Recently, Roy Li was exclusively interviewed by block001.cn, expressing his views on the problems to be addressed by IoT, its integration with blockchain, applications and future development etc.

## ****□ The blockchain technology is still in its early stage; however, under strong economic drive, any small progress will lead to huge economic value.****

****Reporter from block001.cn:****From the perspective of blockchain technology itself, what do you think of the current stage of technology development? Someone said recently that, blockchain is a bubble. How do you feel?

****Roy Li:**** In terms of the maturity of blockchain technology itself, it is still in a relatively early stage. After all, this technology was not introduced until 2009, and some scattered concepts did exist before 2009, but it was in 2009 that it really entered the view of the public. By that time, artificial intelligence had already been popular for five or six decades. Relatively speaking, blockchain is still an early technology and contains many technical obstacles. The biggest problem lies in that, it will take a long time for blockchain to be fully applied into projects

Blockchain has been attached with very strong economic drive. This economic drive has resulted in that, even if the technology is not mature enough at an early stage, which does not matter, with strong economic drives, we can discount future values and wait for the infrastructure to mature.

We are optimistic about the blockchain technology in the long term, and the problems of infrastructure can be concluded. When there are sufficient research and development capabilities, we can solve them.

This is similar to the situation in the 1990s, when we used to believe that the 21st century would belong to bioengineering, or artificial intelligence, or the robot’s world, but did not expect the Internet to develop so fast. Since it has a significantly strong economic drive, people have had huge imaginative space in the economic business of the Internet, so that the Internet develops even faster than robots. In other industries, such as bioengineering and robots, etc., due to their slow cycles, we have a lot of uncertainties in our imagination of its future.

We should look at the current blockchain in two ways. Indeed, it is technically immature. Each technology should undergo a process from immaturity to maturity. However, the most important thing is that, powerful economic drive propels blockchain to become mature faster than other technologies, and any small progress in blockchain will lead to huge economic value.

## ****□ IoT contains many financial elements, and real rights may be switched and transacted through IoT****

****Reporter from block001.cn:****From the very beginning, people say that the practical application of IoT and its integration with industries are consumer finance, and its integration with IoT is rightly the best scenario. Do you agree with that?

****Roy Li:**** Finance and IoT are not in parallel, and IoT contains many financial elements. For example, equipment leasing is a kind of finance. We used to only buy a car, but now we can rent one or share one. The real right is divided, and the right to use is directly divided for sale based on the time and object of use. It is virtualized, which is, on its own, a technical innovation.

Technical innovations can be achieved through IoT plus blockchain. IoT addresses such a problem: real rights may be switched and transacted through IoT. Blockchain addresses liquidation of real rights, maintaining data consistency. For instance, you may pay and drive a car for two hours. You may pay and charge for one hour, and what comes next can be done with IoT+blockchain. Should blockchain focus on finance or something else? That depends on your return on investment. When it reaches a critical point, recognized by all on the market, the industry will naturally grow up.

## ****□ As long as IoT is related to finance, real right transaction and money, it will surely be blockchained****

****Reporter from block001.cn:**** IoT is a highly broad concept, with tons of segment industries, such as agriculture, etc. Which segment industry is most promising with blockchain?

****Roy Li:****Asset-backed securitization and supply chain finance, i.e. related to IoT and finance. For example, a power plant may generate power; an investment of 6 million into a power plant may generate one megawatt, and it may generate power worth hundreds or over one thousand yuan each day …. This power generation itself can be securitized, as an investment into a power plant. However, from the perspective of personal investment, I may think the price is excessively high. Can the investment be made by one hundred persons? It is already like this on the market. But, is so much power generated? When the power kilowatt you tell me is different from what I say, there is an issue of trust to be addressed. At investment, we can calculate its expected annualized rate of return. For this reason, as long as something is related to finance and real right transaction, or close to money, it will surely be blockchained

## ****□ Generation of trust means the generation of value****

****Reporter from block001.cn:****Can the blockchain technology be directly applied to IoT to achieve “integration”?

****Roy Li:****At first, IoT itself is quite complete. The first step of integration of blockchain with IoT is whether centralized databases can be converted into distributed databases. Do you adopt public blockchain, or alliance chain? Once data are adopted and public chains are applied, it should be guaranteed that there are large quantities of users at the terminal who are willing to be connected to your scenario.

