



第九届中国国际“互联网+”
大学生创新创业大赛

I ILLINOIS



THE UNIVERSITY
of EDINBURGH



浙江大学
ZHEJIANG UNIVERSITY



ChatScratch

ChatScratch: LLM-Powered Visual Programming Education Software

ChatScratch: 大语言模型支持的图形化编程教育软件



Contestant: University of Illinois Urbana-Champaign

Recommender: Zhejiang University

本科生创意组 · 国际赛道

Industry Background : Domestic vs. Global Trends

行业背景：国内外发展对比和全球化趋势



Programming education has been incorporated into the curriculum and teaching settings of primary and secondary schools in over **24 countries**

全球范围内，越来越多的国家致力于普及少儿编程教育



在校中小学
人数约 | **5070**万 少儿编程用户
规模约 | **2270**万

数据来源：立鼎产业研究网



在校中小学
人数约 | **1.63**亿 少儿编程用户
规模约 | **350**万

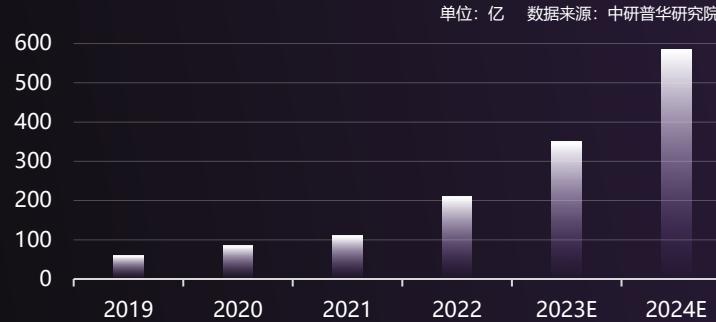
提高少儿编程普及率是 国家、社会的迫切需求

数据来源：多鲸教育

Industry Background : Trends in the Growth of Children's Programming Market and User Base

行业背景：少儿编程市场、用户规模发展趋势

the market size of children's programming



In 2024, the estimated market size for children's programming is projected to reach **58.567 billion** with a trend of **year-on-year growth**.

the number of children learning programming



In 2024, the projected user base for children's programming is approximately **9.7612 million**, undergoing a continuous expansion in scale.

With the support of policies for children's programming and the attention of parents to quality-oriented education, the market size and user scale of the industry are expected to further grow in the future, with great market potential.

少儿编程行业市场规模和用户规模在未来有望进一步增长，具有极大市场潜力。



Visual Programming : An Introductory Coding Solution Tailored for Children

图形化编程：适合儿童入门的编程解决方案

Intuitive Interface

界面直观，简单易学



In comparison to traditional coding, beginners in graphical programming can design projects without learning the syntax.

Simple Process

流程简单，操作具象



确定项目创意



添加角色和背景



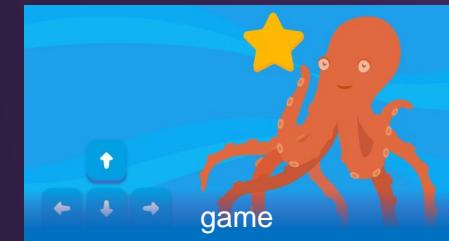
运行调试



组装积木代码

Abundant Themes

题材丰富，生动有趣



Using code blocks to concretize abstract problems, children can create their own projects through simple process, fostering children's computational thinking.

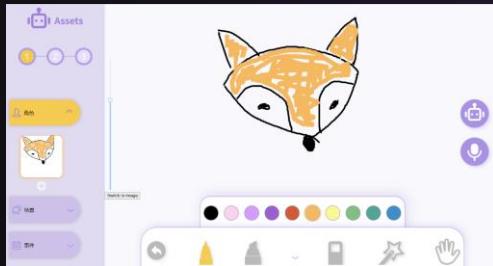
Through themes such as animation and games, which are all entertaining and engaging, children can fully unleash their creativity while coding.

