs and efficient means of information transfer, and regulated by formal and informal sanctions” (Ober, 2010). In other words, it fulfilled the conditions set by Bentham for an effective court system. By allowing large numbers of people to participate, the Greek crowdsourced the court system.



The exponential lowering of computing and communication costs enabled crowdsourcing, the process of getting work done online from crowds. Crowdsourcing principles can be used for knowledge discovery and management (solving an information management problem by mobilizing a crowd to find and assemble information), distributed human intelligence tasking (mobilizing a crowd to process and analyze a large set of information), broadcast search (using the crowd to come up with a solution to a problem that has an objective right answer), peer-vetted creative production (for ideation problems where an organization mobilizes a crowd to come up

with a solution to a problem which has an answer that is subjective or dependent on public support) (Brabham, 2013).

The principles of distributed knowledge discovery and tasking, distributed human analysis and broadcasted search can be applied to an epistemic system for finding the truth about facts and adjudicating disputes. The crowd is perfectly capable of discovering and processing facts to reach a solution that has an objective answer: the wrongdoing happen/did not happen.

Recent advances in crowdsourcing and cryptocurrencies enable the possibility of developing a workflow for dispute adjudication where the collaboration of each individual to the discovery and evaluation of information is attached to a financial reward. Coins are mined and distributed by some criteria related to the effort each individual puts into fact discovery, fact checking and verdict voting.



**Kleroterion.** Ancient Athens allotment machine.

### **How the CrowdJury works**

CrowdJury is a framework which seeks to replicate online some of the functions of the court system in Ancient Athens.

## Fact Gathering

Online crowdsourced whistleblowing platforms have been in place for some time now (eg., I Paid a Bribe in India, Mexico Leaks, etc.). Citizens can blow the whistle on corrupt officials and provide evidence on wrongdoings. Global Leaks developed an open source anonymous, censorship-resistant, distributed whistleblowing platform.

Let us imagine that John is a civil servant who has discovered that his boss, the Secretary, is taking bribes from government contractors. He logs into CrowdJury and reports it. The evidence he provides (pictures of contracts he took with his phone, reports not easily available to the public, etc.) is stored in a cryptographically secure vault. This makes it impossible to be altered or destroyed. By means of some tagging mechanism (geolocalization, by public office, etc), other witnesses are invited to provide evidence. The increased number of witnesses increases the likelihood of ferreting out the truth, since solving the puzzle of a crime usually requires pooling information scattered among many individuals.

## Fact Checking

Raw data is not useful. To have an impact, it needs to be organized and curated. When groups interact with information, their members can leverage their diverse skills to transform raw data into useful knowledge. Facts will be analyzed by groups of 9 to 12 volunteers self-selected by the required expertise. They decide whether the information contained in each vault is accurate and relevant.

## Mediation

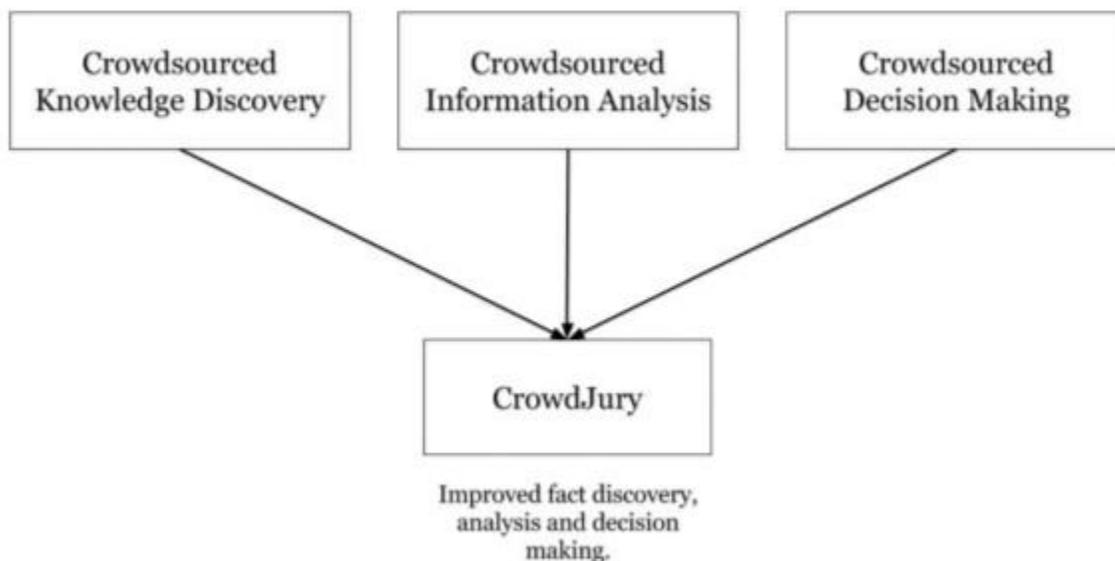
If fact reviewers conclude information is sufficiently accurate and relevant to take someone to trial, an instance of restoration is opened. Modern court systems are based on the principles of punishment for wrongdoings. Restorative justice has a different approach, based on understanding each other and forgiveness. It is important to articulate the facts, the story and the sequence of events behind the wrongdoing. If the defendant pleads guilty, he can propose a form of restoration. This is how the Athenian system worked. The defendant could choose a form of restoration. The jury could choose to accept it or not.