Next, there should be many app developers willing to develop, based on your public blockchain, more interesting scenarios like those contracts related to things. Blockchain and IoT are still at different positions: IoT is just like Android in our mobile Internet, and blockchain is just like Android + mobile Internet system. How shall blockchains be stored indeed? In Oracle, or simply a centralized database for storage? Blockchains only address data consistency, instead of all the problems in IoT.

Only some data in IoT are applied in blockchains. You must guarantee its consistency if you want to solve the problem of trust among different users, parts and aspects in upstream and downstream sections in the industry. By solving the problem of mutual trust among them, you create huge values — trust is among the most valuable things among people.

## ****□ The development threshold of IoT is the highest, and what we do is to lower the development threshold****

****Reporter from block001.cn:****After your Ruff Chain project is integrated with blockchain technology, what do you expect to utilize this differential technology to continue project extension?

****Roy Li:**** Currently, our goal still focuses on enterprise-level blockchains, and this road is very long. This road is rough, but, for Ruff Chain, we can not expect quick results. At present, I do not fancy very much ideas like creating one public blockchain in half a year or one year and then turning it into a huge ecology.

To be really firm in an industry, in particular, you must have thorough understanding of it. Seeing companies offering enterprise services, many people hope to turn them into those dealing with socialization and achieve rapid growth in three months. Is that feasible? You must understand the industry. Even if you’re dealing with document management in an enterprise, you must spend one year understanding what kind of things you need to do.

What we’re doing seems relatively complex, but, it is due to the depth of the industry that there are opportunities. Without a sufficient industry depth, it may turn out to be a purely money contest or industrial merger. The IoT public blockchain has not been well created; enterprises have not input enough time. We should make real efforts, in IoT, to discover the real demand of IoT. The real demand of IoT is, currently, “things” are highly fragmented, without relatively unified standards. We desire to connect these things together, allowing for use by my applications.

Finally, I developed an app, and this product aims to provide a corresponding driver for a camera or sensor. Currently, all these technologies are not mature, or in different modes. Under such circumstances, proper integration alone would consume 80% to 90% of my energy, which is desperate. If enterprises do not realize this and rashly enter IoT, that’s quite inadvisable.

## ****□ The prerequisite for data going onto the chain is that all the equipment can access the network****

Ruff Chain spent a large amount of time dealing in access. For example, with an Android cellphone, for any screen, camera or gyroscope of any brand, I can scan a 2D code with WeChat and the camera. There is no such a system in IoT, and we’ve spent a lot of time dealing in such a wise. For security or for entertainment, a camera, being the brand of Hikvision or any other, can be called for face recognition or code scanning. Only when “offline products are uniformly abstracted” in IoT can these data go onto the chain. Otherwise, without proper abstraction, even if it is a product with extraordinary performance, how can others access you? The majority of IoT developers have no powerful knowledge of blockchain or other underlying technologies.

The world will always belong to those people “without strong technical power, but with powerful force of implementation”. We might have a look at the mobile Internet. Look at companies such as DiDi and Uber. They do not need the most outstanding engineer from Huawei; they only need the creation of product first, followed by gradual optimization — long illness makes a patient a good doctor.

Only by lowering the development threshold for developers can these things be well done. The development threshold of IoT is the highest, which requires understanding of protocols and all the knowledge. What Ruff Chain did in the past few years was about this matter, lowering its threshold. We did not encounter the blockchain technology in the past few years. We have become an industry pioneer in this field. Our knowledge of “blockchain + IoT” was not upgraded until last year.

It can not be made into ecology until it is friendly and low-sensitivity enough to developers — anyone with only one year’s work experience can develop an application of “my own IoT ecology”. Remember: it’s never ecology when there’re only big names who can do it.