Main Problems

现实痛点

Difficulty in Translating Creativity

儿童创意转化困难

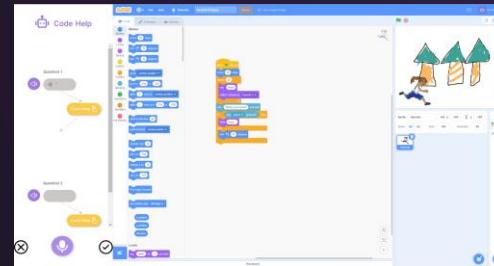


Children often struggle to conceive fully developed ideas and subsequently translate them into programming projects independently and attentively.

儿童通常缺乏**足够完整的创意和将创意转化为编程项目的能力**。

Difficulty in Coding

儿童编写代码困难



Creating a personal project requires high level of proficiency in coding. The official tutorials are tailored to specific projects, which may not match the specific need of children.

官方教程较为固定，**不能支撑初学者完成自己的个性化项目**。

Insufficiencies in Curriculum System and Teaching Staff

课程体系和师资存在不足



The domestic curriculum system is in the early stage, which mainly refers to the standards in America, and there are not enough professionally qualified teachers.

少儿编程课程体系尚在**初期发展阶段**，具有专业资质的教师**数量较少**。

Market Research : Analysis of Domestic and International Products

市场调研：国内外产品分析

There is a lack of programming tools that can assist children in accomplishing independent transformations from a creative idea to concrete projects and comprehending and organizing code blocks effectively.

纵观国内外市场，市面上没有能够辅助儿童完成**自主的**创意转化和理解并组织代码模块的编程工具。

Name	Zone	Feature	Deficiency	Common Drawbacks
Scratch	国外	Multi-platform operation, community resources	Lack of guidance, lack of innovative supporting elements	<ul style="list-style-type: none"> • Neglecting of Children's Creativeness 忽视儿童创意开发
Kitten 源码编辑器	国内	cloud storage, plug-ins and extensions	curt tutorial, lack of freedom	<ul style="list-style-type: none"> • Absence of Child-Friendly Guidance 缺乏良好指导
mBlock 5	国内	Python-controlled items, Sample programs	Lengthy documentation, an overly flat learning curve. Prerequisite Knowledge Required	<ul style="list-style-type: none"> • Limited Freedom 自由度低
幻码云课堂	国内	Supports for a wide range of programming languages, rich course resources with progress tracking	Absence of a graphical programming platform, Unvaried curriculum-based teaching	

