

Status of User Interest in Open Source Artificial Intelligence Software: An Explorative Case Study

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ABSTRACT

The Open Source Software (OSS) development model represents a collaborative model allowing development of software through shared knowledge and skills. OSS hosting platforms act as enablers of this collaborative development. The possibility of free access and participative development for customized reliable software has led to the increase in acceptance and migration to OSS alternatives in almost every area of application. In recent times, Artificial Intelligence has grown at very fast pace impacting the creation and application of software for individuals and industry. There is a considerable rise in OSS projects in the field of Artificial Intelligence being hosted on collaborative hosting platforms. This paper takes case study approach to explore the status and user interest in Open Source Artificial Intelligence software hosted on one of the pioneer collaborative hosting platforms.

Keywords

Open Source Software, OSS, Artificial Intelligence, AI, Open Source AI Software, Collaborative hosting platforms.

1. INTRODUCTION

The OpenSource Software (OSS) [1]movement initially depended upon collaboration among a community of volunteers who contributed to the development of a software based on either their individual need of a problem solution or for skill enhancement. The volunteers include project initiators or leaders; core developers who contribute the major part of the code;co-developers who may contribute in terms of feature addition, bug fixes, and modifications;active users who contribute in testing and feedback for improvement; and passive users who simply use the software without providing any feedback [2]. The projects vary from small sized individual-driven software to large sized community-driven collaborations. Developers and users collaborate on open source software development through various collaborative hosting platforms utilizing the 24x7 global availability of internet. Developers can choose to host and collaborate on OSS projects hosted on various hosting platforms [3-8]. In addition, the users can download and use freely available OSS projects from different categories of software hosted on these platforms. As a result, the collaborative hosting platforms provide facilities which enable the potential developers and users to collaborate in the participative feedback-based development process for creation of high-quality reliable software.

OSS model of development enables innovation in all possible areas of software applicability. OSS solutions are being developed as alternative for the expensive traditional closed software or propriety software in every area of application. Artificial Intelligence (AI) has grown at a much faster pace in

recent times and has impacted creation and application of software in industry as well as day to day life. There has been a considerable rise in the OSS projects in the field of Artificial Intelligence. This research work explores the various available categories of Open Source Artificial Intelligence software to study their current stage of development and user interest.

2. LITERATURE REVIEW

The Open Source Software (OSS) represents decentralized software development model based on voluntary contributions and knowledge sharing. The Open Source Definition by The *Open Source Initiative* provides the criteria for code access and distribution [1]. The OSS projects like Linux, Ubuntu, Apache, MySQL, Mozilla Firefox which became very successful led the migration of user base from similar traditional proprietary software to OSS alternatives. Some important areas are desktop software, mobile software, server software, development tools, cloud solutions, middleware, applications, operating Systems, networking software and security software [3-8]. Researchers have tried to understand the factors which lead to the success of OSS projects [9]. Different studies have identified various factors like vitality, popularity, some time-invariant as well as time dependent characteristics to measure the success of OSS [10-12].

Artificial Intelligence (AI) has paved its way into human life and technological advances. It has significantly transformed the computing capabilities and has made an impact on various aspects of day to day life as well as on industries. AI is being used in education, transportation, medical science, finance, and communication [13]. Over the years, the focus of AI has shifted from initial role of Robots in manufacturing and hazardous work environment to present day data-driven decision making [14]. There are open source AI frameworks to build deep learning models, deploy machine learning models and perform predictive data analysis leading to recognition of open source collaboration being the future of AI [15]. As there has been a growth in number of Open Source AI Software on various collaborative hosting platforms, it becomes significant to study the status of these projects.

3. METHODOLOGY

3.1 Aim of the Study

The aim of the study is to explore the status of user interest in various categories of Open Source AI Software available on collaborative hosting platforms.

3.2 Research Design

3.2.1 Approach

Case Study approach is followed for an explorative study of Open Source AI software available on a collaborative OSS hosting platform.

3.2.2 Selection of OSS hosting platform as Case study

SourceForge.net [3] has been chosen for case study. The decision for using Sourceforge.net is based on criteria that it is one of the pioneer OSS hosting platforms which hosted some of the most successful foundational OSS projects. It offers user friendly interface and provides statistics of hosted OSS projects in a manner which allows ease of access as well as informed selection of OSS projects by individuals and volunteer communities.