近日，Roy Li 接受了block001.cn的独家专访，就物联网需要解决的问题、与区块链的融合、应用和未来发展等发表了自己的看法。

## ****□ 区块链技术仍处于起步阶段；然而，在强劲的经济驱动下，任何微小的进步都会带来巨大的经济价值。****

****区块001网记者：从区块****链技术本身来看，您如何看待目前的技术发展阶段？最近有人说，区块链是个泡沫。你感觉如何？

****Roy Li：****就区块链技术本身的成熟度而言，目前还处于比较早期的阶段。毕竟这项技术直到 2009 年才被引入，一些零散的概念在 2009 年之前确实存在，但真正进入大众视野是在 2009 年。到那个时候，人工智能已经流行了五六年了。相对而言，区块链还属于早期技术，存在很多技术障碍。最大的问题在于，区块链全面应用于项目还需要很长时间

区块链具有非常强大的经济驱动力。这种经济驱动导致，即使技术在早期还不够成熟，没关系，在强大的经济驱动下，我们可以打折未来的价值，等待基础设施成熟。

我们长期看好区块链技术，基础设施问题可以总结。当有足够的研发能力时，我们可以解决它们。

这与1990年代的情况类似，我们曾经认为21世纪将属于生物工程，或者人工智能，或者机器人的世界，却没想到互联网发展如此之快。由于具有显着强劲的经济驱动力，人们在互联网经济业务中拥有了巨大的想象空间，互联网的发展速度甚至超过了机器人。在其他行业，比如生物工程和机器人等，由于周期慢，我们对其未来的想象存在很多不确定性。

我们应该从两个方面来看待当前的区块链。事实上，它在技术上是不成熟的。每一项技术都应该经历一个从不成熟到成熟的过程。然而，最重要的是，强大的经济驱动力推动区块链比其他技术更快地成熟，区块链的任何微小进步都会带来巨大的经济价值。

## ****□ 物联网包含很多金融元素，物权可以通过物联网进行转换和交易****

****区块001网记者：****从一开始，人们就说物联网的实际应用和与产业的结合是消费金融，而物联网与物联网的结合应该是最好的场景。你同意吗？

****Roy Li：****金融和物联网不是并行的，物联网包含很多金融元素。例如，设备租赁是一种金融。我们以前只买一辆车，但现在我们可以租一辆或共享一辆。物权分割，使用权根据使用时间和使用对象直接分割出售。它是虚拟化的，这本身就是一项技术创新。

技术创新可以通过物联网加区块链来实现。物联网解决了这样一个问题：物权可以通过物联网进行交换和交易。区块链解决物权清算问题，保持数据一致性。例如，您可以支付并驾驶汽车两个小时。您可以支付和收费一小时，接下来的事情可以通过物联网+区块链来完成。区块链应该专注于金融还是其他？这取决于你的投资回报。当它到了一个临界点，得到了市场的认可，这个行业自然就会成长起来。

## ****□ 只要物联网涉及金融、物权交易、货币，就一定会被区块链化****

****区块001网记者：****物联网是一个非常宽泛的概念，细分行业很多，比如农业等，区块链最有前景的是哪个细分行业？

****李罗：****资产证券化和供应链金融，即与物联网和金融有关。例如，发电厂可以发电；一个电厂投资600万，可以发电一兆瓦，每天可以发电上百元甚至上千元…… 这种发电本身可以证券化，作为对发电厂的投资。但是，从个人投资的角度来看，我可能觉得价格过高。一百个人可以投资吗？市场上已经是这样了。但是，产生了这么大的能量吗？当你告诉我的功率千瓦与我说的不同时，就有一个信任问题需要解决。在投资时，我们可以计算出它的预期年化收益率。为此原因，