Project History

项目历程

April, 2022

奇思妙码
团队成立



June, 2022

AI助力儿童编程的
构想正式启动



November, 2022

ChatScratch1.0
产品研发完成



ChatScratch

March, 2023

陆续和AC源编程、
幻码星球达成合作



AC源编程



幻码星球®
Huanma.zone

April, 2023

ChatScratch 2.0
多个生成式AI大模
型加持



July, 2023

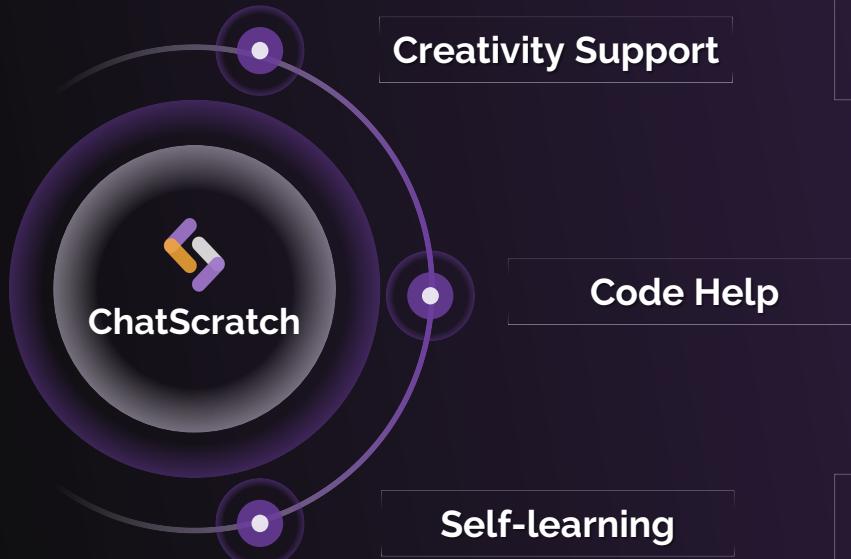
专利和软著
申请提交





Solution

解决方案



Interactive Graphical Programming Software

- Pioneering creative support for graphical programming software
- AI assisted children to build code blocks
- Situational creative assistance

创意开发 · 情景交流 · 创意评估

Personalized-assisted Programming

- Code block location prompts
- Program implementation program guidance
- Even young children can easily use it

位置提示 · 完整方案 · 智能指导

Friendly Problem-solving Tool

- UI perfect barrier-free user experience
- Multi-process and multi-angle code help

创意编程 · 多重辅助 · 个性生成

Advantages : Unleash Children's Boundless Creativity

方案优势：充分发挥儿童创意



故事创作

Communicating with the AI assistant, children can **guide the story** through interaction. In the case that simple response cannot provide satisfactory help, children are supported to **continue interaction** with initiative and **not limited** by the tools.

主导创意 · 自由主动 · 不受局限



绘图美化

With just a few strokes as **the sketch** and a simple **description**, exquisite cartoon pictures can be generated, and chosen **according to children's preferences**. This tremendously increases the lower bound of creative expression.

图文锚定 · 随意挑选 · 提高下限



创新体验

Generated by independent ideas, the code blocks can be **arbitrarily modified and combined**, forming brand-new ideas and stimulating children's unlimited creativity from **infinite possibility**.

任意修改 · 创意整合 · 无限可能

Advantages : Child-oriented Self-study Paradigm

方案优势：面向儿童自主学习设计



Barrier-free Use

无障碍使用

- Intuitive GUI — Great ease of use and enhanced access to information
- Informative images — Direct presentation of code blocks and associative idea stimulation
- Voice communication — Literacy requirement avoidance and better affinity with children



Positive Learning

正反馈学习

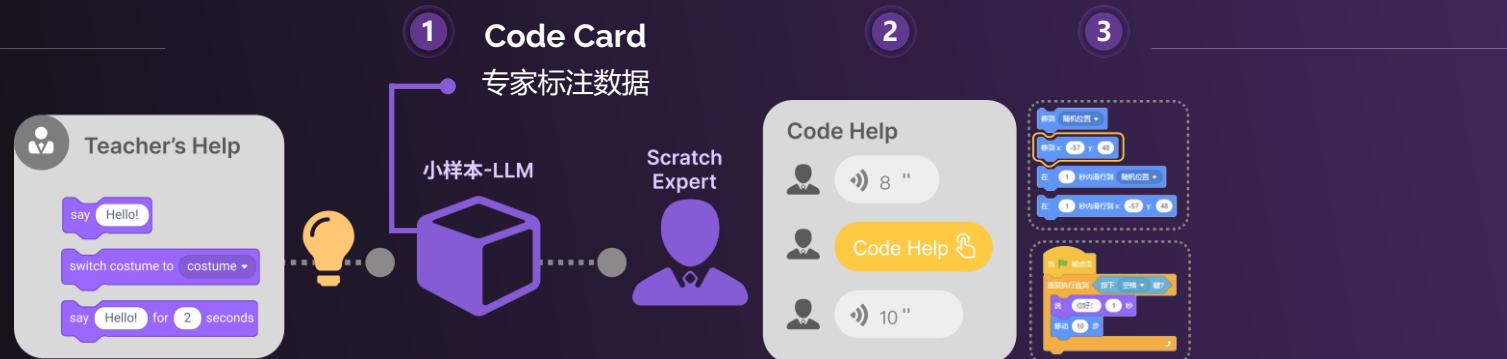
- Multi-modal answers — Response to all queries with AI assistance
- Affirmative feedback — Stimulation to children about finding out and solving problems
- Motivational support — Children's energetic learning helper

The child-friendly design enhances children's confidence and makes them have a pleasant learning experience, which makes it easy for every child to participate in programming.