3.2.3 Formulation of Data Set

The interface provided by SourceForge.net allows filter-based search and listing of projects. The filters are: operating system, category, license, translation, programming language and development status. Further, SourceForge.net interface allows sorting of projects by four types of factors: most popular, date of last update, project name and rating. The user interest is represented by the number of downloads. Sourceforge.net keeps a count of weekly downloads of each project hosted on it. The dataset of OSS projects under study is formulated based on following criteria:

- **Category** - The projects listed under the category of Open Source Artificial Intelligence software have been taken into consideration for detailed study.
- **Popularity** - Project Popularity is a significant criterion for selection and adoption of OSS by potential users. Therefore, the factor “Most popular” has been opted as the sorting criteria.

3.2.4 Data Collection

The hosting platform taken as case study provides counts of projects hosted in each category on its website interface which have been ported to spreadsheet package for analysis. Due to dynamic nature of the collaborative hosting platform, the data for all parameters under consideration for the study has been collected within a short frame of time.

4. DATA ANALYSIS AND DISCUSSION

4.1 Analysis

The analysis has been carried out on following parameters of Open Source Artificial Intelligence software:

- **Category Count** - To analyze the various categories of Open Source AI software available on the hosting platform
- **Status** - To analyze the stage of development of the OSS
- **Programming Language** - To analyze the most preferred programming language for Open Source AI software
- **Downloads** - To analyze the prolific projects based on their download counts
- **Date of Last Update** - To analyze the development status of the hosted project

4.1.1 Category-wise distribution

On Sourceforge.net, the projects hosted under Open Source Software are divided into a total of 22 broad categories. On the day of exploration of the hosting platform, a total of 5930 open source software under the category of Open Source Artificial intelligence software were hosted which are further divided into 34 subcategories. The count of software projects hosted under each sub-category of Open Source AI software are as listed in Table 1. The maximum number of Open source AI Software hosted are in the category of

Machine Learning (1124 projects), followed by Agentic AI Tools (719), Natural Language Processing (NLP) Tools (346), Chatbot Software (307) and Deep Learning Frameworks (232).

Table 1. Category-wise Distribution of Open Source AI Software

S.No.	Open Source AI Software	Count
1	Agentic AI Tools	719
2	AI Assistants	46
3	AI Coding Tools	53
4	AI Image Generators	58
5	AI Models	29
6	AI Music Generators	9
7	AI Text Generators	48
8	AI Video Generators	15
9	Autonomous Driving Software	14
10	Chatbot Software	307
11	ChatGPT Apps	59
12	Computer Vision Libraries	222
13	Data Labeling Tools	17
14	Deep Learning Frameworks	232
15	Facial Recognition Software	75
16	Generative Adversarial Networks (GAN)	33
17	Generative AI	198
18	Image Recognition Software	51
19	Large Language Models (LLM)	157
20	Machine Learning Software	1124
21	Natural Language Processing (NLP) Tools	346
22	Neural Search Software	19
23	Object Detection Models	64
24	OCR Software	214
25	Reinforcement Learning Frameworks	131
26	Sentiment Analysis Software	23
27	Speech Recognition Software	163
28	Speech to Text Software	41
29	Text Annotation Tools	23
30	Text to Speech Software	163
31	Transformer Models	5
32	Vector Search Engines	19
33	Voice Assistants	21
34	Voice Cloning Software	13

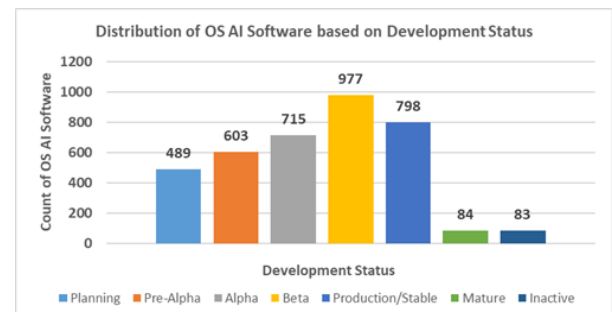


Fig 1: Distribution of Open Source AI Software based on Development Status

Table 2. Distribution of development status of software under major subcategories of Open Source AI software

Sub-category	Planning	Pre-Alpha	Alpha	Beta	Production/ Stable	Mature	Inactive
Machine Learning Software	39	45	67	113	111	15	10
Agentic AI Tools	75	95	121	136	89	10	9
OCR Software	10	22	16	32	41	8	--
Natural Language Processing (NLP) Tools	13	19	27	35	38	4	--
Computer Vision Libraries	12	19	16	33	32	2	2
Text to Speech Software	5	9	20	31	29	2	1
Chatbot Software	9	16	17	31	28	5	4
Speech Recognition Software	9	18	18	27	17	--	1
AI Assistants	3	2	1	4	9	--	--
Deep Learning Frameworks	--	1	--	4	8	--	--
Speech to Text Software	--	1	2	4	8	--	--
Image Recognition Software	--	--	2	1	6	--	--
Object Detection Models	--	1	1	4	5	--	--
Facial Recognition Software	3	4	5	7	4	2	2
ChatGPT Apps	--	--	--	3	3	--	--
Generative AI	--	1	--	4	3	--	--
AI Coding Tools	--	--	1	1	2	--	--
AI Text Generators	--	1	1	--	2	--	--
Data Labeling Tools	--	--	--	1	2	--	--
Reinforcement Learning Frameworks	5	2	5	5	2	--	--
Text Annotation Tools	1	--	2	5	2	--	1
AI Image Generators	--	--	--	1	1	--	--
Large Language Models (LLM)	--	--	1	1	1	--	--
Sentiment Analysis Software	--	1	--	2	1	--	--
Voice Assistants	--	--	--	2	1	--	--
Autonomous Driving Software	--	3	--	1	--	--	--