## ****□ 产生信任就是产生价值****

****区块001网记者：区块****链技术能否直接应用于物联网实现“融合”？

****Roy Li：****起初，IoT 本身是相当完善的。区块链与物联网融合的第一步是中心化数据库能否转化为分布式数据库。你采用公链还是联盟链？一旦采用数据，应用公链，要保证终端有大量的用户愿意接入你的场景。

接下来应该有很多应用开发者愿意基于你的公链开发更多有趣的场景，比如那些与事物相关的合约。区块链和物联网仍然处于不同的位置：物联网就像我们移动互联网中的安卓，而区块链就像安卓+移动互联网系统。区块链究竟应该如何存储？在 Oracle 中，还是只是一个用于存储的集中式数据库？区块链只解决数据一致性问题，而不是物联网中的所有问题。

只有物联网中的一些数据被应用到区块链中。如果要解决行业上下游不同用户、不同部分、不同方面的信任问题，就必须保证其一致性。通过解决他们之间的相互信任问题，你创造了巨大的价值——信任是人与人之间最有价值的东西之一。

## ****□ 物联网的发展门槛最高，我们做的是降低发展门槛****

****区块001网记者：****在您的Ruff Chain项目与区块链技术集成后，您希望利用这种差异化技术继续进行项目扩展吗？

****Roy Li：****目前我们的目标还是聚焦在企业级区块链上，这条路还很长。这条路崎岖不平，但对于 Ruff Chain 来说，我们不能指望立竿见影。目前，我不太喜欢半年或一年创建一个公链，然后把它变成一个巨大的生态的想法。

尤其是要在一个行业里真正的坚定，你必须对它有透彻的了解。看到提供企业服务的企业，很多人都希望能在三个月内把它们变成做社会化的企业，实现快速成长。这可行吗？你必须了解这个行业。即使您在企业中处理文档管理，您也必须花费一年的时间来了解您需要做什么样的事情。

我们正在做的事情似乎相对复杂，但是，正是由于行业的深度，才有机会。如果没有足够的行业深度，它可能会变成纯粹的金钱竞赛或产业合并。物联网公链还没有做好；企业没有投入足够的时间。我们应该在物联网方面做出真正的努力，去发现物联网的真正需求。物联网的真正需求是，目前“物”高度碎片化，没有相对统一的标准。我们希望将这些东西连接在一起，以供我的应用程序使用。

最后，我开发了一个应用程序，这个产品旨在为相机或传感器提供相应的驱动程序。目前，所有这些技术都不成熟，或者模式不同。在这种情况下，仅靠适当的整合就会消耗我80％到90％的能量，这是绝望的。如果企业没有意识到这一点，贸然进入物联网，那是相当不可取的。

## ****□ 数据上链的前提是所有设备都可以接入网络****

Ruff Chain 花费大量时间处理访问权限。比如安卓手机，任何屏幕、摄像头、任何品牌的陀螺仪，我都可以用微信和摄像头扫描二维码。物联网中没有这样的系统，我们花了很多时间来处理这样的事情。为了安全或娱乐，可以调用海康威视或任何其他品牌的相机进行人脸识别或代码扫描。只有在物联网中“线下产品统一抽象”，这些数据才能上链。否则，如果没有适当的抽象，即使是性能非凡的产品，别人怎么能访问你呢？大多数物联网开发人员对区块链或其他底层技术没有深入的了解。

世界永远属于那些“没有强大的技术力量，但有强大的执行力”的人。我们不妨看看移动互联网。看看滴滴和优步等公司。他们不需要华为最优秀的工程师；他们只需要先创造产品，然后逐步优化——久病成医。

只有降低开发者的开发门槛，才能做好这些事情。物联网的发展门槛是最高的，这需要对协议的理解和所有的知识。Ruff Chain这几年做的就是为了这件事，降低门槛。过去几年我们没有遇到区块链技术。我们已成为该领域的行业先驱。我们对“区块链+物联网”的认识直到去年才升级。

除非对开发者足够友好和低敏感度，否则无法做成生态——任何只有一年工作经验的人都可以开发出一个“我自己的物联网生态”的应用。请记住：只有大牌才能做到，这绝不是生态。