对儿童友好的设计降低了学习难度，让每个儿童都能轻松参与编程。

Innovation : Virtual Identity as Programming Teachers Using LLMs

创新点一：基于大语言模型的虚拟教师代码教学



1 结构性小样本特化训练

Finetune the GPT-3.5 model by small structured samples serving as the scratch expert.

2 语音指引与高亮积木块

Locate code blocks on voice input with highlight, and provide voice prompts also.

3 解决方案自动生成

Automatically generate basic solutions based on vocal demand that allow experimentation.

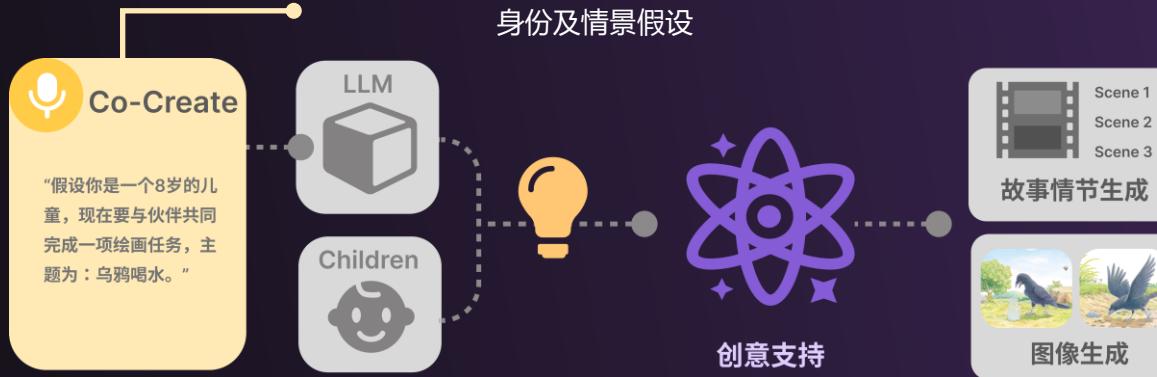
Help children find specific code blocks and generate solutions automatically with **expertised knowledge**.

Innovation : Virtual Identity as Companions Using LLMs

创新点二：基于大语言模型的模拟同伴绘画陪伴

Identity & Scenario Assumption

身份及情景假设



① 接近儿童思维方式

Adopt thinking patterns akin to those of children, our AI enables a sense of familiarity, promoting a close connection and co-creation.

② 专注平等交流的故事构建

Operate without judgment or constraints, ensuring a level communication during the creative process.

③ 基于合作共创的创作尝试

Deliver genuine teamwork and communication experiences for children with AI companionship and collaboration.

Assist children in enhancing their storytelling and drawing, in a playful and child-like styles.

Innovation : Enjoyable Drawing Assistance Enhanced by Generative AI

创新点三：基于生成式AI的趣味绘画辅助

会 设 定
不会作画

Based on **detailed ideas** and **imperfect sketches**, ChatScratch generates **featured pictures** for the children lacking drawing skills.