4.1.2 Development Status

SourceForge.net allows projects to be marked in 7 types of development status depending upon the stage of development the project is in. The stages of development are: Planning, Pre-Alpha, Alpha, Beta, Production/Stable, Mature and Inactive [16]. Fig. 1 presents the count of Open Source AI Software in different stages of development. It is observed that maximum number of the projects are in Beta Stage and only 798 of the hosted Open Source AI software have reached the Production/Stable stage.

Table 2 presents the distribution of development status of software under subcategories of Open Source AI software. It is observed that Machine Learning Software, Agentic AI Tools, OCR software, NLP Tools, Computer Vision Libraries, Text-to-Speech software, Chatbot software and Speech Recognition software are the topsub-categories where development of software has progressed to Production/Stable state. This implies that developers have contributed more to the projects or tools which fall under these categories. Although Deep Learning and Generative AI are the latest AI research areas, yet a very small number of projects in these

categories are in any active stage of development. Fig 2 shows the most prolific categories of Open Source AI Software based on Production/Stable development status.

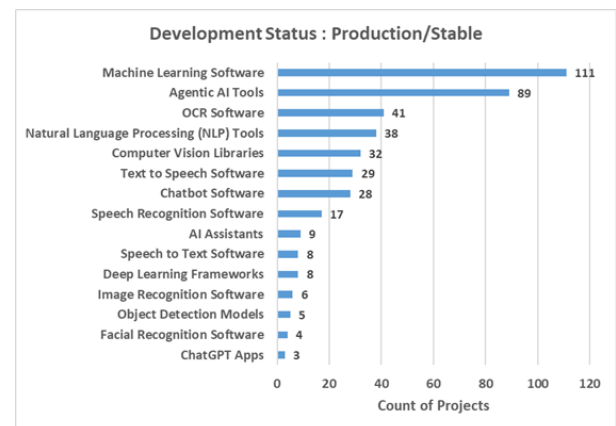


Fig 2: Most Prolific categories of Open Source AI Software in Production/Stable state

4.1.3 Programming Language distribution

It is observed from Table 3 that Java, C++, C, PHP and Python are the most preferred programming languages used in general for most of the OSS projects.

Table 3. Count of OSS using a specific Programming Language

S.No.	Programming Language	Overall OSS Count	OS AI Software Count
1	Java	43717	1513
2	C++	36166	1194
3	C	27201	493
4	PHP	23627	135
5	Python	16585	1458
6	C#	14288	281
7	JavaScript	13259	218
8	Perl	8252	116
9	Unix Shell	4416	46
10	Delphi/Kylix	3381	31
11	Visual Basic .NET	3032	30
12	Visual Basic	2805	34
13	Assembly	2206	42
14	Ruby	1773	45
15	Go	1612	60
16	Objective C	1556	28
17	TypeScript	1504	140
18	PL/SQL	1381	7
19	JSP	1362	12
20	Tcl	1211	20

4.1.4 User Interest

User interest in any OSS project is depicted by count of downloads of the respective software project and developer’s interest is observed from the date of last update. The developers of OSS projects are also part of the user base. The hosting platform used as case study allows sorting of OSS projects hosted on it by 4 factors: most popular, date of last update, project name and rating. Popularity is a significant measure of user interest. Therefore, the projects were sorted by popularity factor and data pertaining to number of weekly downloads and date of last update was summarized. Table 4 presents the position of overall top 5 most popular Open Source AI software and Table 5 presents the user interest parameters of topmost popular OSS in respective subcategory of AI software. It is pertinent to note that the position is as listed on the collaborative hosting platform at the time of exploration for this study. The collaborative hosting platforms are dynamic in nature as the counts keep changing owing to corresponding change in parameters.