## Open Trial and Jury Verdict

An online trial is held with a massive jury. Whoever wishes to participate in the jury can apply. In Athens, any citizen over age 30 could apply to be on a jury on a certain day, but he could not choose in which specific case. The decision of who got to be a jury and on what case was made with a randomization device called kleroterion. So the distribution of jurors to cases was not biased by anyone's ex ante interest in a particular case. Just as in Athens, the actual jury in CrowdJury is selected by a randomization device, which mimics the working of the Greek kleroterion.

The entire trial is broadcasted online and all pieces of evidence (picture, videos, etc.) are made public to all. In the spirit of the “open courts” advocated by Bentham, anyone can attend the trial and ask questions to the defendant but only the jury can vote for the verdict.

The prosecution lays out a “theory” about a wrongdoing in which, allegedly, the defendant took part. Jurors are the finders of fact. Their job is to determine whether there was a wrongdoing and whether it was committed by the defendant. Finally, the verdict of the CrowdJury is determined by an online vote.



## Incentives

Early concerns in the Peer to Patent experiment were that no reviewers would participate or that conflict of interests would distort the process of patent review. Similar concerns affected Wikipedia. Why would users spend their time in the platform? Why would they report wrongdoings? Why would witnesses contribute with their expertise to solving crimes? Why would they spend time in analyzing evidence?

Experience in the Peer to Patent, Wikipedia and all the open source initiatives seem to suggest that people are willing to contribute with their time and expertise to projects they believe in. Contribution is an intrinsic motivation to participate. But without some kind of financial reward, it may be difficult to sustain motivation in the long run. The success of the CrowdJury approach may need deep time commitment of users to develop specific skills for online data analysis.

The right incentives could be produced by paying in Bitcoin or by issuing an altcoin (CrowdJury coin or Crowdcoin) for rewarding the users that participate in the judicial process. Bitcoin miners are paid in bitcoin for lending their computing power to the blockchain network. What if one

could mine Crowdcoints by lending time and expertise to report crimes, analyze evidence and participate in a jury?

This may align individual incentives with community welfare. Crowdcoints incentivize work for the common good. When few people contribute to justice, a higher quantity of the coin is mined by each individual contribution. Specific criteria for mining is subject to discussion. It may be affected by the amount of time each user devotes to reviewing evidence, reputation, etc.

### **CrowdJury, the Linux for a Global Court System**

*“When we first visited the Wikipedia site, we thought it was a quaint idea but honestly had fairly low expectations about the quality of the articles, and we expected to find more vandalism than on a 1980s subway car. We were wrong on both counts. First, the quality of the articles is outstanding—the vast majority are clearly written and succinct and have just the right level of depth. People take great care in making the articles objective, accurate, and easy to understand. This brings us to the seventh principle of decentralization: put people into an open system and they’ll automatically want to contribute”. Ori Brafman and Rod Beckstrom, *The Starfish and the Spider*.*

The CrowdJury framework may sound odd when compared to early 21st century trial procedures. Yet it is not very different from trial procedures used in Ancient Athens. The framework may help solving many distorting factors that affect a trial outcome. When incentives are right, the crowd can be leveraged to contribute with evidence and analysis. A single prosecutor and a small jury can be bought. It is harder to buy a large number of prosecutors and juries.