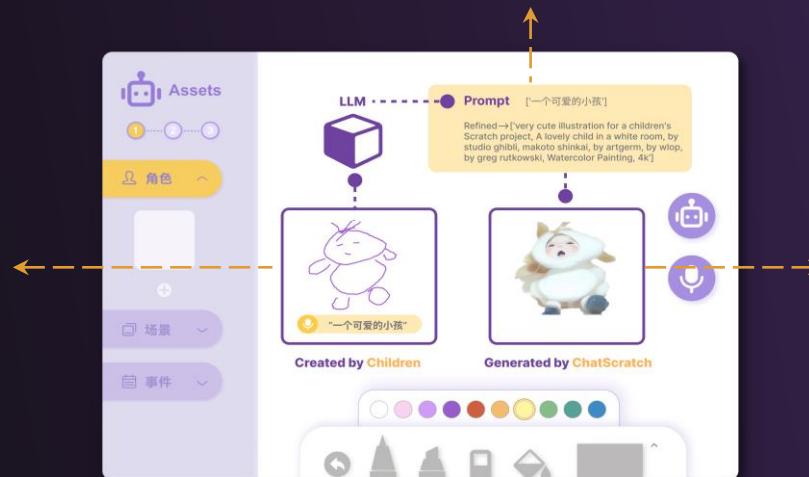
Step 2 大语言模型生成AI画图prompt

Through LLM, the semantics will be reshaped into a prompt used to generate graphic material.

Step 1

结合设定与草图的CLIP语义分割

Understand the semantics of the provided annotated sketch using CLIP.



Step 3

ControlNet画图助力儿童美术设计

Using ControlNet, graphic material with similar shape of the sketch can be generated.

Innovation : Story Co-creation Enhanced by Generative AI

创新点四：基于生成式AI的共创故事辅助

会 作 画
不会设定

Based on **featured sketches** and **rough settings** from children's oral information, ChatScratch generates full stories for the children lacking of story-refining skills.

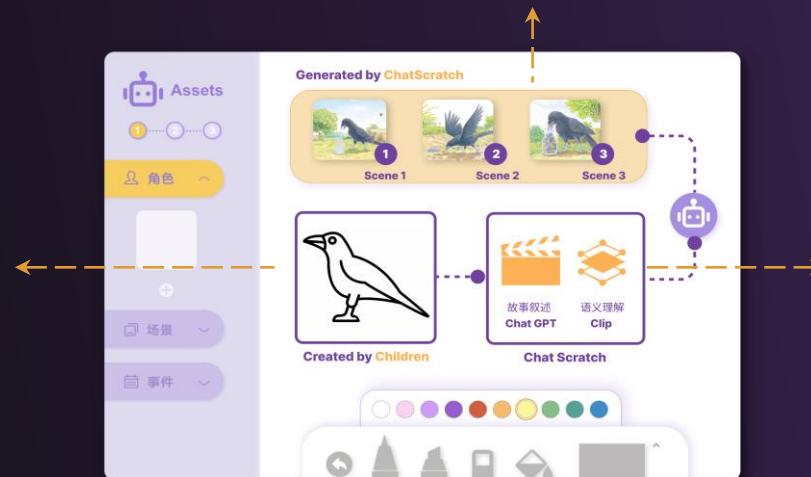
Step 3 Stable Diffusion画图扩充系列故事场景

With the help of Stable Diffusion, we can turn the stories into a series of well-drawn scenes.

Step 1

结合画像与粗设的CLIP语义分割

Understand the semantics of the provided drawing using CLIP, connected with imperfect description.



Step 2

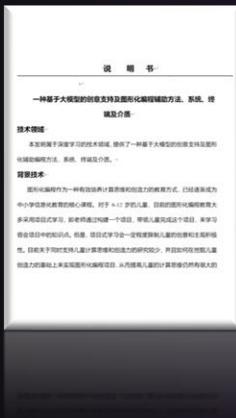
基于ChatGPT的完整故事生成

Perfect stories can be generated by ChatGPT under the given outline as children's wish.