Table 4. Overall Top 5 of the Most Popular Open Source AI Software*

S.No.	Open Source AI Software	Weekly Downloads	Date of last update
1	Weka (Machine Learning Software)	16469	2023-09-25
2	Tesseract OCR (Open source OCR Engine)	2044	2025-03-07
3	OpenCV (Computer Vision Library)	7781	2025-01-09
4	AnyTXT Searcher (Search engine)	5046	2025-03-03
5	eSpeak: speech synthesis (Text-to speech engine)	3516	2021-11-17

* As on the day of exploring the hosting platform

Table 5. User interest parameters of the Most Popular project in subcategories of Open Source AI Software

Sub category of Open Source AI Software	Weekly Downloads of Most popular Project in the sub category*	Date of last update
Agentic AI Tools	977	2018-05-16
AI Assistants	282	2023-03-21
AI Coding Tools	16	2024-07-23
AI Image Generators	12	2023-03-22
AI Models	88	*
AI Music Generators	4	2023-09-06
AI Text Generators	3	2024-11-27
AI Video Generators	15	2023-08-22
Autonomous Driving Software	17	2024-06-11
Chatbot Software	61	2025-03-04
ChatGPT Apps	39	2023-08-03
Computer Vision Libraries	7803	2025-01-09
Data Labeling Tools	17	2025-02-13
Deep Learning Frameworks	360	2023-09-07
Facial Recognition Software	76	2024-08-12
Generative Adversarial Networks	10	2022-08-19
Generative AI	80	*
Image Recognition Software	2036	2025-03-07
Large Language Models (LLM)	316	2 days before *
Machine Learning Software	16469	2023-09-25
Natural Language Processing Tools	2809	2013-04-25
Neural Search Software	14	2 days before *
Object Detection Models	143	2022-08-01
OCR Software	2044	2025-03-07
Reinforcement Learning Frameworks	35	2023-09-07
Sentiment Analysis Software	5	2021-05-20
Speech Recognition Software	1082	2024-01-11
Text Annotation Tools	17	2025-02-13
Text to Speech Software	3481	2021-11-17
Transformer Models	3	2024-10-22
Vector Search Engines	14	2 days before *
Voice Assistants	82	2023-03-21
Voice Cloning Software	27	2024-06-27

* As on the day of exploring the hosting platform

4.2 Discussion

The Artificial Intelligence and its related tools are the current area of research. Over the years, there has been a rapid increase in evolution of AI. The present study has been conducted to specifically explore the user interest in Open Source Artificial intelligence software. The term ‘user’ includes core developers, other contributors and users of the OSS projects. As collaborative hosting platforms are dynamic in nature i.e. the count of software projects hosted on them may change during a small time-period. In the Open Source Software, 22 broad categories (approx 2,00,000 projects) were listed on the hosting platform taken as case study out of which Open Source Artificial Intelligence software category was

chosen for detailed analysis considering the recent rise in this field of application. It is observed that on the day of exploration though there were 5930 Open Source AI software hosted on the platform, yet only a limited number has reached stable state of development. Fig. 1 depicts that very few projects have reached maturity and a significant number is in the Beta phase. This implies that research and development in Open Source AI software is evolving although the underlying development model of Open source software relies on volunteer contributions towards collaborative development. From Table 2 it is observed that Machine learning Software, Agentic AI Tools, OCR Software, NLP tools, computer Vision libraries, Text to speech Software, Chatbot software and Speech Recognition software are the sub categories having trend of reaching stable state implying the increasing user interest in these areas. In remaining categories, very small number of projects have progressed in terms of development stage. Similar trend is seen in the most popular Open Source AI software as observed from Table 4 and Table 5. The most popular project belongs to the category of Machine Learning having highest number of weekly downloads. Thus, the Open source AI Software belonging to Open Source Machine Learning Software have garnered the highest user interest. Java and Python are the most used programming languages in the development of Open source AI software.

5. CONCLUSION

Artificial intelligence is evolving at a very fast pace. Correspondingly, there is a rise in associated software being developed for individual and industrial use. Even though the OSS model of development depends upon volunteer contributions, OSS projects are being developed in various categories under Artificial Intelligence. Most of the OSS hosted under the category of Open Source AI are still under development progress. The present study has provided useful insights into the type of Open Source AI software that are in demand by highlighting the specific categories where development progress is more thus identifying research trends based on user interests in open source development. The study identified the categories of Open Source AI software which have garnered the highest user interest. Open source Machine Learning software has been identified as the most prolific category where development is the highest depicting that the user interest is the highest in this category of AI. As a result, it is deduced that this is prospective area of research and development under AI having scope of further development in near future. The explorative study has been conducted on a single collaborative hosting platform. As the OSS projects evolve incrementally due to changing requirements based on feedback at different stages of development, a detailed study across multiple collaborative hosting platforms will provide further insights into the success of different categories of Open Source AI software based on user interest.

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