CrowdJury has the potential of helping existing governments cut costs and improve management of their court systems by leveraging the power of collective intelligence. It can also be used for conflict adjudication in political communities where court systems doesn’t yet exist, such as private cities and neighborhoods. But where it can make the biggest impact is in justice administration in global communities stretching across jurisdictional boundaries.

Online social networking transformed how people connect and collaborate across borders. Facebook is, in fact, a political community with its own laws and justice system. Companies such as Facebook, Google, Twitter and others are starting to look just like global utilities and performing functions which traditionally belonged to governments (Wettstein, 2009). CrowdJury will be the court system solution for such global communities.

Private law and courts were common in the Middle Ages, before nation states gained the monopoly of the judiciary. Lex mercatoria was a system of law that regulated business dealings among traders in the Mediterranean. It was enforced through a system of merchant courts along the main trade routes. It worked as an international law of commerce where no state law existed. Different forms of lex mercatoria exist today such as Valve’s Overwatch and eBay’s justice system that solves over 60 million conflicts a year among users from many national jurisdictions.

When compared to already existing systems of private adjudication, CrowdJury does not sound like science fiction. Valve gaming company developed the Overwatch system to catch cheaters in their game Counter Strike. Evidence analysis is crowdsourced among users from all over the world, who are rewarded by a special currency issued by Valve and useful to buy games in their platform. eBay developed a similar solution for adjudicating conflicts among their users. Facebook has its own user rules and adjudication system.

Overwatch is Valve's proprietary court solution. It's like when IBM developed its own proprietary software to run its hardware. Then came Microsoft Windows, a proprietary OS solution that worked with different hardware companies. And finally, Linux, an open source solution. The same process is likely to unravel in the court system. State court systems and Overwatch are like the software developed by each community to solve their own adjudication needs. CrowdJury seeks to generalize such principles and make them accessible to every other community in need of adjudication services.

Linux kernel is used in products such as Ubuntu and Debian. CrowdJury is the kernel to be used in crowdsourced court systems which will likely be more in need in the next years to address the specific needs of online exchanges, online gambling and global social networks.

Bentham, Madison and the thinkers and politicians that crafted today institutions on 18th century technology thought there existed three main institutions to foster discourse: the court system, the postal service and the uncensored press (Resnik, 39). Such were the tools for the circulation of knowledge, publicity and transparency. Open courts were to justice what the postal service and the press were to information. The postal service and the press were disrupted by cheaper and more efficient ways for the circulation of information. Alternatives to adjudicatory facilities have lagged behind.

CrowdJury has the potential of adapting the judiciary to 21st century digital technology and to the realities of global marketplaces, the sharing economy, the collaborative commons and private cities. It has the potential of creating a judicial process which is both transparent and self-financed.

The digital revolution enabled crowdsourcing and the blockchain, and radically different ways of structuring old institutions. While the idea of a crowdsourced judicial system may sound odd, the principles underlying the CrowdJury approach were known by the Athenians several centuries ago. If collective wisdom can write a complex piece of software and a world class encyclopedia, it can also help improve the court system.

Laudan reminds us that trials by ordeal were considered workable for centuries and so was torture as a mean to extract confessions. Neither system was very good at finding the truth. Nor is ours.

The CrowdJury framework laid out here is limited in every possible way. Yet it is a starting point for discussion on how to leverage the new technologies of collaboration for the construction of a new justice system addressing the problems of our age.

Let us not forget a famous quote by geneticist John Haldane (1892–1964) on the four stages for the acceptance of a new idea:

“1) *This is worthless nonsense*, 2) *This is an interesting, but perverse, point of view*, 3) *This is true, but quite unimportant*, 4) *I always said so*”.

**Help us build the CrowdJury! Visit [crowdjury.org](http://crowdjury.org)**

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