Technological Barrier : Pertinent Research Achievements

技术壁垒：团队相关研究成果

Including but not limited to **one pending patent directly related to the project**, **5 research papers** and a **Youth project under National Natural Science Foundation of China**, our team possesses extensive research supporting the ChatScratch development.



Analysis for Competitive Products

竞品分析

	Online Platform	Online Course	Offline Course	School	ChatScratch
Expense per year (CNY)	698	1k	15k-25k	Free	499 Cost-effective
Learning Effect	Worse Lack of communication	Good Lack of supervision	Better Inefficiency of "many-to-one" class	Bad Inefficiency of "many-to-one" class	Best
Accessibility	Anytime and Anywhere	Specific time but Anywhere	Specific time and developed areas	Specific time and developed areas	Anytime and Anywhere
Personalized Assistance	Absent	Limited	Limited	Limited	Highly Support

Business Mode : A Transition from B2B to B2C

商业模式：从B2B到B2C

Revenue Model: Institutional Distribution and Individual Direct Sales



Reduce operational costs
Expand user base
合理降低运营成本 快速扩大用户群体

We will offer **pilot cooperation** agreements to education institutions, providing low-cost while high-quality software services with **adjustable pricing** according to the size of their users.

Form business partnerships
Engage with individual users
接轨正式商业合作 开始对接个人用户

We will also directly connect with individual users, and attract them by means of **limited-period free trial**, gift for completion of learning tasks and **regular membership**.



Adjustable Pricing with cyclical increment
多元调整定价 周期溢价增值

Considerations:

- Service Life
- Function Demand
- Extra Service
- User scale
-

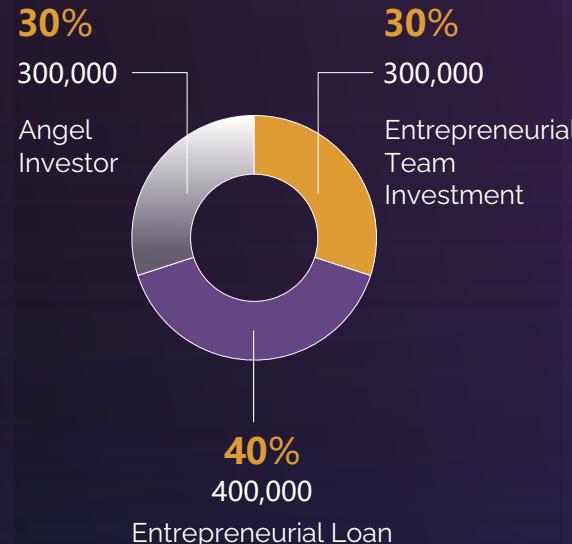
Capital Structure : Investment and Equity Analysis

资金结构：投资与股权分析

Diversified Financing to Minimize Risks

多元化融资 最小化风险

- Our project has received support from government entrepreneurship assistance policies, which not only helps us expand the project's influence but also provides more opportunities and platforms.
- We have garnered favor from partners who provide professional educational resources and technical support while also contributing to the project's initial funding and angel investors who offer ample funds for project operations.



Reserving Equity to Ensure a Stable Growth

预留部分股权 保证稳定发展

- To preempt any potential funding shortages, we have chosen to allocate the aforementioned funds as initial project equity, reserving a 10% ownership stake. This strategic move is intended to facilitate the inclusion of new partners or project investors when necessary, ensuring the capability to introduce additional investment to meet financial demands.
- By adopting this approach, not only can we ensure the seamless operation of the project but also provide ample opportunities for expansion and growth.

Promising Prospects : Analysis of Investment and Revenue

财务预测：收入与利润分析

NPV ￥61,870,000

IRR 509%

· 收益可观

· 现金流充足，投资风险小



NPV stands for Net Present Value, and a higher value indicates more substantial return.

IRR represents Internal Rate of Return.

Business Collaboration : Huanma Zone- An Industry-Research Collaboration Platform

企业合作：幻码星球——产研共建发展平台

www.huanma.zone

Field Research in the Enterprise

企业中田野调查

Building upon specific market guidance and on-site product research, the company will seek collaboration models that are better suited for the development of children's programming in the new era. With scientific research, talent, and achievements as driving forces, we aim to provide products and services to training institutions.



Innovative Research and Development

创新研发

Leveraging the robust industry-academia-research platform and associated market resources provided by "幻码", the research team is expected to achieve technological development according to users' feedback and the interviews from the companies and eventually outline the next stages of research.

Business Collaboration : AC Source Programming - Deep Commercial Partnership

企业合作：AC源编程——深度商业合作

<http://101.43.142.51/home>

Implementation in Class

Attracting More Prospective Users

全面应用于课堂 吸引更多潜在用户

ChatScratch is implemented in class to offer children relevant provision and refinement, thereby elevating learning efficiency.



We also cater to the distinct learning needs of various students, promoting customer satisfaction and attracting a larger pool of potential clients.

Development for Special Needs,

Enhancing Competitiveness

个性化需求开发 使服务更有竞争力

We provide real-time customer service for teachers to enable the development of specialized versions based on their requirements, thereby enhancing teaching efficiency.

We implement tiered instruction based on children's comprehension levels and teaching effectiveness to amplify learning motivation, making the company more unique and competitive in the market.

Individual Customers : ChatScratch for self-taught children

个人用户：与自学编程的儿童同行

A brand-new self-taught learning experience
Cultivating innovators for the new era

ChatScratch aid children by refining their drawing and guiding their programming in different virtual personalities.



广东深圳的宋同学 6岁 小学一年级

宋同学的母亲：

“他想用山和水来编程，但画得非常简单，但我平时工作繁忙，没有时间帮助他实现这些，但ChatScratch总能以同龄人或者哥哥姐姐的身份出现，理解他的意思，给出一些很棒的图和故事。”



浙江杭州的刘同学 10岁 小学三年级

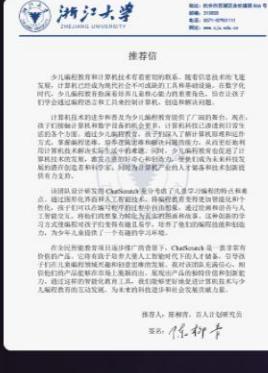
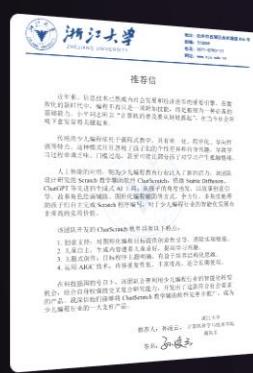
刘同学的父亲：

“在他想故事的时候，我会陪他一起画图和想象……但在找不到他要的编程块的时候，我这个门外汉就无能为力了，'ChatScratch'会以老师的身份来帮助他，给出各种想要的编程块。”

Industry Recognition

业内认可

专家推荐



企业认可



A Fellow of the Royal Academy of Engineering, two Professors in the realm of Intelligent Design and Artificial Intelligence :

"ChatScratch holds significant practical value for the intelligent development of the children's programming industry"

一位英国皇家工程院院士、两位教授、一位博士生导师推荐

"Huanma Zone" and "AC Source Programming" states:
 "We believe that this Team will bring excellent products and services to more educational institutions, bringing innovative changes to the field of children's graphical programming."

两大少儿编程机构推荐



Core Team

核心团队

Our team is comprised of exceptional students from UIUC and UoE, bringing together innovative talents from various disciplinary backgrounds.

奇思妙码团队由来自**UIUC**和**UoE**的优秀学子创立组成，包含**不同学科方向**的创新人才



Consultant Team

顾问团队

**Prof Peter Childs****创意引领**

- Professor at large for the Innovation Design Engineering double masters degree in Imperial College London
- Fellow of the Royal Academy of Engineering
- Contribute to 200+ papers, multiple books, and contracts exceeding £80 million

**Prof Lingyun Sun****人工智能**

- Recipient of the highest award -**Super AI leader** at the 2021 World Artificial Intelligence Conference
- Dean of International Design Research Institute of Zhejiang University
- Director of Zhejiang University-Alibaba Intelligence, Design, Experience and Aesthetic Lab

**Prof Kejun Zhang****智能设计**

- Develop innovative design service platforms in multiple areas and contribute to the construction of virtual design platforms for lunar exploration (China Academy of Space Technology)
- Director of Industrial Design Department, College of Computer Science and Technology, Zhejiang University
- Guide students to win many prestigious domestic and international design awards, including the Red Dot Award and IF Award.

**Dr Liuqing Chen****人机交互**

- Member of Executive Committee of Human-Computer Interaction Committee of China Computer Federation
- Member of Executive Committee of China-Britain Artificial Intelligence Association
- Collaborate with Alibaba on various intelligent and design projects



Comprehensively Expand Employment

就业带动：全方位拓展就业空间

For increasing every 1,000 ChatScratch users:

- Directly promote employment of 50 people
- Indirectly promote employment of 200 people

产品研发维护
70人

产品运营
50人

市场营销
30人

财务管理
20人

—Provide a wide range of job requirements and promote the structuralization of the product industry

- Promoting diversified employment
 - Based on chatscratch, further promote the popularization of children's programming education, grasp the booming trend of industry development, create diversified positions, and promote the development of science and technology.

educationalist

technical developer

educational planners

.....



Educational Dimension : Comprehensive Talent Cultivation

教育维度：综合育才

**Guiding minds, nurturing talents,
and shaping characters**

思想引领，育人育才



我们团队以“少年强则国强”的精神为依归，深耕少儿编程教育。

**Integration of Industry,
Research, and Education"**

产研学结合



我们团队积极参与行业内学术讨论与创新创业比赛，深入产业界和学术界发展动态。

**Colleges' extensive support for
academic and personal growth**

院校支持



我们团队在学校的大力支持下进行创新创业，充分利用校内的科研资源进行软件的开发与完善。

Educational Dimension : Integration of Profession and Entrepreneurship

教育维度：专创融合

Learning for practical application

学以致用



我们团队将所学专业知识与实际儿童编程行业结合，在调研中更好的了解市场动向，助力软件开发。

Integration of multiple majors

学科交叉



我们团队成员来自计算机工程，电子工程，生物信息等专业，遇到困难运用各自的专业知识协同解决。

Mass entrepreneurship and innovation

能力提升与双创引领



团队成员参加互联网+大赛的同时，带动更多同学参与到创新创业中，为学弟学妹树立了良好榜样。



Future Plan : Incremental Development

未来规划：渐进式发展

Beginning 2023-2025



Gain insights into demands
and preferences of customers

生成用户画像

Establish an integrated
portal website

建立综合门户网站

Use digitized marketing with
community-driven engagement

数字化营销 社区化吸引

Interim 2025-2030



Provide tailored customization with
real-time improvement suggestions

量身定制 实时反馈

Build collaborative coding space
with team projects

共享编码空间 团队挑战项目

Enhancing versatility through
mobile app development

提高泛用性 移动端开发

Long-term 2030-2040



Promote international localization
through regional collaborations

国际本土化 地区性合作

Seek seamless integration into
instructional curricula

深度嵌入教学课程

Facilitate group activities and foster a
culture of sharing and exchange

组织集体活动 鼓励分享交流



第九届中国国际“互联网+”
大学生创新创业大赛

I ILLINOIS THE UNIVERSITY
of EDINBURGH

浙江大学
ZHEJIANG UNIVERSITY



ChatScratch

Fun with code, no limits in sight, with ChatScratch on show,
sparks of brilliance ignite!

LLM-Powered Visual Programming Education Software